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PEER REVIEWED PAPERS

Lean Leadership and Lean Management

1. "**Engaging Faculty in Lean Teaching**," *International Journal of Lean Six Sigma*, Vol. 6, Issue 1, 2015 http://www.emeraldinsight.com/doi/full/10.1108/IJLSS-06-2014-0015
2. "**Music as a Framework to Better Understand Lean Leadership**," *Leadership and Organizational Development Journal*, Vol. 34, Issue 5, 2013, pp. 407-426.
3. "**Frank George Woollard: Forgotten Pioneer of Flow Production**," with P.J. Seymour, *Journal of Management History*, Volume 17, Issue 1, 2011, pp. 66-87.
4. "**Standardized Work for Executive Leadership**," *Leadership and Organizational Development Journal*, Vol. 29, No. 1, 2008, pp. 24-46.
5. "**Improving Management Education**," *Quality Assurance in Education*, Vol. 14, No. 4, 2006, pp. 363-384.
6. "**Origins of Lean Management in America: The Role of Connecticut Businesses**," *Journal of Management History*, Vol. 12, No. 2, 2006, pp. 167-184.
7. "**Leaders Lost in Transformation**," with D.J. Stec, *Leadership and Organizational Development Journal*, Vol. 26, No. 5, 2005, pp. 370-387.
8. "**Using Kaizen to Improve Graduate Business School Degree Programs**," *Quality Assurance in Education*, Vol. 13, No. 1, 2005, pp. 37-52. **Highly Commended Paper Award** from Emerald Publishing.
9. "**Using Value Stream Maps to Improve Leadership**," with D.J. Stec, *Leadership and Organizational Development Journal*, Vol. 25, No. 8, 2004, pp. 622-645.
10. "**Improving Business School Courses by Applying Lean Principles and Practices**," *Quality Assurance in Education*, Vol. 12, No. 4, 2004, pp. 175-187.
11. "**Is Management Education Beneficial to Society?**," *Management Decision*, Vol. 42, No. 3/4, 2004, pp. 481-498.
12. "**Linking Leaders' Beliefs to Their Behaviors and Competencies**," *Management Decision*, Vol. 41, No. 9, 2003, pp. 893-910.
13. "**A Mathematical Logic Approach to the Shareholder vs. Stakeholder Debate**," *Management Decision*, Vol. 39, No. 8, 2001, pp. 618-622.
14. "**Redefining the Focus of Investment Analysts**," *The TQM Journal*, Vol. 13, No. 1, 2001, pp. 34-50. **Citation of Excellence Award** from *Emerald Management Reviews*.
15. "**The False Promise of 'What Gets Measured Gets Managed'**," *Management Decision*, Vol. 38, No. 9, 2000, pp. 612-615.
16. "**The Oath of Management**," *Management Decision*, Vol. 38, No. 4, 2000, pp. 261-262.
17. "**Cracking the Code of Business**," *Management Decision*, Vol. 38, No. 2, 2000, pp. 60-79. **Highly Commended Paper Award** from Emerald Publishing.
18. "**Lean Behaviors**," *Management Decision*, Vol. 36, No. 9, 1998, pp. 615-631. **Outstanding Paper Award,** 1998 volume of *Management Decision*.
19. "**Continuous Personal Improvement**," *Journal of Workplace Learning*, Vol. 10, No. 1, 1998, pp. 29-38.

Continuous personal improvement

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Abstract

Many manufacturers are now critically evaluating every activity and process for its effectiveness in bringing maximum value to the customer. Intuitive factory management techniques of yesterday are being replaced by much simpler, often counter-intuitive, methods that greatly minimize delays, reduce costs, and improve quality. This body of knowledge and practice is broadly known as "world-class manufacturing" or "lean manufacturing", and encompasses well-defined continuous improvement tools such as *kaizen*, cellular manufacturing, pull systems, total productive maintenance, and visual factory. However, success with lean manufacturing can be limited unless it is recognized that the behaviour of employees must change concurrently with changes in business processes. The author describes the applicability of well-defined continuous improvement tools to the continuous improvement of one's self. The model serves as a foundation for those familiar with world-class manufacturing methods to focus on self-improvement efforts. Further, this model is useful as a mnemonic device to simplify the difficult task of personal development, as well as ensure consistency between business processes and group or individual behaviour.

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Introduction

In recent years, employees have become familiar with an array of concepts and strategies designed to improve the effectiveness of business processes (Bikhchandani *et al.*, 1992; Hammer and Champy, 1993; Moeller, 1996). Re-engineering both office and manufacturing shop floor processes has greatly improved the productivity and cost-competitiveness of a wide variety of products and services (Lee, 1996; Schonberger, 1986; Womach *et al.*, 1990; Womack and Jones, 1996). However, the factors that enable re-engineering concepts to achieve the gains necessary for global competitiveness can remain elusive. There are many examples of re-engineering efforts that have not been successful (Kotter, 1995; Pfeffer, 1996), often due to management's ignorance of individual and collective behaviour, as well as the complex psychological interactions between leaders and followers in times of change (Kets de Vries, 1989, 1993, 19894).

Successful businesses typically possess effective systems and procedures that serve all participants well, from order entry to after-market service. But that is not all that is required. Managers and leaders must be capable of performing the business and personal fundamentals well. The personal fundamentals involve both intra- and inter-personal skills, and their importance reflects the fact that one of a manager's principal products is successful interaction with people. These skills include leadership, consensus building, coaching, motivation, and rewards, to name a few. However, realization of these competencies requires the ability to reflect, achieve self-awareness, emotional stability, and consistency in words and actions. A few people may be born with all that it takes to lead effectively; but for most, it is the result of hard work and dedication, focused on modifying ineffective life-long habits, biases, and assumptions (Bennis, 1989; Cleary, 1989; Covey, 1989; Csikszentmihalyi, 1993).

It is apparent that as aggressive competition continues to create a greater variety of challenges there will be a tendency to value tougher managers that force business performance. However, this is the easiest possible solution that anyone can implement. More people must be willing to accept the far greater and more worthwhile challenge of becoming disciplined. The bar for acceptable

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behaviour and personal performance must be raised concurrently with the business goals. The future business environment will demand that everyone in an organization, especially managers, have more effective inter- and intra-personal skills including intellectual and emotional capability for leadership, persuasion, co-operation, empathy, consistency, sharing a vision, meeting commitments, and humility.

Managers must recognize that their relationships, parent's training, religious education, and formal education do not usually imbue them with these skills. These experiences may, in fact, work together in negative associative ways to become significant obstructions to personal development in later years. In addition, the motivation for personal development may be thwarted by directly observing the failure of key role models, fixation of mental models based on stereotypes, or the existence of dysfunctional work environments that offer few rewards for practising generative behaviours. Self-awareness, reflection, the ability to accept or deflect strong criticism, and perseverance thus become important competencies.

Senior managers typically have access to professional coaches to provide guidance on leadership and personal development. Workers would be fortunate if their supervisor or manager took a strong interest in their performance and coached them to greater effectiveness. But the pressures of day-to-day life often preclude consistent and meaningful coaching. So it is typically up to individuals to train themselves, provided that they see a personal or business need, have a desire to change, and are willing to make a commitment to life-long learning. A significant investment in personal time is required to understand, internalize, and practice the timeless principles that guide generative behaviours. Most people are simply unwilling to invest the time it takes either because the payback is not well-defined or the desired results can not be achieved within the expected time frame of a few weeks. Many people also do not know where to start or how to sustain themselves through frustrating periods. If they are successful at learning the concepts, some are simply unable to consistently practice what they preach. The work environment may also discourage the practising of generative behaviours.

The objective of this paper is to provide simple bridges between business process improvement tools that are now generally common in the workplace and personal development, with the goal of improving personal and organizational effectiveness. The model is presented as metaphors to aid in understanding and comprehension of the concepts. Table I shows the relationships between selected factory continuous improvement tools and personal development strategies. Note that they should not be interpreted as tools capable of analytically measuring human performance. Hence, readers are advised to avoid extension to unrealistic or unintended domains.

Continuous improvement

The term "continuous improvement" means incremental improvement of products, processes, or services over time, with the goal of reducing waste to improve workplace functionality, customer service, or product performance (Suzaki, 1987). Processes subjected to analysis by this concept characteristically reveal significant opportunities for reductions in process time or expense, and improvements in quality or customer satisfaction. Continuous improvement principles, as practised by the most devoted manufacturers, result in astonishing improvements in performance that competitors find nearly impossible to achieve.

In terms of personal development, "continuous improvement" requires us to question the basic notion that people can not change. This belief, popularized by clichés such as

Table I Business process-personal behaviour relationships

Factory process improvement tools	Personal improvement strategies
Continuous improvement	Life-long learning
One-piece flow	"Do it now" mindset
Standard work	Personal discipline, consistency, alignment
Kanban	Service-oriented mindset, helping others
Five S's	Organized workspace, thoughts and behaviour
Visual controls	Generative body language
Audio signals	Engaging and constructive encounters
Total productive maintenance	Mind-body harmony

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"you can't change people" is obviously false, given the overwhelming evidence to the contrary. Continuous personal improvement asks us to accept the challenge to modify our own behaviour, and recognize that self-development is a never-ending process. It is striving for perfection, but knowing that it can never be fully achieved. Mistakes will be made, but these will be viewed as positive sources for reflection, enhancing our self-awareness, and serve as indispensable elements for future development.

Manufacturing processes are not improved without first gaining a detailed understanding of what is done, who does it, why it is done, how it is done, and how long it takes to do. Similarly, we first have to understand ourselves before we can decide what to improve. This means that we must benchmark our behaviours and seek solutions to intra- and inter-personal conflict through feedback, self-reflection, and dialogue. Feedback may come without asking, but it is better to seek it from people that can provide you with useful objective data. It helps if the feedback-giver is someone who genuinely cares about people, and if the feedback is delivered pointedly but diplomatically. For feedback to be successful, we must be willing to listen, suspend responding (unless asked), and later reflect on what has been said.

Reflection means that we think about what we said and did, that we evaluate the outcome or other possible outcomes that may have been more desirable, in a positive light for a brief period of time. It differs from analysis, which is typically much more laboured or detailed and can take days, weeks, or months to arrive at an understanding. Successful reflection provides clear direction, uncovers useful lessons learned, and makes us feel happy and more content. Reflection can be greatly facilitated by reading books or articles that describe generative behaviours or alternative solutions to conflict (Covey, 1989; Csikszentmihalyi, 1993; Roberts, 1987). Meditation is also a highly effective means of constructively reflecting on circumstances or achieving mental states free of clutter (Cleary, 1995; Goleman, 1989).

Dialogue involves a substantive exploration of the possibilities with one or more person. It is distinct from discussion and debate, which is divisive, highlights differences, and results in winners and losers. This tends to be the dominant mode of conversation today. Dialogue requires suspension of personal views, such that active listening, thoughtful questioning, and learning takes place. All participants win when engaged in dialogue, because everyone contributes and learns. Problems or conditions are explored and resolved constructively when we identify areas of common ground and make use of the diversity found in people and their thought processes.

Success at continuous personal improvement also requires developing an understanding of and attentiveness to our own biases and assumptions, and that of others. It means having the discipline to catch ourselves just before we say or do the "wrong" thing. It means bringing subconscious thoughts, one by one, to the forefront of our mind and challenging their validity. It will help make the choice between living life as generally happy and content or cynical and unfulfilled. This skill develops gradually, over time, if worked on consistently, and is helpful in eliminating the human disposition towards negative thoughts and actions. It is a skill that requires great diligence, but is well worth the years of daily effort. Every situation and environment offers opportunities to practice continuous personal improvement, no matter how negative it may be.

One-piece flow

One-piece flow is a technique used to manufacture components in a cellular environment. The cell is an area where everything that is needed to process the part is within easy reach, and no part is allowed to go to the next operation until the previous operation has been completed. The goals of one-piece flow are to make one part at a time, correctly, all the time, and to achieve this without unplanned interruptions or lengthy queue times. Tasks are reduced to their simplest components so that there are fewer opportunities for machine or operator error. Done correctly, there is a continuous flow of activity between the shop operators and manufactured product. Savants of one-piece flow manufacturing continuously search for improvement opportunities to reduce waste by even fractions of a second or hundredths of a per cent. This is a generative manufacturing method created to continuously increase output, improve quality, and grow sales and profits, without the need for constantly

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enlarging production or support staff. One-piece flow is an extremely efficient way to manufacture goods, provided the correct physical structure and behavioural models have been set up to support its particular needs.

In terms of continuous personal development, one-piece flow means to perform each activity as it is presented; i.e. to "do it now". Complete each task as it comes, rather than letting it sit in queue waiting for disposition, which simply increases your personal work-in-process inventory. For example, open mail and respond to it when read, rather than let a week's worth pile up unanswered. Answer voice mail messages immediately after they are retrieved. Sign whatever is in the signature folder when it is received. Meet with people when they want to meet with you. After all, people would not be interacting with you if they did not need your participation or value your opinion. Respond to people when people need a response, not when you are ready to give it. In an organization, we exist partly to serve each other. Behaving with a service-oriented mindset means that we drop what we are doing and serve others, even if we would rather keep doing our own task, and even if there is no identifiable reward. If it is so important, then we should go somewhere else to get it done undisturbed.

If you are a supervisor or manager, you have a special responsibility. Your job is to serve others, particularly those that "work for you". Managers work for the people that comprise the organization that they are held accountable for. Do not keep people waiting, as they are probably trying to help "your" organization progress. So you should stop what you are doing and satisfy their needs first. If you recognize that things are piling up, do not ignore it; do something about it. Delegate upwards, downwards, sideways, outside the company, or do it yourself. As the saying goes, "do what you don't want to do, because that's probably what needs to be done".

Standard work

Standard work is a term used to systematize how a part is processed, and includes man-machine interactions and studies of human motion. Manufacturing engineers break down each operation into small pieces, making certain that each worker is given all the tools to make the part quickly and with the highest quality. The process is documented in writing, with photographs and video, and examples of defective products nearby. This is done to eliminate errors that waste time and money, and ensure reproducibility from operator-to-operator. Successful standardization of work processes helps assure high quality product, proud workers, satisfied customers, workplace safety, and strong factory cost performance. Reducing variation in the shop floor environment leads to remarkable productivity improvements.

One of the challenges of senior management is to ensure that everyone in the organization understands the challenges of the marketplace, accepts the performance metrics, and believes in the company's values, mission, and vision. This is especially important if the marketplace is undergoing great change, and the company's processes must be improved. However, supervisors and managers may not fully support senior management at first because they do not know how or are not willing to adapt their style to the needs of the people and of the business. So each manager will interpret strategies and goals differently, and tell a slightly different story to his or her people depending on the personal biases and assumptions formed over the years. Wide variation in management's message and leadership styles can have significant negative impact on shop and office productivity. Faults in the corporate culture may become magnified and exploited by those wanting to deny the current business realities and maintain the status quo.

Proactive senior management will communicate extensively to explain the issues, gain buy-in for the going-forward plan, and develop new multi-level training classes to teach the skills necessary to win in the marketplace. When this is done well, the variation in management and leadership practices is reduced to the point where they become standardized. What were previously faults in the corporate culture may become new pillars of strength from which to prosper. The consistency in words and actions can help transform an organization and lead to successful business process improvement activities.

Kanban

Kanban is a Japanese word that means "instruction card". It is a signal, such as an

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empty container returned to the start of the assembly line, that makes obvious the need for replenishment of materials to a user. Kanbans are used in "pull" manufacturing systems, where product is manufactured to the pull of market-driven demand. Successfully deployed kanbans deliver the right amount of material to the right place exactly when it is needed. The unpredictable and expensive batch-and-queue method of manufacturing, coupled with unreliable forecasting associated with traditional production models, is replaced with reliable, predictable, kanban systems. Thus, great speed can be achieved in manufacturing, and product is not manufactured when a need does not exist. There is little ambiguity.

For managers, a kanban or pull system means providing the workers with what they need when they need it – tools, software, capital equipment, access, feedback, or the opportunity to participate. It means that management is responsive to the needs of the people, and takes immediate and meaningful action. Governors that limit the speed of the corporate engine are removed to ensure the organization's response is tuned to customer requirements. Processes are well defined, but flexible, so that speed can be achieved in satisfying needs. There is little paralysis caused by uncertainty or having to refer to voluminous rules or procedures. Managers today often tell workers that speed is critical to success. So to be consistent, managers should meet workers' needs with great speed, as it is critical to credibility and success.

Consistency is a fruitful area for personal development, and requires constant feedback and close monitoring of one's own behaviour in different circumstances. Developing empathy for others is aided by strong listening, solid reality-checking skills, and willingness to accept constant (often negative) themes from workers. These will lead to more accurate views of the workplace, and issues contained within it, so that a positive impact can be made when addressing workers' needs for change.

The Five S's

The "Five S's" are a shorthand description of shop floor practices that means "sort, simplify, standardize, self-discipline, and sweep". Sort, simplify, and standardize relate to knowing what you need, eliminating unnecessary items from the workplace, and point-of-use storage and utilization of materials. Self-discipline and sweep describe work habits related to orderliness and cleanliness. Shop supervisors and managers typically require operators to maintain shop orderliness and cleanliness. However, their own offices, work habits, and problem solving mental models may be quite disorganized. So to be consistent, office areas must be held to the same standards as shop areas – neat and clean – and work habits should be well organized to improve service. The Five S's also support the "do it now" mindset that is critical to achieving speed.

Visual controls and audio signals

Visual controls are information boards displayed where everyone in the factory can see them. This is in contrast to previous workplace rules, which dictated that performance data should be retained as "management secrets", for the sole consumption of well-educated managers who knew what to do with the numbers. The visual controls, now common in many American manufacturing facilities, describe workplace safety, production throughput, material flow, quality metrics, or other information. Another form of visual control is a flashing light that tells everyone a piece of production equipment has broken unexpectedly and is in need of immediate repair.

Managers can also adopt visual signs and controls. If they leave the office, go off-site or for meetings in another building, they can post a sign saying where they are, when they will be back, and how they can be contacted. Another form of visual signal is body language, whose fundamentals should be well understood since a manager's primary product is successful interaction with people. Tight facial muscles, frowns, furrowed brows, negative gestures, appearing frustrated, confused, angry, or worried, brings one's inner world to the surface. It broadcasts a "me first" signal, that my own issues are more important than yours. It says that we are not very interested in making ourselves available to other people, and reduces the opportunity for successful interactions. Habits like tapping feet, crossed arms, doodling, frequent breaking of eye contact, and answering the phone or reading the mail while talking to people signal disinterest. While everyone has times

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where they need reduced personal interaction, it is important to remember that disengaging habits can quickly be formed. It takes a great deal of practice to learn how to give each person your undivided attention and thus maximize the positive outcomes (and opportunities for action) possible with each encounter, while at the same time not appearing to be duplicitous. If you are not smiling, your people are not smiling either.

Audio signals in the factory are also very important because they signal malfunctioning equipment, sound warnings before the start of machine operation, or other useful information. In an management context, audio signals can indicate enthusiasm, neutrality, agreement, hurriedness, disinterest, confusion, or hostility. The tone of voice, pauses, volume, pace, inflection, and timing of these auditory cues should be appropriate to the situation. Managers who like their jobs and are comfortable with their role and responsibilities will offer mostly enthusiastic auditory clues, such that each encounter is constructive. This tells people that you are comfortable listening to them and willing to give your undivided attention to help solve problems; that you prefer to praise them for things that are done well, rather than find fault in the few things done poorly. If you are not laughing, your people are not laughing either.

Total productive maintenance

Machine tools are vital to the manufacture of goods. However, equipment is often treated poorly, and run continuously to failure. Unanticipated equipment down time is the bane of manufacturing. So progressive manufacturers treat equipment as important assets to be cared for to achieve top performance. Total productive maintenance (TPM) is a shop equipment maintenance programme that supports minimization of capital assets and maximization of production output. The goals of TPM include zero unplanned equipment stoppages and optimum machine performance. These are achieved by commitment to established maintenance schedules by both managers and shop operators.

Analogous to TPM for machines is the maintenance of your mind and body. Our personal effectiveness is defined mostly by how we think and feel. So it is important to take care of ourselves so that we will be available and in operation when others need us. If we have adopted a service-oriented mindset, then we are comfortable with the notion of devoting ourselves to others. Thus, we are willing to meet the expectations of others, even if we receive no acknowledgment for our efforts. But this can not be achieved if we are sick. So everyone should have their own TPM programme to develop right mind and body, to ensure an effective, purposeful, and enjoyable life that others can benefit from. Exercise, read, meditate, eat well, work, reflect, play, maintain a positive outlook, etc., and associate with diverse people that you can learn from.

It is also important to realize the significant contributions that other people can make to help develop one's self-awareness. The people providing constructive feedback are obvious contributors to personal development. What about the critics or people we consider to be our "enemies"? The normal response is to avoid those people or situations that may be aggravating or upsetting, question our intelligence, adversely impact our confidence, or cause us to confront our fears. But since anger is the death of possibilities, we could try to do the opposite of what we feel like doing and instead reflect on the situation to understand what worked well and what did not. We could get closer to the problem, rather than farther way. The problem will likely be encountered again and again if we do not try to seek alternative solutions. But to do so we typically need help from other sources such as books, articles, asking other people what they would do, or asking the critic why he or she is critical. A key competence is the ability to contain one's emotion and open the mind to other solutions (Cleary, 1996; Goleman, 1989). Effective conflict resolution and learning requires the ability to suspend subjective thinking, willingness to change, and to have a confident view of circumstances. Another saying worth remembering is "my harshest critics have been my greatest teachers".

Continuous personal improvement traps

Any tool has a range of effectiveness, beyond which it becomes useless or even counterproductive. For example, some continuous improvement tools normally applied to the manufacturing environment may not be applicable to pure service businesses. Similarly, the continuous personal

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improvement tools previously described require careful consideration in how they are applied to one's self or a large group of employees. The culture must let people make mistakes without fear of rejection, allow sufficient time for the concepts to diffuse through the organization, and be patient as people make the transition away from ineffective life-long work habits and behaviours. It must also set realistic expectations for conformity to the model, and be tolerant of reasonable variation due to individual styles and preferences normally found in diverse organizations.

This section is intended to highlight some of the common mistakes that could be made in the application of this model. For example, one-piece flow in manufacturing seeks to reduce tasks to their simplest components. However, people are not systems reducible to discrete components, since thoughts and actions are produced by the synthesis of a wide variety of information. Some information may be in the form of precisely measured data as presented in charts or graphs, but may also include more ambiguous data such as consumer opinion surveys or biases for certain desired outcomes. Useful data also comes from personal observation, environmental factors, or sensory data that provides needed comfort in decision making. One-piece flow suggests a "do it now" mindset is the best way to get things done. However, this could lead to degenerate outcomes such as the loss of control over one's schedule. This could create a bias for ignoring useful, yet time-intensive, activities such as dialogue with others to develop a better understanding of the marketplace, improving human resource policy, or determining new product investment strategies.

A "do it now" mindset within the continuous personal improvement model will also challenge established thoughts on what constitutes a priority. Prioritization is a tool to help the decision-making process. However, it is often used to aid every decision-making opportunity, and is thus a frequently misused tool. To "do it now" means there is no time to prioritize! No doubt prioritization has real utility in many circumstances, but overuse can become a bad habit that results in underdeveloped decision-making skills. It reinforces the belief that we can not do it all, and does not challenge one to gain resources external to their local environment to get things done. Prioritization forces most people to work on what is achievable, rather than what needs to be done. Application of the one-piece flow model can have counter-intuitive results in that it should improve one's ability to quickly disposition actions and thus minimize the use of prioritization as a decision-making tool. In addition, rapid disposition of routine business matters will leave more time to do other things. On the down side, experts of the "do it now" method may risk losing sight of higher-level business needs since the strong positive sense of accomplishment achieved by actually doing something and having satisfied employees can be addictive.

The concept of standard work could also be easily misinterpreted. For example, it would not make sense to apply this concept to continuous personal improvement for the goal of making every manager or employee behave in exactly the same way. Standardization could imply to some in the organization that there is no opportunity for interpretation or dissent. Also, management's message can be standardized more easily than each manager's style. The latter may be worthwhile doing to reduce extremely wide variations in style. But certainly nobody would want a charismatic manager to present the company's survival plan to employees in a stale pro forma style. People are dynamic, ever-changing, chaotic systems that can not be standardized in any strict sense.

Managers behaving with a kanban mindset will be severely challenged to provide employees exactly what they need, when they need it, every time. There are often practical limitations, usually caused by systems and procedures that prevent rapid response (and thus must be improved!), such as a slow capital appropriation approval process. There may also be budget, space, or manpower constraints that are not rapidly solvable. Alternatively, employees may have not thought hard enough about how they can get what they need without spending lots of money or breaking new ground. For this situation, there is the saying "spend ideas, not dollars", which is an extremely powerful cost-reducing concept if it can be successfully assimilated by everyone in the organization. Managers, however, are all too often simply unwilling to meet employees' needs, as if generosity is forbidden in the workplace or somehow diminishes power. So the challenge for all managers is to develop a kanban

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mindset to improve their on-time delivery performance. Employees should be hearing "yes!" by smiling managers many more times than they hear "no way!" by angry managers.

An example – root cause diagram

Fishbone diagrams are a commonly used factory floor problem-solving tool that makes apparent the many factors that contribute to an undesirable condition. They are graphical representations of primary, secondary, and tertiary causes related to observed or measured effects. It is an extremely useful tool for determining the root cause of problems, and thus a starting point for establishing workable solutions. Fishbone diagrams are typically used to determine the failure of tangible processes, such as why a machine fails repeatedly, or why quality defects continue to plague certain production operations. They are rarely used by management to analyse the failure of human factors in business settings.

One of the banes of management is getting people to follow management's lead. A lack of effective communication is often cited, subjectively, and without much supporting evidence, as the root cause of why a shared vision was not achieved. Thus, competitive threats requiring widespread change in business processes are often responded to only half-heartedly by employees. If communication is ineffective, then management may utilize more direct means to achieve commitment or compliance. This can degenerate into abusive behaviour by management towards employees, which will alienate workers and lead to further erosion of influence. But communication may be only one of many primary causes, which may also be interrelated to other important factors.

Figure 1 shows a fishbone diagram that shows why management often lacks influence with followers, while Table II presents detailed descriptions of the secondary causes and related corrective actions. At least four primary causes have been identified in this example: trust, communication, processes, and environment – and numerous secondary causes. These form the basis of the corporate culture from which management and employees must operate within. Thus, simple explanations for the failure of an initiative, such as ineffective communication, may actually be the result of more complex and highly interrelated corporate cultural and behavioural problems.

Concluding remarks

The application of continuous improvement tools in manufacturing is most effective when they are used concurrently. The tools and concepts come alive when daily activities and simple teachings are coupled, and can result in significant improvements to corporate

Figure 1 A fishbone diagram showing the primary and secondary causes of why management can lack influence with followers in an organization

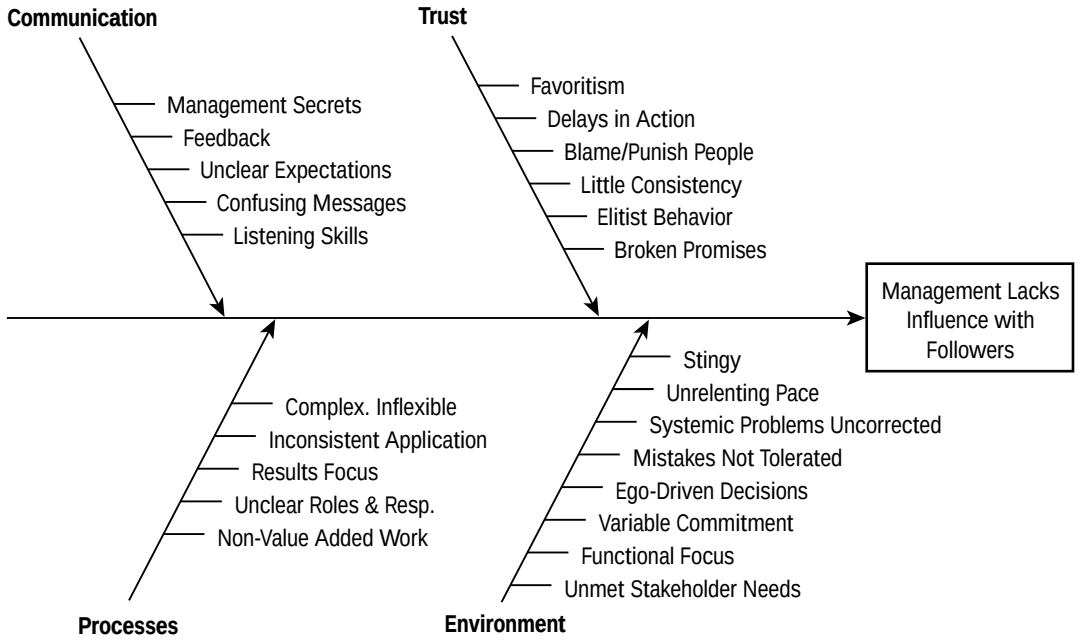

Table II Why management lacks influence with followers

Primary cause	Secondary causes	Secondary cause description	Corrective actions
Trust	Favouritism	Workers perceive management to favour some people over others, such as salaried workers over hourly workers.	Standard work, continuous improvement
	Delays in action	managers hold forums to hear employees' concerns, yet are either non-responsive or slow to respond to workers' needs. Workers' concerns are not understood.	One-piece flow, Kanban
	Blame/punish people	Workers are risk-averse because of fear of failure.	Standard work, continuous improvement
	Little consistency	Management says one thing, does another; does not walk the talk.	Standard work, continuous improvement
	Elitist behaviour	Managers see themselves as superior to workers. Two sets of rules.	Continuous improvement
	Broken promises	Management does not meet its commitments to workers.	One-piece flow, Kanban
Communication	Management secrets	Employees know or believe management withholds information. Knowledge is power mindset. Motives are unclear.	Kanban
	Feedback	Management does not actively provide corrective feedback.	One-piece flow
	Unclear expectations	Managers do not provide simple statements of expectations.	Kanban
	Confusing messages	Management's message is unclear or contradictory.	Visual controls, Audio controls
	Listening skills	Management makes time to hear but does not understand.	Continuous improvement
Processes	Complex, inflexible	Procedures difficult to follow or out of step with business needs. Cumbersome processes demotivate and slow down workers. Management requires seemingly endless study of issues and recommended solutions.	5S, Standard work
	Inconsistent application	Processes and procedures followed arbitrarily.	Standard work
	Results focused	Processes not followed when the need for results take precedence.	Standard work
	Unclear roles and responsibilities	Workers confused about who does what, when, and why.	One-piece flow, Standard work
	Non-value added work	Workers believe their time is wasted doing unnecessary tasks.	Kanban
Environment	Stingy	Managers get all the rewards; workers get few. Workers lack proper tools. Pervasive sense of inequity.	Continuous improvement, Kanban
	Unrelenting pace	Constant pressure to perform. Little recognition for jobs well-done.	TPM, Kanban
	Systemic problems uncorrected	Management fails to help correct problems repeatedly identified by employees. Management lacks detailed understanding of business processes and procedures.	Kanban, One-piece flow
	Mistakes not tolerated	Employees fear taking risk due to known consequences. Managers want to hear only "good news". Preference for who did it, rather than what went wrong.	Kanban, Visual controls, Audio controls
	Ego-driven decisions	Decisions made for the elevation of one's self.	Kanban
	Variable commitment	Managers subvert each other by openly supporting or criticizing strategic direction.	Standard work
	Functional focus	Managers do what is best for their area, rather than for their customers or company at large.	Standard work, Kanban
	Unmet stakeholder needs	Management favours one group of stakeholders over all others.	Continuous improvement

culture and financial performance. However, tools used separately from one another lose their synergistic quality, and can greatly limit efforts to become a lean manufacturer. Likewise, the tools presented in the continuous personal improvement model are interdependent. They offer the potential to serve as a foundation for individuals to become better skilled at life-long learning and systems thinking. The model also provides a tangible vehicle for reducing personal dependence on external circumstances, and places the resolution of everyday challenges within your own hands.

The continuous personal improvement model provides a simple framework for

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overcoming common barriers that limit personal performance in the workplace. Continuous personal improvement is a methodology for achieving effective generative relationships, making meaningful contributions, and improving one's ability to view problems as worthwhile challenges and positive experiences. This will not come easily. It takes substantial effort to develop self-awareness and break away from life-long teachings, biases, and assumptions that inhibit achieving these goals. In addition, dysfunctional work environments may not seem conducive to the practice of continuous personal improvement, when, in fact, they are actually the prime environment to develop such skills. If you are a supervisor or manager, you should believe that you work for your employees and constantly strive to do these things very well. The set-backs will be many and varied, but should never lead to the abandonment of worthwhile goals. Since the continuous personal improvement model is process-oriented, it is also useful for developing behaviours that can help people in everyday life with friends and family.

References

Bennis, W. (1989), *On Becoming a Leader*, Addison-Wesley, New York, NY.

Bikhchandani, S., Hirshleifer, D. and Welch, I. (1992), "A theory of fads, fashion, custom, & cultural change as information cascades", *Journal of Political Economy*, Vol. 100 No. 3, pp. 992-1026

Cleary, T. (1989), *Zen Lessons - The Art of Leadership*, Shambhala, Boston, MA.

Cleary, T. (1995), *Minding Mind*, Shambhala, Boston, MA.

Cleary, T. (1996), *The Human Element*, Shambhala, Boston, MA.

Covey, S.R. (1989), *The Seven Habits of Highly Effective People*, Simon & Schuster, New York, NY.

Csikszentmihalyi, M. (1993), *The Evolving Self*, Harper Collins, New York, NY.

Goleman, D. (1989), *The Meditative Mind*, Putnam, London.

Hammer, M. and Champy, J. (1993), *Re-Engineering the Corporation*, HarperCollins, New York, NY.

Kets de Vries, M.F.R. (1989), *Prisoners of Leadership*, J. Wiley & Sons, New York, NY.

Kets de Vries, M.F.R. (1993), *Leaders, Fools, & Impostors*, Jossey-Bass, San Francisco, CA.

Kets de Vries, M.F.R. (1994), "The leadership mystique", *Academy of Management Executive*, Vol. 8 No. 3, pp. 73-92.

Kotter, J.P. (1995), "Leading change: why transformation efforts fail", *Harvard Business Review*, March-April, pp. 59-67.

Lee, C.R. (1996), "Process re-engineering at GTE", *Strategy & Business*, Fourth Quarter, No. 5, pp. 58-67.

Moeller, B. (1996), "The next wave: re-engineering for growth", *Strategy & Business*, Winter, No. 2, pp. 18-32

Pfeffer, J. (1996), "Why do smart organizations occasionally do dumb things", *Organizational Dynamics*, Summer, pp. 33-44.

Roberts, W. (1987), *Leadership Secrets of Attila the Hun*, Warner Books, New York, NY.

Schonberger, R.J. (1986), *World Class Manufacturing*, The Free Press, New York, NY.

Suzaki, K. (1987), *The New Manufacturing Challenge*, The Free Press, New York, NY.

Womack, J.P. and Jones, D.T. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J.P., Jones, D.T. and Roos, D. (1990), *The Machine That Changed the World*, HarperCollins, New York, NY.

Lean behaviors

Outstanding Paper Award Winner!

M.L. Emiliani

Seeks to extend the traditional understanding of productivity by more closely coupling task and behavioral elements of work within the bounds of 1890s mass production principles and 1990s lean production principles. Comparisons are made between common batch and queue manufacturing methods and the typical behaviors exhibited by people in the workplace, which are known to be deficient in their ability to establish trust and gain commitment. A new model for leadership and organizational behavior based upon the philosophy and practice of lean production is presented, and contains concrete symbols rooted in behavioral science, philosophy, economics, and industrial engineering. The practice of lean behaviors is shown to be an essential element for producing healthy work environments that can lead to economic growth, as well as help businesses sustain efforts to become lean producers. The principal focus is on how individuals can consistently behave in ways that create value, with the goal of eliminating waste in both intra- and interpersonal relationships. Also included are guidelines to facilitate the selection and development of people that possess basic capabilities for eliminating waste in their thoughts and actions.

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Introduction

For about 100 years, US manufacturers have relentlessly pursued efficiency strategies to reduce costs, improve output, establish competitive position, or increase market share. The scientific management methods developed by Frederick Taylor (Taylor, 1967) and the mass production manufacturing philosophy and practices developed by Henry Ford (Womack *et al.*, 1990) resulted in significant useful improvements for the era in which they were used. However, the early process-oriented mass production methods have, since the Second World War, largely degenerated into results-oriented, output-focused, production systems that rigidly control most manufacturing businesses today. It is likely that this production system was "improved" over time by aggressive and undisciplined results-oriented managers seeking to raise production efficiency to meet both explicit and, more importantly, implicit company or personal goals. Such behavior, practiced over decades, typically results in the solidification of corporate cultures with debilitating inward focus, and where eventually the voice of the customer and other stakeholders could no longer be heard. In addition, suppliers would develop similar behavior patterns either independently or more likely the result of their relationship with more powerful and influential customers (Jenner, 1998).

While US manufacturers were refining a results-oriented batch and queue production system that enjoyed the benefit of abundant resources, Japanese manufacturers re-building after the Second World War had less human, material, and financial resources. As a result of these and other factors, the problems they faced in manufacturing were vastly different than their Western counterparts (Womack *et al.*, 1990). These circumstances led to the development of a new, lower cost, manufacturing philosophy and practice. Early leaders were Eiji Toyoda and Taiichi Ohno of the Toyota Motor Co., and Shigeo Shingo, a consultant to Toyota and other Japanese manufacturers. They systematically developed a disciplined process-focused production system (Ohno, 1988; Shingo, 1988), now known as the "Toyota Production System", or "lean production", whose objective is to minimize the consumption of resources that add no value to a product. The resulting competition among US and Japanese auto makers over the last 25 years is now legendary, particularly because lean production methods can be very difficult to duplicate even by those who know it best (Taylor, 1997). The competitive advantage of lean production is formidable and has yet to be fully realized even in the automotive industry (Womack and Jones, 1996).

Lean production, applied correctly, results in the ability of an organization to learn. As in any organization, mistakes will always be made. But mistakes are not usually repeated because this is a form of waste that the lean production philosophy and its methods seek to eliminate (Robinson, 1990). In contrast, most businesses, whether service or manufacturing, typically repeat the same mistakes again and again, year after year. This is evident in the average performance of most large companies, which is today best characterized by the degenerate workplace depicted in Dilbert® cartoons. The ability of an organization to learn does not require it to have a lean production philosophy. However, it must possess an ability to change how it thinks (Senge, 1995), which requires a culture characterized by trust, shared responsibility, and openness to experimentation without fear of failure (Senge, 1996). Instead, the majority of companies have functional, results-oriented leadership highly skilled at maintaining the status quo or perpetuating local optimization strategies (Jenner, 1998).

Managers practicing in such environments quickly recognize that they must alter their behavior to that of the group in order to "survive" in the workplace. This is the path of least resistance, a well-worn low road accessible to anyone capable of trading integrity for personal underperformance. The toll that this exacts on a manager is to become a living stereotype; a clone of Dilbert's® hapless boss that employees inevitably ridicule as a means to find solace. The widespread popularity of this cartoon and its related merchandise concretely demonstrates that "Dilbert® Companies" are extremely common in today's business world, and that low-trust

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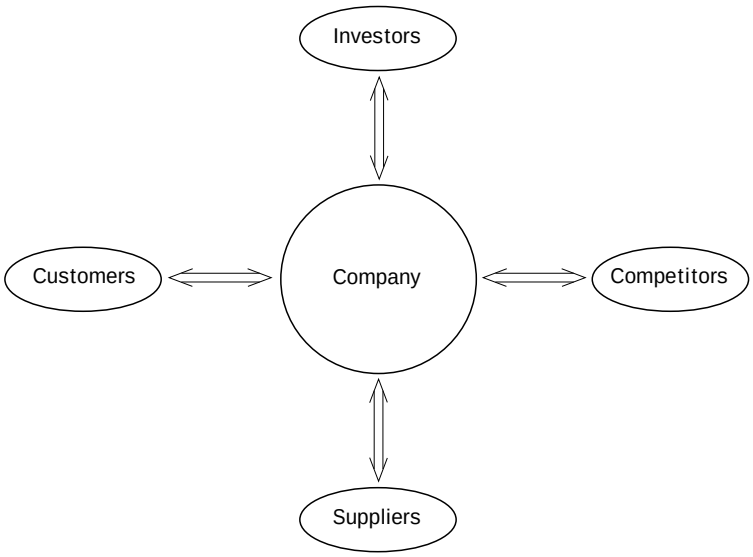
managers highly skilled in the de-accession of knowledge are even more common. In contrast, there are few managers that perform as truly successful role models. To do so would require the discipline to learn, practice correct behaviors (Emiliani, 1998), understand the system-level implications of their actions (Senge, 1990), and unlearn political behaviors.

Businesses that are unable to learn and change their behavior will, no doubt, risk the future existence of their entire enterprise as currently governed. This will cause prolonged distress and lead to high turnover amongst the various stakeholders – suppliers, investors, and employees (Campbell and Alexander, 1997) – and create easy opportunities for competitors. Handing the competition advantage will further de-stabilize a company and lead to even greater future turmoil. Figure 1[1] shows the key participants in a business, each having a relationship governed by processes that are defined by a complex mix of industry norms, formal business procedures, State and Federal laws, finance and accounting rules, information systems, informal practices, and unspoken assumptions. The leaders of well-managed businesses know that they have a serious responsibility to understand the role of each constituent within this community, what they want, the information they provide, and the processes and behaviors governing generative relationships. Each of these relationships should be carefully managed in order to minimize waste and maximize the benefits to all that function within the community. The interaction with these constituencies should be balanced, since favoring one over another typically leads to under-performance in key areas such as product quality, on-time delivery, financial performance, or customer satisfaction.

Figure 1
The key participants in a business



Working efficiently

Frederick Taylor devoted his life to improving the productivity of manufacturing organizations and the prosperity of the production community (Taylor, 1967). He was generally concerned about the waste of material resources, its impact on both US industry and its global competitiveness, its effect on people and their wages, as well as prices paid by consumers. Taylor's particular interest was in the waste generated by workers in their daily activities that he claimed were vast, less visible, very much under-appreciated, and costly. His goal was to develop workers' ability to achieve maximum efficiency by understanding materials, tools, and the sequence in which the work was performed. This included analyzing physical movements, performing time studies, and dividing certain activities between management and production workers. Undaunted by critics, nay-sayers, and negative attitudes, Taylor's often lengthy and elaborate experiments enabled him to prove, over time, that counter-intuitive methods often were, in fact, the most effective solutions for achieving significant increases in efficiency. Simply stated, Taylor's "four great underlying principles of management" are the:

1 development of a true science;
2 scientific selection of workers;
3 scientific education and development of workers; and
4 co-operation between management and workers.

Taylor understood the concept of waste in its most subtle forms, and the applicability of his model to the management of individual and group activities in settings other than manufacturing for which he is best known. He discussed the destructiveness and suffering caused by adversarial relationships between employers and employees and wrote of the importance of co-operation, friendship, harmony, and mutual prosperity in the workplace. Elsewhere in his paper, Taylor re-stated the principles of management in complimentary and more humanistic terms:

- science, not rule of thumb;
- harmony, not discord;
- co-operation, not individualism;
- maximum output, in place of restricted output; and
- the development of each worker.

It is apparent that Taylor clearly recognized the importance of human behaviors,

including trust, to the technical success of his scientific management principles – i.e. measurable improvement in manufacturing productivity as determined by early cost accounting and industrial engineering metrics. However, US industry typically misunderstood, mis-applied, or selectively applied, Taylor's principles, which led to highly visible inferior outcomes for which he alone is often blamed. In fact, the totality of Taylor's philosophy and methods represented breakthrough thinking and were the foundation upon which lean production principles were constructed beginning in the 1930s (Shingo, 1988).

Employees performing task work in the late 1800s and early 1900s often had perceived or social incentives to work slowly and thus limit daily output of parts. In addition, time-honored trade methods handed down by word of mouth from artisan to apprentice were thought to be the most effective means of accomplishing work. The logic of such behavior was that this would help perpetuate employment of vast quantities of workers at the local level. There was little understanding of the higher order impact of such behavior because alternative scenarios were not generally sought after or, if available, proved to be unconvincing. However, Taylor showed that oral tradition and the protection of one's interest, which appears entirely logical, would generally result in reduced demand for products and a poor understanding of how much work could actually be accomplished. Alternatively, if employers and employees cooperate to improve productivity, then it is likely that output could be greatly increased which would result in lower prices, higher sales, higher wages, higher profit, and improved competitiveness. However, the apparently productive work methods owned by trade person role models proved to be a powerful inhibitor to change that took decades to overcome even on a small scale.

Early practitioners of lean manufacturing believed that it was management's responsibility to structure the workplace to maximize productive output. This required the elements of work to be closely analyzed and the testing of alternative methods through careful experimentation. Work would be reduced to smaller elements, often only seconds in duration, to understand better how time was utilized. Such a strategy would systematically reduce the influence of the tradespeople and their oral tradition, and erode their start-to-finish manufacturing skills that required years of apprenticeship to fully develop. However, the loss of individual power and influence gives way to a new strategy that is capable of better serving the larger community: investors, suppliers, employees, and even competitors. The mindset and behaviors that evolved in support of lean production have proved to be a formidable means of producing goods in ways that constructively reinforce each other.

Behaving poorly in the workplace makes everyone, including management, ignorant of how well people can actually behave, and results in the evolution of new types of undesirable behavior patterns. Poor behaviors allow people to avoid co-operation, gain personal advantage, and protect personal or departmental interests. These self-serving habits become well-developed over time, resulting in highly skilled but unproductive gamesmanship that no customer would want to pay for. All too often the most highly skilled gameplayers become unwholesome ego-driven role models for future generations. Survival of the fittest, in this context, means the lowest forms of behavior win – but only on a personal level, which is good enough for many people. However, the corporate culture, which mirrors the aggregate of individual behavior of managers, will likely fail to serve the larger community. The result is a deterioration of trust between workers, management, suppliers (Sheridan, 1997), and investors, which can further erode a company's competitive position. Competitors may also suffer from this, as they now often work together in joint ventures or other co-operative business arrangements. A lack of trust and differences in corporate culture have been cited as primary reasons why collaborative business arrangements often fail or at least fall well below expectations (Kanter, 1994).

Unlike manufactured goods, it is much harder to systematically analyze a person's behavior and test alternative methods through experimentation within the daily turmoil of work environments. That is unless one has the benefit of a full-time coach or is disciplined enough to independently develop better behaviors. The last 15 years have seen a great surge in resources to address interpersonal skill and leadership development, and includes journal articles (Manzoni and Barsoux, 1998; Simons and DaVila, 1998), books (Bennis and Nanus, 1985; Cleary, 1989; Covey, 1989; Goleman, 1995), seminars, and consulting practices. No doubt these are great resources. However, the reader or participant often finds that the methods or information are too "soft and fuzzy" and do not deliver strong footholds that can be easily remembered and applied. Thus, behavioral performance often loses significance in the face of strong competition and demanding business performance metrics. However, it is clear that

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companies must raise their expectations for productive behavioral performance since this is inextricably linked to the productive output of goods and services. Very few companies do both well enough to gain sustained competitive advantage and widespread stakeholder satisfaction.

Lean manufacturing and lean behaviors

Waste in lean production is defined as actions that do not add value to a product and can be eliminated. Waste is viewed by those that understand the concept deeply as the singular enemy that greatly limits business performance and threatens prosperity unless it is relentlessly and systematically eliminated over time. The primary types of waste include defects, re-work, overproduction of goods, transportation, waiting, inventory, unnecessary movement, and unnecessary processing (Womack and Jones, 1996). The search for waste is never-ending and regarded as one of the few things that non-production workers can do to add value to products. For example, machine downtime is the bane of manufacturing, and its elimination can be a preoccupation for vast numbers of workers. However, people downtime, as characterized by poor relationships or lack of communication, is routinely tolerated by management and may even be implicitly encouraged in highly political workplaces.

The concept of waste has not yet been effectively extended to the self-defeating behaviors of individuals and groups of people in the workplace. Why has not the same revulsion for waste developed in the context of poor interpersonal relationships present in most business settings? We work very hard to improve manufacturing productivity, yet place comparatively little emphasis on improving our own behaviors. Shop productivity takes precedence over behavioral productivity because money, defects, inventory, and time are much easier to measure. In addition, the level of stress in competitive business settings can make it very difficult to eliminate behavioral waste. Humans have repeated the same mistakes for thousands of years (Senge, 1995), which shows that we rarely understand their root causes. The persistently wasteful individual and group behaviors could be a reason why many large businesses fall well below the expectations of one or more of its stakeholders.

We all know people that behave oddly at work. Some get annoyed by the smallest irritants, others are overly aggressive, rude, or demeaning, and a few are just impossible for most people to get along with. We generally tolerate the disruptive personalities found in the workplace, preferring instead, when pressured, to cite a key strength that they possess along a singular dimension such as technical capability or historical or functional knowledge. Amazingly, very few people truly grasp the enormous negative impact that such behaviors have on an organization. How often have you heard or even said:

> I am not doing this for Bill because he never helps me when I need something.
>
> Susan is really difficult to work with ... stay away from her!
>
> I don't think Dan deserved that promotion.
>
> Jill thinks the Vice President is an idiot.

All of these comments can be viewed as "normal" business behavior, but they are, in fact, waste because they add no value and can be completely eliminated from the conversation. Such comments disseminate incomplete information, reinforce stereotypes, build or perpetuate barriers, hide important issues, and completely block progress between individuals (Senge, 1995). Can this be a reason why so many large businesses report rather mediocre financial results year after year (*Fortune* Editors, 1998)? Should net profits consistently less than 5 percent not signal that something is wrong, rather than being acceptable to most shareholders?

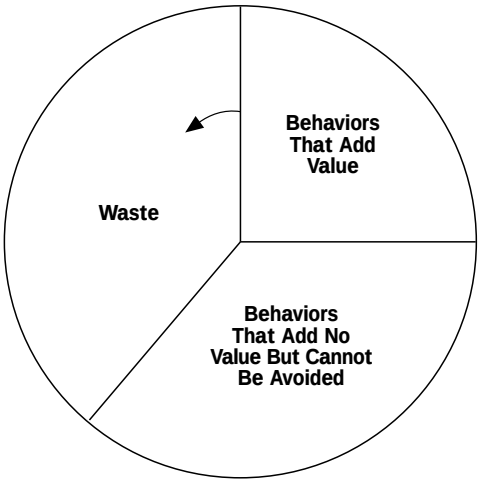
We also know colleagues that possess good "people skills". They are highly valued in business and generally have a process-focused style whose benefits are only realized over time. However, they can be easily eclipsed by results-oriented colleagues that force progress on narrow issues with little regard for the higher-order impact. These people often become the role models that others follow in order to achieve their desired status or income level. This duality is tacitly accepted in most corporate cultures because the stakes are high and process-oriented methods are ignored or judged to be too dull or risky. However, support for this duality creates a destructive tension that leads to widespread confusion and consistent underperformance. The lack of disciplined behavior between individuals or between the company and its stakeholders can be important factors that limit the life span of most businesses to about 30 years (de Geus, 1997). The long-term impact of dysfunctional behaviors – office politics, irrationality, lies, confusion, and deceptions – can never be good, as they surely divert attention from the stakeholder community.

It takes a great depth of knowledge and real teamwork to effectively eliminate waste in manufacturing processes. It takes as much, if not more, knowledge and real teamwork to

eliminate waste in interpersonal relationships (Eisenhardt *et al*., 1997; Katzenbach, 1997). Managers routinely ask for, and get, greater improvement from the factory floor each time new cost, delivery, or quality goals are established. However, employees rarely demand that managers behave in ways that challenge their interpersonal skills and strive for consistent effectiveness. Followers too often accept arbitrary or unusual situation-specific behaviors from their leaders, most likely due in part to a well-founded fear of retribution. The most successful businesses challenge themselves to achieve functionality in a wide range of operating practices, not just in manufacturing performance. The ability to learn and transmit learning among individuals and key constituents in a rapidly changing business environment will help ensure future prosperity (Senge, 1990).

The concept of "lean" behaviors is analogous to lean production. Lean behaviors are defined simply as behaviors that add or create value (Figure 2)[2]. It is the minimization of waste associated with arbitrary or contradictory thoughts and actions that leads to defensive behavior, ineffective relationships, poor co-operation, and negative attitudes. A person exhibiting lean behaviors is most easily recognizable by their ability to resist the temptation to contribute wasteful verbal or gestural content to conversations. In contrast, behaviors that inhibit work flow are analogous to wasteful batch and queue mass production methods. These behaviors are termed "fat" behaviors, and are defined as behaviors that add no value and can be eliminated. They include the display of irrational and confusing information that results in delays or work stoppages, or the articulation of unsubstantiable subjective thoughts and opinions. Fat behaviors are recognizable as lots of talk where nothing has actually been said, or indirect words whose meanings are subject to variable interpretations. Savants at deciphering fat behaviors learn how to "read between the lines" – an unproductive skill that can further proliferate fat behaviors.

Figure 2
Lean behaviors, fat behaviors and waste



Five fundamental concepts

The beauty of the lean production philosophy is that it couples disciplined personal behaviors to disciplined production methods. The production methods are simple to grasp, yet can be very difficult to apply and are deceptive in the depth of their total value to an enterprise. It appears complex especially to people whose mindset is rigidly fixed in batch and queue manufacturing practice. This chasm is more easily transcended after one has participated in kaizen events facilitated by experts in lean production methods (see, for example, http://www.iijnet.or.jp/shingijutsu/indx_e.htm, http://www.gembakaizen.com, and http://www.lean.org). There are five basic concepts that define lean thinking and enable lean production: specify value, identify the value stream, flow, pull, and perfection (Womack and Jones, 1996).

Specify value

In lean production, the value of a product is defined solely by the end-use customer. The product must meet the customer's needs at both a specific time and price. The thousands of mundane and sophisticated things that producers do to deliver a product are generally of little interest to customers. This differs markedly from what most companies do, which is to specify value from the point of view of engineering, finance, marketing, or other internal departments. Value specified by functional experts is a self-serving means of preserving local interests within a company, as it reinforces the power and influence of certain organizations, their people, their ideas, and their equipment or technologies. It is an effective means of raising today's level of status quo to meet tomorrow's more demanding status quo requirements. It is also long-term waste. To view value through the eyes of the customer requires most companies to undergo difficult and comprehensive reorganization of people, their mindset and behaviors, and business processes.

Specifying value in interpersonal relationships means simply to understand the wants and expectations of the people that we interact with. It means to understand what other people want or expect you to be, what they

want or expect to hear, what they want or expect to see, or what they want or expect you to say or do. It is the behaviors that others judge to be acceptable in certain environments. To what extent should you try to meet these expectations? Well, that depends upon the circumstances. In some cases it would be very wise, while in others it would be completely foolish. Specifying value in human interactions is much more complicated than in human-product interactions. In all cases we should at least understand the wants and expectations of others since this then gives us opportunities to add value in our interactions. Seeing the value of our words and actions through the eyes of our colleagues can enable the reduction of wasteful interpersonal behaviors.

Identify the value stream

Identifying the value in lean production means to understand all the activities required to produce a specific product, and then to optimize the whole process from the view of the end-use customer. The viewpoint of the customer is critically important because it helps identify activities that clearly add value, activities that add no value but cannot be avoided, and activities that add no value and can be avoided. For example, most companies that manufacture personal computers have long believed that wholesale and retail distributors were an integral component of the value chain whose cost was part of the price that customers are willing to pay. That was until one company, Dell Computer Company, understood that inventory-intensive distribution adds no value and can be avoided by using innovative direct marketing methods, thus reducing product cost and increasing value in the eyes of end-use customers (Fisher, 1998). Price-sensitive customers have rewarded Dell with significant year-over-year increases in sales, profits, and market share. Dell's direct marketing strategy also rewards investors with higher returns and suppliers with increased sales. The rewards enjoyed by competitors include a better understanding of their customer's purchasing preferences and how to improve return on assets through more effective utilization of working capital. In other words, competitors gain useful knowledge – if they can learn.

Identifying the value stream in individual or group behaviors means to understand what people do and why they do it. Behaviors are usually closely linked to the functions that people perform, and include the work and non-work pressures that people face in the performance of their activities. Careful observation will reveal that some behaviors clearly add value, some behaviors add no value but are unavoidable, and some behaviors add no value and can be eliminated. The behaviors and perceptions embedded within the functions that people perform are a primary factor in determining if they add value, or are allowed to add value, to a product or service. For example, have you ever discounted your colleagues in procurement, marketing, manufacturing, or information systems because you do not understand what they say or do? Did you behave in a manner that helped uncover the underlying meaning or concern?

The value stream in relationships is rife with waste when people do not talk to each other and instead remain focused on the inner workings of their own functional worlds. People can change their mindset and learn to see the whole instead of only their part. The resultant clarity creates the foundation from which we can begin to understand what other people do and then identify where waste can be eliminated. For example, if we discovered that a report required by manufacturing every month is aggravating and time consuming for marketing to prepare, and that this contributed to tension between the two functions, then a better solution could be found that might also improve the behaviors of the two groups. Progress like this will not occur unless there is trust, a willingness to share information, and acknowledgment that local actions or behaviors can have significant emotional impact on others.

Flow

After value has been specified and value streams have been identified, the next step is to get the activities that add value to flow without interruption. Flow in lean production means to process parts continuously, from raw materials to finished goods, one operation or one piece at a time. This is in contrast to batch and queue manufacturing methods, where large batches of parts are processed sequentially; that is, the entire batch does not move to the next operation until all parts have been processed by the prior operation. This discontinuous production method results in lengthy queue times and large quantities of expensive inventory, both of which add to the cost of the product. Batch and queue remains the dominant method of production because the many benefits of flow are counter-intuitive. Flow production methods can be very difficult to implement in mature manufacturing businesses because they challenge all aspects of conventional manufacturing wisdom and practice. It is important to recognize that batch and queue manufacturing is performed solely for

the benefit of the producer, whereas flow production responds to the value in products as specified by end-use customers.

Flow in a behavioral context means to behave in a manner that minimizes or eliminates delays or stoppages in the work performed by others. Common practices that cause delays include contradictory or confusing words or actions delivered by managers or colleagues. Any form of inconsistent behavior will create queues that threaten responsiveness to rapidly changing conditions. A manager's inability to "walk the talk" is perhaps the most obvious form of waste that can cause massive confusion and delays as employees spend time trying to figure out what is really being said. Simply put, the fat behaviors normally exhibited by managers or employees cause widespread frustration and reduce commitment, participation, and co-operation. As in batch and queue manufacturing, fat behaviors are intuitive and eliminate flow amongst workers, while lean behaviors are counterintuitive and facilitate clearer meaning and direction.

Pull

The concept of pull in lean production means to respond to the pull, or demand, of the customer. Lean manufacturers design their operations to respond to the ever-changing requirements of end-use customers, while the operations of batch and queue manufacturers are designed to meet their own local needs. Those able to produce to the pull of end-use customers do not need to manufacture goods according to wasteful and inaccurate forecasts that batch and queue manufacturers must rely upon. The planning for delivery of product to end-use customers is less troublesome, and demand becomes more stable if customers have confidence in knowing that they can get what they want when they want it.

Pull applied in a behavioral context means to recognize that people operate under many different mental models (Senge, 1990), which requires us to adjust our style or approach often. We can think of the people that we interact with as customers, where each one has a different set of demands. If we are able to adjust our approach to that demand, than we can fluidly meet the requirements and expectations of others. If, however, we respond according to a fixed mental model – i.e. batch and queue behavior mindset – then we can rarely meet expectations. Instead, we have to forecast the response of others based upon our own behaviors that have been designed over the years to meet specific personal needs. Forecasting the behaviors of others is pure waste because it is time consuming and often inaccurate, and should thus be eliminated. Practicing lean behaviors reduces ambiguity and re-work in interpersonal relationships.

Perfection

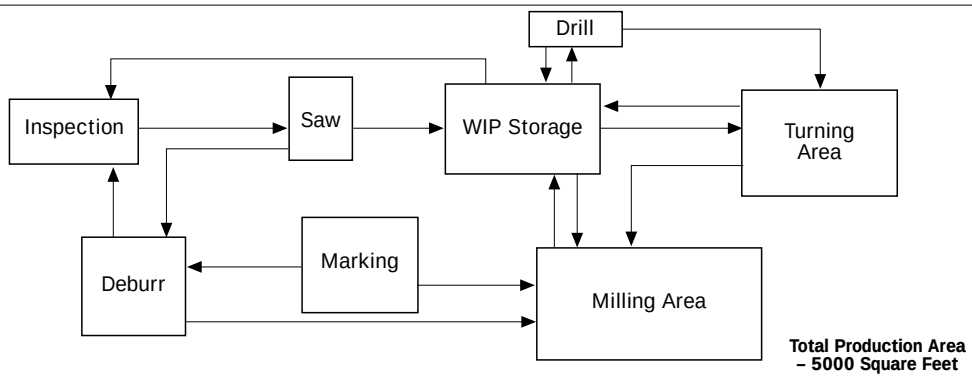
If an enterprise can do the first four steps well, then all activities become transparent. This enables people to more easily identify and eliminate waste, and focus on improving activities that create value. The first four steps interact in a "virtuous circle" that enables the pursuit of perfection. The concept of perfection in lean production means that there are endless opportunities for improving the utilization of all types of assets. The systematic elimination of waste will reduce the costs of operating the extended enterprise and fulfills the end-use customer's desire for maximum value at the lowest price. While perfection will never be achieved, its pursuit is a goal worth striving for because it helps maintain constant vigilance against wasteful practices.

Similarly, perfection in a behavioral context means to take advantage of the transparency brought about by the first four steps in order to more easily identify and eliminate behaviors that do not create value. A transparent environment delivers more immediate feedback to people, which is of great benefit to everyone because it enables the pursuit of behavioral perfection. Behavioral perfection is as impossible to achieve as perfection in lean production. However, people that can move from fat to lean behaviors will, over time, be as successful as those producers that have moved from batch and queue to lean production.

Intuitive versus counterintuitive thinking

Batch and queue production methods are a natural way of thinking for most people; it is an entirely intuitive way to make things (Figure 3)[3]. Practitioners of this method prefer large batches processed sequentially, which requires the use of economical lot sizes to effectively amortize lengthy machine set-ups. It is not unusual to find set-ups, or change-overs, taking several hours or even days to perform. This production mindset completely discounts the possibility that change-over can be achieved in minutes and that small quantities can be produced quickly and more affordably under flow manufacturing conditions (Figure 4[4]) (Robinson, 1990). The logic against economical lot sizes and hours-long set-ups can be nearly impossible for many people to realize, particularly if they grew up in a batch and queue environ-

Figure 3
Batch and queue manufacturing



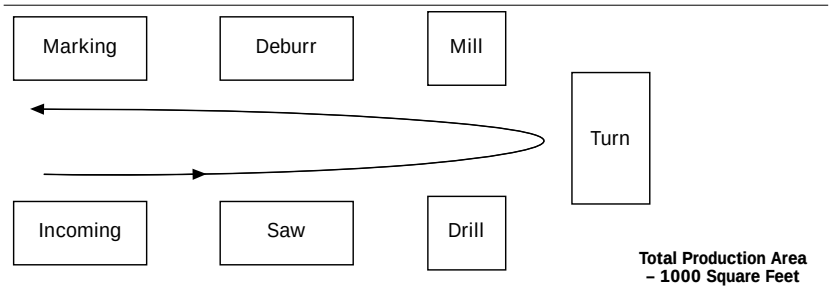
ment. That is unless they are taught to see the massive amount of waste through direct experience such as *kaizen* events.

Similarly, fat behaviors are also intuitive, and its practitioners are much too common. They specialize in the expulsion of amorphous conglomerates of thoughts and actions that maximize the consumption of psychological resources. Their behavior impedes flow between people because its primary operating mechanisms include deception, gossip, innuendo, half-truths, lying, revenge, and destructive political behaviors driven by high ego. The result is local or widespread confusion, negative emotions, stress, frustration, defensiveness, and deterioration of the social structure. It is nearly impossible for most people to see the destructiveness of fat behaviors because their mindset constitutes the form and substance of this mental model. People have difficulty seeing themselves behaving differently in a workplace that promotes self-preservation, and is characterized by such terms as "survival of the fittest" or "dog-eat-dog". It is hard for many to imagine that they can be more effective when past behavior patterns have delivered financial security and status. The personal risk is to just too great and the rewards are uncertain.

In contrast, lean behaviors are counterintuitive just as lean production is counterintuitive. It involves saying or doing what needs to be said or done at the right time, in the right proportion, for the right purpose, to the right people. Interpersonal flow is enabled by self-awareness, humility, suspension, deference, calmness, and quietude (Cleary, 1989). This improves trust and generates other value-creating opportunities, and helps eliminate waste due to delays, inspection or verification, and re-work. For example, how often have you worked weeks to give an important presentation to managers (i.e. an inspection), then get sent back to go get more data (i.e. re-work), and present again (i.e. verification) a few weeks later (i.e. a delay)? The practice of lean behaviors might have clarified the intent and desired outcome of the presentation first given.

Fat management styles have their philosophy rooted in the belief that the principles that guide human interaction are based upon the lowest forms of behavior: i.e. selfishness, distrust, envy, hate, greed, revenge, etc. Today's managers, like turn-of-the-century tradespeople, may soon be forced to abandon rule-of-thumb management practices based upon fat behaviors in favor of new lean behavior methods. However, they will not do this unless it can be proved, through training and experimentation, that counterintuitive methods are often more effective.

Figure 4
One-piece flow production



Behavioral waste

The fat behavior patterns that managers develop over time become a skill that often causes unintended consequences (Argyris, 1986, 1991, 1994; Kurtzman, 1998). For example, the ability to communicate ambiguously and without ever making a commitment results in the avoidance of conflict. Refinement of this skill reduces people's ability to say what they mean, sometimes even in the

simplest of conversations, and forces other people to "read between the lines". If such behavior becomes the norm, then the unintended consequence is an organization that cannot effectively discuss important issues. Business problems linger unresolved, often for years, and it becomes increasingly difficult to confront the issues. Ignoring problems leads to repetitive errors that consume resources whose focus is usually on short-term solutions to appease management.

The fear of real or perceived threats lead to the establishment of unwritten rules and assumptions that dominate the behavior of all employees. Both the people and the business then lose their ability to learn from internal or external sources, except, of course, those that teach defensive behaviors. Activities become less process focused and increasingly transactional, which further satisfies the culture's strong desire to limit communication and avoid conflict. Trust becomes a non-issue because there simply is not any. This leads to increasingly destructive behavior patterns that promote functional allegiance and minimum cross-functional co-operation (Schein, 1996). Conversations are reduced to simple comments, obligatory discussions, or debilitating debates, and emotions are either flat due to disinterest or enraged in the defense of one's views. Information becomes closely guarded, the transfer of knowledge is biased towards agreement or good news, and learning is stunted so that an organization is not able to accurately assess its competitive position.

An organization that does not possess the basic ability to communicate loses important opportunities to engage in more substantive forms of communication such as dialogue (Isaacs, 1993; Schein, 1993). Dialogue is a powerful way to share knowledge, gain appreciation of others, learn, solve problems, and create value. The suspension of ego, emotion, assumptions, and paradigms in dialogue allows the issues to come to the surface for holistic exploration. It also permits colleagues to mutually explore their fields of knowledge and reflect upon what they have learned (Shaw and Perkins, 1991). A fast-paced transactional environment can discourage people from slowing down long enough to listen, inquire, and test their beliefs. The satisfaction that some people gain from solving a constant stream of unexpected problems can be so great that they find it difficult to reflect, strategize, or engage in substantive dialogue to uncover the root cause of systemic problems. The "heroes" and "firefighters" become the dominant model of an effective employee. Reward systems are often well aligned with crisis management which further adds to the challenge of breaking free of fat behaviors.

Relations with stakeholders will no doubt suffer due to these defensive behaviors. Suppliers are usually the first to feel the negative consequences, followed by customers, then investors. A savvy competitor can gain valuable information by asking these stakeholders for benchmark comparisons of their own behavior under different conditions. The company that exhibits the most consistent generative behaviors, as well as helpful tendencies, will be the partner of choice for employees, suppliers, customers, and investors. Lean behaviors exhibited by the corporate culture should be a strong source of competitive advantage.

This is but one example in which the impact of behavioral waste should be easily recognizable across a wide range of stakeholder conditions. Most employees would likely say that they know this happens all the time, but they allow the waste to perpetuate either because it seems impossible to overcome or because its elimination is not valued or rewarded by management. At least the waste is recognized, which is a first step. The next step is to find ways to eliminate it to the greatest extent possible. Table I compares common fat behaviors that result in waste

Table I
Comparison of behavior attributes

Fat behaviors	Lean behaviors
Confusion	Self-awareness
Unnecessary commentary	Humility
Irrelevant observations	Compassion
Random thoughts	Suspension
Self-imposed barriers	Deference
Ego	Calmness
Irrationality	Quietude
Revenge	Reflection
Inaction	Honesty
Positions	Benevolence
Interpretations	Consistency
Uncertainty	Generosity
Negativity	Patience
Excess	Humor
Gossip	Understanding
Sarcasm	Respect
Preoccupation	Listening
Ambiguity	Observation
Extreme flattery	Trust
Cynicism	Sincerity
Subjectivity	Equanimity
Bias/prejudice	Objectivity
Deception	Discipline
Selfishness	Rectitude
Pride	Wisdom
Criticism	Balance

and selected lean behaviors that promote flow between people (Cleary, 1989, 1996). It is important to realize that interpersonal skills and organizational effectiveness are developed by practicing and improving upon weaknesses (i.e. lean behaviors), not strengths (i.e. fat behaviors).

The following is a list of the results of fat behaviors commonly found in the workplace. They include real or implied threats to help make things happen, management secrets, minimal feedback, poor results in employee surveys, few suggestions in the suggestion box, etc.:

- threats, real or implied;
- micromanagement;
- disappointing employee surveys;
- few improvement suggestions;
- employees stuck in functional area;
- scarcity mentality/limited resources;
- low turnout at meetings;
- calls not returned;
- annoyed stakeholders;
- slow response to changing conditions;
- employee turnover;
- rumors;
- transactional focus;
- crisis management;
- failure not tolerated;
- unclear expectations;
- little or no feedback;
- appearance over substance;
- favoritism;
- many procedures;
- low trust;
- talk not walked;
- management secrets;
- few rewards;
- ego-driven decisions;
- department or functional focus;
- unmet stakeholder needs;
- relentless pace;
- poor listening skills;
- broken promises;
- élitism;
- delays in action;
- confusion;
- destructive politics;
- declining market share;
- fear;
- ignorance;
- blind obedience;
- reduced loyalty;
- mistakes repeated; and
- conflict

Many of the consequences of fat behaviors relate to the loss of employee commitment. It is obvious that if employees do not feel they are being heard, then their participation in the business is likely to be greatly reduced. It thus follows that the prosperity of employees, and those groups within the stakeholder community that interact with employees, should also be reduced.

The economics of lean behaviors

Taylor's thinking can be extended to show that two main elements are required to achieve productive work. Assume that work, whether performed in the shop or office, consists of two discrete components of equal value: non-emotional and emotional. The non-emotional, or rational, content of work is related directly to the physical manufacture of a product – documents, tools, machines, materials, and motions. High non-emotional productivity implies people performing tasks efficiently in the production of goods or services. Conversely, the emotional content of work is invariably related to, if not required for, the manufacture of goods or delivery of services. It includes all things that can affect production such as written or spoken words, tone of voice, physical gestures, assumptions, and perceptions. High emotional productivity implies that people behave efficiently in support of production.

A manufacturing environment that constructively amplifies both types of productivity should be a market leader with above average return on sales, return on net assets, earnings per share, etc. It should also be a very good place to work, a sought-after company to supply, and a formidable competitor.

Employees subjected to the fat behaviors of colleagues and managers day after day cannot usually avoid at least some loss of self-esteem over time (Blitzer *et al.*, 1993). An environment rich in the practice of fat behaviors will wear people down and make them feel as if they can never do a good enough job no matter how smart they work or how many hours they put in. Recurring layoffs, few rewards or celebrations, impersonal task work, and incessant "fire drills" can make people think they are failures. Over time, they feel more alone, lose confidence in themselves and their decisions, and become less committed to achieving the goals of the organization. They may become stuck in their department because their attitude has deteriorated, which in turn reduces their performance and lowers their potential for future raises or bonuses. The economic impact of fat behaviors is felt not only by the employee, but by the company as well since its workers may not have the commitment or energy to meet the demands of competition in the market place (Koretz, 1998; Pennar and Mueller, 1997). In addition, a work environment filled with fat behaviors is unhealthy, which no doubt

leads to more sick days and higher health care costs due to stress-related illnesses.

Economists have recently begun studying and measuring the economics of social bonds, or social capital, in belated recognition of its importance within the framework of classical economic theory. Social capital is "the web of social relationships that influences individual behavior and thereby affects economic growth" (Pennar and Mueller, 1997). It examines the effects between the environment in which people live and their future health, social, educational, or financial status. As might be expected, people living in middle class neighborhoods will generally fare better in life than those living in low income areas. What is less obvious is the positive effects that generative behaviors such as trust and co-operation have on economic growth and prosperity (Fukuyama, 1995). High levels of trust result in increased participation in social groups that can be correlated to local economic growth. Social bonds are much more difficult to create when fat behaviors are practiced.

Do lean behaviors correlate with financial performance? The answer is probably yes, when one considers the totality of costs associated with fat behaviors across the entire stakeholder community – employees, suppliers, investors, *and* competitors. *Fortune*'s annual "100 best companies to work for in America" evaluates the financial performance of one pair of relationships – that of the company and investor (Grant, 1998). The five and ten year average annual returns to investors are both approximately 58 percent greater for the "100 best companies" compared to the *Russell 3000 Index* over the same period. It should be noted that only 54 of the "100 best companies" have been publicly traded over the past ten years, which indicates that a large portion of top company-investor performance comes from relatively new businesses. It is likely that new businesses experiencing rapid growth in competitive markets are fun places to work and do not yet exhibit the extent of fat behaviors that mature businesses typically do.

Finding the right people

By the time college seniors begin to look for a job they have been exposed to about 25 professors teaching in the classroom. A question the author regularly asks undergraduates when they interview for a job is: "Of all the professors you have had in class, who were the best and why". Invariably, the undergraduates can recall only one or two professors. When asked why, they cite story-telling ability, energy, enthusiasm, demanding but fair treatment, and ability to correlate theory and practice. In essence, they learned more from those professors that have a wider range of better-developed skills. So what about all the other professors; how is it that there can be so many who make so little impact on their customers? In most universities, the faculty has two primary functions: teaching and research. Some excel at one or the other, but few excel at both – which is what the university and its customers need. What criteria do universities use to find the right people? Certainly a successful record in research and obtaining funding will satisfy the employer to a great extent, but what qualities are sought after to meet the pull of the customer? Do professors receive training on how to teach, or are they allowed to simply repeat the same boring institutionalized methods that they learned when they were students? In general, universities have not yet met the challenge of training professors to teach to the extent that industry tries to train people to be effective managers or leaders.

If you ask the same question to colleagues at work – "Of all the managers you have worked with, who were the best and why?" – invariably they can recall only one or two managers of the many they have know over a ten, or even 20, year period. When asked why, they cite many of the same reasons that students do about their professors. But it goes a step further in the workplace, because employees that have been exposed to good managers will often remember them warmly and may even revere them. It is possible that it is because the manager behaved well, consistently over an extended period of time, towards their employees that they receive such high levels of respect and admiration – despite the preponderance of fat behaviors surrounding them. So how does one go about finding such people, who, in addition, must be capable of achieving sometimes tough business objectives?

Let us first probe this question in the context of the feeling that one gets when "time flies"; i.e. when one's attention is completely focused by the activity that is being performed. This phenomenon, the psychology of optimal experience, has been studied extensively and is called "flow" (Csikszentmihalyi, 1990). Psychological flow is the control of one's inner experience, or the moment-by-moment contents of consciousness, to a condition of happiness. Some people get this feeling occasionally, while others experience it regularly. Flow is typically achieved when the mind or body is engaged in an activity that leads to an outcome where success is within the capability of the participant. Flow

can be facilitated by engaging in activities that deliver a great sense of satisfaction such as gardening, sports, reading, playing music, painting, cooking, writing, and even work.

It can be hard to experience flow at work when one feels overwhelmed by the magnitude of the challenge, or if the challenge does not make sense to those who are responsible for carrying it out. It is even worse if the environment is frustrating and contradictory because there is rarely the sense of control that helps lead to satisfaction. If one's mental model is that work is difficult and its sole purpose is to earn a paycheck, then the odds that the person can regularly achieve flow while at work are very small – it is just something to do until the weekend arrives. Certainly an employee, with disciplined mental effort, can re-orient his or her own mindset over time to achieve greater satisfaction from work. But it would help if management could also change their mental models to help make the workplace less confusing or chaotic. Adepts of lean production have done just that; work is designed to be unambiguous and direct, and therefore production flows.

Psychological flow is achieved when the following conditions are met:

- challenging activities matched to personal skills;
- focused attention;
- clear goals;
- immediate feedback;
- freedom from external concerns;
- sense of control;
- loss of self-consciousness; and
- sense of time is altered.

People that experience flow regularly perform activities for their own intrinsic reward because it results in pleasure worth repeating. Such people have what is called an autotelic personality (Csikszentmihalyi, 1993, 1996). Control over subjective experiences often leads to peak performance, which can manifest itself in various ways. For example, the psychic demands of flow often lead to personal talents or creative results that are achieved for their own intrinsic value in the absence of known rewards. Workers that are able to convert monotonous activities to flow experiences will find their labors more rewarding and exhibit higher self-esteem or less stress (Csikszentmihalyi, 1993).

An autotelic personality could be a foundational characteristic for managers to achieve effective lean behaviors in the workplace because they are able to organize their consciousness, enjoy learning and discovery through personal experience, have the skills to recognize generative opportunities, and strive to repeat rewarding experiences. People that can experience flow more easily should be able to transform the clutter generated by contradictory and chaotic work environments to more positive outcomes through their ability to set clear goals, focus, and ability to lose the sense of self. The loss of self-consciousness could also serve as a shield that helps protect them from the fat behaviors directed towards them, behaviors that would normally send others wandering off on to tangents designed to defend their turf, knowledge, or self-esteem. So in other words, for people with autotelic personalities, the quality of experience is determined by how they respond internally, rather than by external conditions that might otherwise consume scarce mental energy. Rewarding experiences are revisited often, which may then result in discoveries that establish new paths worth exploring. Psychological flow also delivers a sense of control through the elimination of worries that would otherwise cause distraction and inhibit flow. Mastery of an activity whose challenge is matched to personal skills can deliver a state of seemingly relaxed or effortless performance free of gross errors.

To find the right person, one could also structure inquiries of the candidate's basic views on "how the world works". An external view rooted in fat behaviors (Table I) can lead to the reliance upon and perpetuation of environmental dependencies found in most workplaces. Alternatively, one can probe to see if managerial candidates have views that are less dependent on external circumstances and can therefore structure their own experiences to result in greater happiness and productivity. In addition, does the candidate have the basic skills to reach the goal of being an effective manager, or instead a covert desire for self-aggrandizement? It is also interesting to know how managers spend their leisure time. Are they inactive – watch television after work or "do nothing" while on vacation – or do they apply their mind or body in hobbies or adventures? Autotelic personalities will tend to seek flow experiences in leisure activities where they are generally more easily accessible. It would also be interesting to evaluate candidates' requirements for approval from others, as this may uncover sycophantic behavior or a propensity for self-centeredness. In either case, they will have difficulty learning.

People with a propensity towards fat behaviors (Table I), and anger in particular, will not be capable of regular flow experiences, much less promote flow in others. Negative feelings will make it difficult to control thoughts and actions, or identify potential matches between challenging opportunities and their skills, because the mind is focused on the

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many aspects of life that promote disorder. It is likely that one's emotional intelligence (Goleman, 1995) is a significant factor in determining one's ability to more regularly achieve flow in threatening environments such as the workplace. Emotional intelligence is the ability to control one's behavior to eliminate self-defeating impulses, to know when and how to express emotions, and to discern the feelings of others. It is an intelligence that is poorly developed in humans because our instincts, through evolution, have taught us to respond impulsively to threatening situations. No doubt this behavior can be valuable as it surely helped our ancestors survive hostile primitive conditions. But how well does poorly developed emotional intelligence carried over from primitive times serve modern civilized human beings with better-developed rational minds?

Emotional instincts are so strongly programmed into the basic structure of the human brain that we can evaluate a threat in a few milliseconds without conscious knowledge. Thus, defensive routines may be revealed well before a complete understanding of the magnitude of the threat is realized. Impulsive emotional responses have to wait for the rational, or thinking, mind to catch up to further evaluate the threat. A rational response may be appropriate for the circumstances if the delay is short and the threat is determined to have been overestimated. If, instead, the thinking mind later confirms the threat, then we should be thankful that the emotional response provided us with an effective early warning. However, a rational mind that is preoccupied by anger, frustration, low self esteem, anxiety, or a sense of victimization will have difficulty evaluating the threat, and any response is likely to contain a higher emotional content that could be too strong or off target for a given situation. The subconscious emotional memories retained from past experiences can thus work to either improve rational decisions, or lead to systemic difficulty in controlling one's response in stressful business settings.

Candidate managers could also be queried for emotional intelligence by probing their response to challenging situations. For example, what type of frustrating situations have they lived through? Can they stay focused, motivated, and maintain a positive outlook when things are not going well? Can they withstand sustained criticism from colleagues or learn from significant setbacks such as failure to achieve key business objectives. Are they able to control impulsive behavior? Can they delay gratification? The ability to manage one's feelings and to have awareness of other's emotions are key competencies that are useful in any facet of life. These intra- and interpersonal skills can be developed through improved understanding and practice. It should thus be apparent that the functional skills required in business are but one of many forms of intelligence that must be mastered in order to be an effective manager (Argyris, 1994; Goleman, 1995; Goleman and Thurman, 1991; Senge, 1990).

Personal discipline

One of the most difficult challenges that a manager faces is maintaining control over his or her intra- and interpersonal behavior as the level of responsibility increases. The stress brought on by pressures to perform in a leadership role and meeting the expectations of others can be overwhelming at times, causing impatience, impairment of listening skills, preoccupations, loss of sleep, poor decisions, and inconsistent messages. In addition, the base of constituents that a leader must interact with can increase greatly, which usually results in less time to dialogue with subordinates. As a result, the manager can begin to lose touch with many important sources of feedback on business or personal performance. It is not long before the manager's behavior evolves to reflect their existence in a highly fragmented and competitive environment filled with colleagues practicing fat behaviors (Argyris, 1994; Emiliani, 1998).

The management styles of individuals, whether intrinsic to one's personality, learned from defective mentors, or the result of transformative leadership experiences, have been formally extended to the behavior of organizations and related to overall business functionality (Kets de Vries, 1989, 1993, 1994; Kets de Vries and Miller, 1984, 1986). The various modes of leadership can be characterized as manifestations of personal neuroses that will inevitably drive business strategies, operating methods, and organizational behavior. For example, a leader that views the world suspiciously can drive an organization to be paranoid and have low trust, which results in defensive behavior that searches for enemies to blame and punish. Dissenters are not tolerated, information is closely guarded, there are few rewards, and risk-taking is discouraged. A leader that seeks to control the organization will install bureaucracies rife with compulsive political behavior and where decision making is labored or conservative. The focus is inward and supported by extensive use of plans with numerous checkpoints. Managers are reclusive, and

subordinates work very hard to ensure there are no surprises. Overly narcissistic managers thrive on taking advantage of others and are preoccupied with negative emotions such as envy or revenge.

While not usually aware of their own shortcomings, these same managers are often acutely aware of the shortcomings of their business and the need to continuously improve strategies and organizational practices. However, the standard method for doing this is typically discontinuous and therefore often results in failure (Kotter, 1995; Strebel, 1996). For example, change programs are traditionally deployed by training large numbers of employees in the change initiative and its associated business case, then establishing rewards to deliver the intended results. Additional training is often provided in parallel to develop new behavioral norms, but this can be poorly aligned with the behaviors that must actually be used to get results in the expected time frame. Thus arises a tension between the "theories espoused" by managers versus "theories in use" by the organization (Argyris, 1994; Kurtzman, 1998). The resulting confusion can further develop personal habits better aligned with the "theories in use", which slows the change process and perpetuates fat behaviors. In the end, the business results usually prevail over the behaviors used to achieve them.

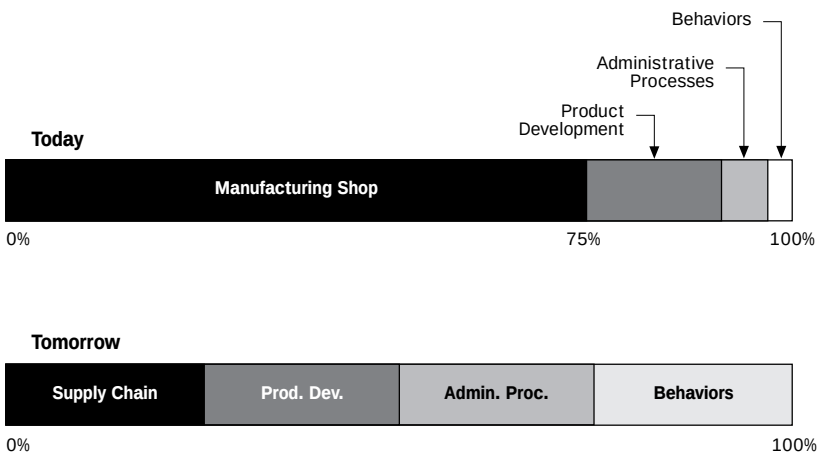
Institutionalized fat behaviors make change programs confusing because people are not sure when the old threats are really gone. It can take years for the organization at-large to determine when it is safe to begin practicing the "theories espoused". An alternative course of action would be to align the business results with the espoused behaviors and give them equal emphasis in both measurement and reward. This will help ensure that results are achieved using the new behavioral model. However, the chance of failure remains high unless managers and employees understand the great individual effort that must be applied to become disciplined in the practice of lean behaviors. The effort should be no less intense than that applied towards achieving key business goals.

Managers are very fond of saying "the devil is in the details". This colloquialism traditionally assumes that the details pertain to missing data whose discovery and analysis would presumably help improve the business. This stems, no doubt, from a fixation on data and performance measurements due to heightened competition and the accessibility of personal computers with powerful easy-to-use software. The focus on metrics at the expense of resulting behaviors shows that many people can understand the details, but few are capable of understanding system-level interactions and effects. Perhaps the devil is actually in the details of how we behave.

People with both autotelic personalities and high emotional intelligence possess a high level of intrinsic personal discipline (Csikszentmihalyi, 1990; Goleman, 1995). For others less endowed, both attributes can be learned over time by those willing to seek the basic knowledge and develop their capabilities. In addition, minds can be trained to see waste in intra- and interpersonal behaviors; to be attuned to thoughts and actions that produce errors and waste time or effort. Reinforcing mechanisms such as role models or mentors and business goals aligned with behavioral goals will be needed. Without effective teachers to help people behave in ways that reduce waste, managers will simply add to the corpus of degenerate behaviors. Can businesses continue to focus on only part of the available opportunity for improvement (Figure 5[5]) and still claim success?

Managers that do not meet business objectives are usually set aside due to non-performance. Imagine the strong message that would be sent through an organization if managers unable to achieve at least baseline lean behaviors after reasonable time were also set aside. It is just too easy to find people that can force results using fat behaviors (Emiliani, 1998). Senior managers must recognize and improve their own behaviors, then take up the far greater challenge of finding and advancing larger numbers of people that can meet both business and behavioral objectives. Once lean behaviors are deeply understood, they must be practiced diligently under all conditions until they become

Figure 5
Focus of improvement



sustaining behaviors that replace old habits. The next task is to strive for perfection.

Conclusion

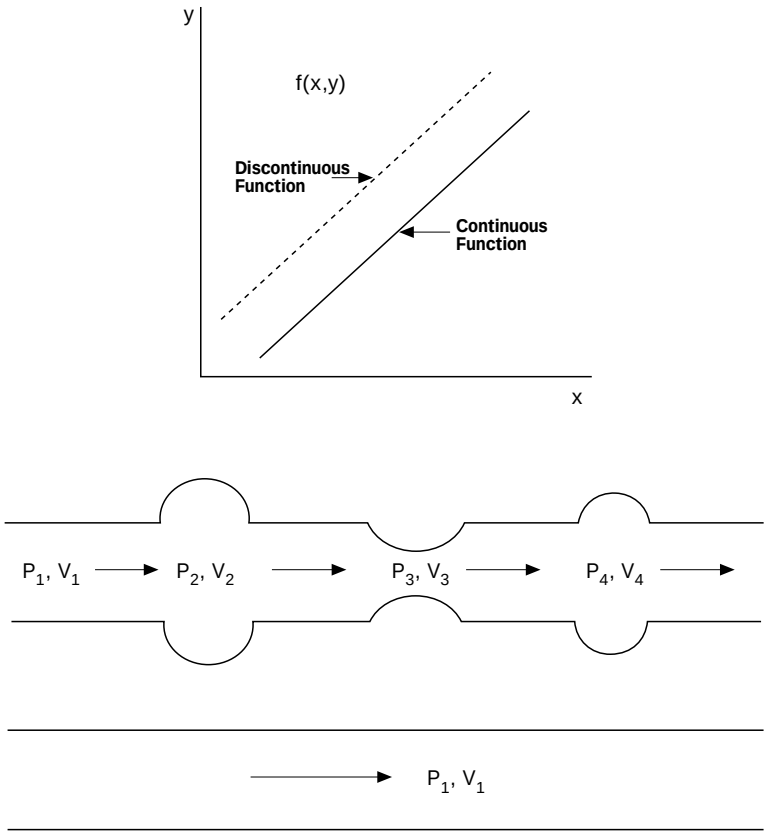
The intent of this paper is to show the tremendous amount of waste that normally exists in intra- and interpersonal relationships. The lean production model is used to highlight the required mindset and establish simple paths that can be used to minimize behavioral waste. It is a frontal assault on standard mental models that seek to strictly enforce local optimization. Like lean production, it is a five to ten year challenge for a well-established organization to develop even the most fundamental capabilities for sustained practice of lean behaviors. On a personal level, the transformation will take two to four years, but is no less challenging in the depth of personal discipline and perseverance required to achieve even baseline success.

Fat behaviors will win over lean behaviors 100 percent of the time until enough people within an organization lose their tolerance for the massive amount of waste that fat behaviors produce. Can behavioral waste be completely eliminated? The answer is surely "no". In fact, disagreements and other types of interpersonal tension can be important contributors to creativity or the development of individuals, organizations, or products. Stated another way, "Are fat behaviors ever useful?" Perhaps, but they should be used sparingly, after very careful consideration, and only under restricted conditions, because they can be potent destroyers of trust, morale, commitment, and self-esteem. Fat behaviors prevent us from knowing many important things about ourselves and others. Ignorance of this information surely leads to significant under-performance due to costly delays, rework, and poor co-operation. Managers have the prime responsibility to transform themselves and their organization from fat to lean behaviors. It is a challenge befitting the most well educated and highly compensated leaders in the workplace.

It is not inconceivable that someday investors, suppliers, customers, or employees will begin to question the cost or ethics of fat behaviors in a manner similar to recent stakeholder concerns about a company's environmental record or their presence in countries that lack basic human rights. Critical stakeholders such as investors or employees may precipitate improved behaviors once they more fully comprehend its impact on financial performance or quality of everyday life in the workplace. No stakeholder, except for competitors, would be happy if they knew the costs added to the goods or services that they purchase due to fat behaviors. Customers, in particular, deserve to share in the gains from a company's ability to practice lean behaviors.

Taylor said that his scientific management principles were no great discovery or invention (Taylor, 1967). Instead, it was simply the realization that better methods can be found by simply combining, classifying, reframing facts, and testing paradigms using the science of industrial engineering. Similarly, lean behaviors are no great discovery or invention either. It is simply the realization that individual and group behaviors can profoundly affect the prosperity of communities, and that better methods lie within the study of interdisciplinary subjects such as psychology, physical sciences (Figure 6[6]), management, economics, system dynamics, philosophy, and industrial engineering.

Figure 6
Possible analogs between human behavior and physical sciences



Notes

1 The stakeholder community consists of five interrelated elements: company, customers, investors, suppliers, and competitors. Each pair of interactive relationships is governed by formal and informal rules and processes (arrows). A clear understanding of the needs of

each stakeholder will result in a more balanced approach to the solving of complex business problems. Employees within the company can also be viewed as investors, through long-term compensation such as stock options or stock-based savings plans, or through their investment of physical and mental energy.

2 The pressures of competitive environments, performance metrics, and institutionalized fat behaviors result in the display of few behaviors that actually add or create value. The goal is to maximize behaviors that create value and eliminate those that lead to waste. Caution must be applied to those behaviors that do not *appear* to add value but cannot be avoided. For example, informal conversations, such as workers chatting in the hallway, can solve problems, build relationships, and help people learn or gain shared understandings. Applying Taylor's scientific management principles to this type of activity, in an effort to measure and eliminate it, could be very unwise. The lean behavior model does, however, recognize that non-value added behaviors, such as occasional arguments or a "slip of the tongue", are part of human nature and can lead to important creative output. Thus, behaviors that add no value but cannot be eliminated may not be a strong source of opportunity for personal improvement for those not yet skilled in identifying waste.

3 Batch and queue production (top) is a slow and costly method for producing goods because the large quantity of in-process material cannot move to the next step until the entire batch is completed. Workers perform a large amount of non-value added activity that can be minimized or eliminated such as parts transportation, multiple inspections, storage/retrieval, and time-consuming machine set-ups. In addition, a large amount of physical space is required to support this production method.

4 A lean environment produces parts using a less wasteful form of production called one-piece flow (bottom). Equipment in the manufacturing cell is arranged in the sequence that the parts are processed. Each part moves to the next operation only after successful completion of the prior operation. Key features include quick change-over and rigorous preventative maintenance to eliminate unanticipated machine downtime. Results include less part travel, faster cycle times, shorter lead-times, fewer defects, higher inventory turns, higher cash flow, and lower cost.

5 The primary focus of efficiency improvement efforts in manufacturing businesses has been the shop floor where many activities and outcomes are directly measurable – inventory, machine utilization, tooling expense, labor, etc. Only recently has business begun to understand the waste that occurs in product development, where design drives 80-90 percent of product cost. Design engineers far removed from manufacturing may not understand the impact on cost-quality-delivery of specifying expensive or long lead-time raw materials, tolerances that are not within the capability of standard equipment, or features that greatly exceed customer requirements. More recently, businesses have started to review administrative processes only to find massive amounts of waste there as well. Examples include unnecessary delays in processing sales or purchase orders, payments, and warranty or benefits claims. In the future, businesses should adopt a balanced approach for improvement of internal efficiencies, with a more even distribution of focus and resources. In addition, they must also recognize that 50-70 percent of the cost of manufactured products comes from external suppliers. Company resources should be applied towards improving supplier performance, in balance with overall needs and customer requirements. The development of human behaviors remains largely untapped in most businesses. Sustained practice of lean behaviors can propel further improvement in overall business performance by eliminating waste within functions and between internal and external interfaces.

6 The top diagram shows the concept of continuity from a mathematical perspective. The dotted line exhibits sudden changes whose behavior is termed discontinuous. In contrast, the solid line behaves predictably in a continuous manner, thus simplifying efforts to find solutions. A continuous mathematical function is often said to be "well-behaved". The bottom diagrams represent the flow of fluid in pipes of varying and constant cross section. Fluid flowing in the pipe with variable cross-section undergoes numerous changes in velocity and pressure, as opposed to the pipe with constant cross-section. People whose behaviors are unpredictable, or discontinuous, force others to respond to sudden changes in direction or intensity. Solutions to management problems that cross interfaces (i.e. supervisor-subordinate, stakeholder, or functional boundaries) may be less vexing if the practice of lean behaviors can be practiced by individuals and then integrated into the organization.

References

Argyris, C. (1986), "Skilled incompetence", *Harvard Business Review*, September-October, pp. 74-9.

Argyris, C. (1991), "Teaching smart people how to learn", *Harvard Business Review*, May-June, pp. 99-109.

Argyris, C. (1994), "Good communication that blocks learning", *Harvard Business Review*, July-August, pp. 77-85.

Bennis, W. and Nanus, B. (1985), *Leaders*, Harper & Row, New York, NY.

Blitzer, R.J., Petersen, C. and Rogers, L. (1993), "How to build self-esteem", *Training and Development*, February, pp. 58-60.

Campbell, A. and Alexander, M. (1997), "What's wrong with this strategy?", *Harvard Business Review*, November-December, pp. 42-51.
Cleary, T. (1989), *Zen Lessons – The Art of Leadership*, Shambhala, Boston, MA.
Cleary, T. (1996), *The Human Element*, Shambhala, Boston, MA.
Covey, S. (1989), *The 7 Habits of Highly Effective People*, Simon & Schuster, New York, NY.
Csikszentmihalyi, M. (1990), *Flow*, Harper Perennial, New York, NY.
Csikszentmihalyi, M. (1993), *The Evolving Self*, Harper Perennial, New York, NY.
Csikszentmihalyi, M. (1996), *Creativity*, HarperCollins, New York, NY.
de Geus, A. (1997), "The living company", *Harvard Business Review*, March-April, pp. 51-9.
Eisenhardt, K., Kahwajy, J. and Bourgeois, L. (1997), "How management teams can have a good fight", *Harvard Business Review*, July-August, pp. 77-85.
Emiliani, M.L. (1998), "Continuous personal improvement", *Journal of Workplace Learning*, Vol. 10 No. 1, pp. 29-38.
Fisher, L.M. (1998), "Inside Dell Computer Corporation: managing working capital", *Strategy & Business*, No. 10, First Quarter, pp. 68-75.
Fortune Editors (1998), "The Fortune 500", *Fortune*, April 27 , pp. F-1-F-70.
Fukuyama, F. (1995), *Trust*, Simon & Schuster, New York, NY.
Goleman, D. (1995), *Emotional Intelligence*, Bantam Books, New York, NY.
Goleman, D. and Thurman, R.A.F. (Eds) (1991), *Mind Science*, Wisdom Publications, Boston, MA, pp. 82-7.
Grant, L. (1998), "Happy workers, higher returns", *Fortune*, January 12 , p. 81.
Isaacs, W. (1993), "Dialogue: the power of collective thinking", *The Systems Thinker*, Vol. 4 No. 3, April, pp. 1-4.
Jenner, R.A. (1998), "Dissipative enterprises, chaos, and the principles of lean organizations", *International Journal of Management Science*, Vol. 26 No. 4.
Kanter, R.M. (1994), "Collaborative advantage: the art of alliances", *Harvard Business Review*, July-August, pp. 96-108.
Katzenbach, J.R. (1997), "The myth of the top management team", *Harvard Business Review*, November-December, pp. 83-91.
Kets de Vries, M.F.R. (1989), *Prisoners of Leadership*, John Wiley & Sons, New York, NY.
Kets de Vries, M.F.R. (1993), *Leaders, Fools, and Impostors*, Jossey-Bass, San Francisco, CA.
Kets de Vries, M.F.R. (1994), "The leadership mystique", *Academy of Management Executive*, Vol. 8 No. 3, pp. 73-92.
Kets de Vries, M.F.R. and Miller, D. (1984), *The Neurotic Organization*, Jossey-Bass, San Francisco, CA.
Kets de Vries, M.F.R. and Miller, D. (1986), "Personality, culture, and organization", *Academy of Management Review*, Vol. 11 No. 2, pp. 266-79.
Koretz, G. (1998), "The vital role of self-esteem", *Business Week*, February 2, p. 26.
Kotter, J.P. (1995), "Why transformation efforts fail", *Harvard Business Review*, March-April, pp. 59-67.
Kurtzman, J. (1998), "An interview with Chris Argyris", *Strategy & Business*, First Quarter, No. 10, pp. 87-96.
Manzoni, J.-F. and Barsoux, J.-L. (1998), "The set-up-to-fail syndrome", *Harvard Business Review*, March-April, pp. 101-13.
Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.
Pennar, K. and Mueller, T. (1997), "The ties that lead to prosperity", *Business Week*, December 15, pp. 153-5.
Robinson, A. (1990), *Modern Approaches to Manufacturing Improvement*, Productivity Press, Portland, OR.
Schein, E.H. (1993), "On dialogue, culture, and organizational learning", *Organization Dynamics*, Autumn.
Schein, E.H. (1996), "Three cultures of management", *Sloan Management Review*, Fall, pp. 9-20.
Senge, P. (1990), *The Fifth Discipline*, Currency Doubleday, New York, NY.
Senge, P. (1995), "Making a better world", *Executive Excellence*, August, pp. 18-19.
Senge, P. (1996), "Rethinking leadership in the learning organization", *The Systems Thinker*, Vol. 7 No. 1, February, pp. 1-7.
Shaw, R.B. and Perkins, D.N.T. (1991), "Teaching organizations to learn", *Organizational Development Journal*, Vol. 9 No. 4, Winter, pp. 1-12.
Sheridan, J.H. (1997), "Bonds of trust", *Industry Week*, March 17, pp. 52-62.
Shingo, S., (1988), *The Shingo Production Management System*, Productivity Press, Portland, OR.
Simons, R. and DaVila, A. (1998), "How high is your return on management?", *Harvard Business Review*, January-February, pp. 71-80.
Strebel, P. (1996), "Why do employees resist change?", *Harvard Business Review*, May-June, pp. 86-92.
Taylor, A. (1997), "How Toyota defies gravity", *Fortune*, 8 December, pp. 100-8.
Taylor, F.W. (1967), *The Principles of Scientific Management*, W.W. Norton, Co., New York, NY.
Womack, J.P. and Jones, D.T. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.
Womack, J.P., Jones, D.T. and Roos, D. (1990), *The Machine That Changed the World*, HarperCollins, New York, NY.

Application questions

1 Think of examples in your organization of "lean behaviors" and "fat behaviors" and consider why they have arisen that way.

2 The author has taken a manufacturing concept (lean manufacture) and applied it to personnel management. What other techniques from management (strategy, operations, marketing) might translate to behaviors?

Case study

The making of a lean aerospace supply chain

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Keywords

Lean production, Kaizen, Supply-chain management, Purchasing, Organizational behaviour, Learning organizations

Abstract

Presents the details of an initiative launched in 1995 to transform an aerospace machined parts supply chain comprised of many small businesses from high cost mass production to lower cost lean production. It presents the overall conditions as they existed at the onset of the initiative, strategies and tactics that were used to bring about the desired changes, and an analysis of the business practices, cultural, and behavioural factors that contributed to successes and failures. Recommendations are given to help others in their quest to develop lean supply chains. The lessons learned are most applicable to supply chains containing a large number of small, privately held, businesses making inexpensive parts. However, many of the recommendations will also apply to supply chains containing larger publicly held companies producing more expensive parts or assemblies.

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Introduction

The objective of this case study is to share important experiences that others can benefit from in their efforts to create lean supply chains. It describes the conditions that existed between a large customer and many smaller suppliers in a time of great change in the marketplace, and integrates technical, cultural, and behavioural factors. A central theme is the actions and responses of the people involved in the initiative and how legacy behaviours rooted in mass production (Ansari *et al.*, 1997) affected efforts to rapidly introduce major change. In particular, the lean supply chain initiative deployed by Large Aerospace Company (LAC)[1] threatened traditional business practices and the long-standing, well-understood, relationships between various stakeholders. The changes implied by the initiative upset the status quo and tested the technical (Robinson, 1990) and emotional (Goleman, 1995) competencies of both LAC and the machined parts supply chain. This case study seeks to link these attributes in a holistic framework to demonstrate the importance of understanding the perspectives of multiple stakeholders when introducing broad-based change in supply chain management practices.

Background

Large Aerospace Company Inc. assembled a team of energetic, qualified, and well-educated change agents in 1995 to lead a multi-year activity to create a lean supply chain for machined parts that was patterned after Honda's supply chain practices (Nelson *et al.*, 1998). The implementation leaders were a cross-functional group of mid-level managers with adequate internal and external resources to drive the transformation. Key functions – purchasing, engineering, quality, finance, human resources, continuous improvement, materials management, and MIS – were
co-located to facilitate communication and co-ordination and thus help achieve the goals. The managers had diverse backgrounds with different levels of knowledge of lean production, and the employees reporting to each manager had narrower backgrounds and an even wider variation in their understanding of lean production. All of the managers had a

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functional responsibility in addition to supporting the lean supply chain initiative.

The supply chain selected for this initiative produced machined parts from bar stock, castings, and forgings. The first-tier machining suppliers specialized in machining and typically outsourced all other operations such as electroplating, non-destructive inspection, heat treating, welding, brazing, plasma spraying, etc. The LAC supply management team maintained close business relationships with the first-tier machining suppliers because of the purchase order contract that joined them together. LAC supply management also had strong informal relationships with many key Tier 2 and Tier 3 suppliers which were utilized primarily to expedite parts. The bulk of the day-to-day interaction was between LAC managers and individual buyers and the owner or operations manager.

The relationship between customer and supplier is normally complex and involves many parameters that extend across technical, functional, business, and human dimensions. The following six headings summarise the key conditions, as they existed in 1995, to aid in developing a more complete understanding of the context of this case study.

Machining supplier data

- Suppliers were small family-owned businesses with 25-60 employees.
- Suppliers had £3-10 million per year in total sales.
- Most had been doing business with LAC for 20-40 years.
- The owners were typically the child or grandchild of the founder.
- The owners were usually strong entrepreneurs tolerant of certain types of risk.
- Most owners were not interested in change.
- Other members of the family often worked in the business.
- All produced parts using batch and queue mass production systems.
- Most produced a wide variety of product configurations.
- Most had modern machines (due to their belief that technology improved productivity).
- Information systems were being upgraded.
- Suppliers interfaced with 10-15 buyers from LAC.
- Part prices were based on "economical lot sizes".
- There was little long-term business planning.

Product data

- There were few design standards for machined parts.
- Less than 1 per cent of the parts were in computer file format.
- The commodity spanned several engineering teams across all product platforms.
- LAC's engineers rarely worked with machining suppliers in the design stage and were largely unavailable once the part was in production because inexpensive machined parts were "low on the priority list".
- There was a backlog of over 200 engineering changes related to blueprint errors or manufacturing process improvement waiting to be processed.
- Simple configuration changes took an average of 11 weeks to complete.
- Of configuration changes 25 per cent resulted in cost reduction, 65 per cent had no change in price, and 10 per cent resulted in cost increases.
- The machined parts are typically less than 50cm in diameter.
- Primary manufacturing processes are milling, turning, drilling, and grinding.
- Parts were designed to close tolerances and are of medium to high complexity.
- Parts are made from bar stock (60 per cent), forgings (20 per cent), and castings (20 per cent).
- Parts are made from a variety of standard and custom alloys: stainless steel/nickel (60 per cent), titanium alloys (35 per cent), and aluminum/magnesium (5 per cent).
- Over 200 sub-tier suppliers support the machining suppliers by providing raw materials and performing a variety of services such as welding, brazing, heat treat, X-ray, coatings, and chemical and metallurgical testing. All sub-tier products, processes, and services are controlled by LAC's quality organisation.

Cost performance

- Of the parts 90 per cent had a unit cost of <£600, 80 per cent had a unit cost <£300.
- Annual quantities ranged from hundreds to a few thousand pieces.

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- There were no long-term agreements with machining suppliers. All parts were quoted competitively every 6-18 months.
- Twelve machining suppliers produced 80 per cent of the purchased volume.
- LAC typically represented 30-80 per cent of a supplier's annual sales.
- Machining suppliers did not have pricing agreements with their suppliers (nor did LAC have pricing agreements with the sub-tier suppliers).
- Sub-tier suppliers generally raised their prices 5-10 per cent every year, which the machining supplier either partially adsorbed or passed through to LAC in its entirety.
- The cost of this commodity increased an average of 5 per cent each year.

Delivery performance

- The machined parts commodity consisted of about 5,000 part numbers; 2500 part numbers had delivery requirements within the next 18-24 months.
- Of the machining suppliers 95 per cent were located within 150km of LAC.
- Each machining supplier was responsible for about 200 part numbers, and typically had 50-75 part numbers in process.
- Parts typically require two-five outside processes.
- The supply chain had well-established social and business relationships, supply lines, materials management, and logistics systems.
- On average, there were 350 overdue part numbers every day (~20 per cent of LAC's total overdue).
- On-time delivery performance was about 70 per cent.
- The average lead-time was about eight months.
- The machining suppliers were learning to use LAC's new just-in-time materials management system.

Quality performance

- All machining suppliers had a documented quality system in accordance with LAC requirements.
- Annual quality system audits showed that 30 per cent of the machining suppliers received "A" ratings (best), 55 per cent "B" ratings, 10 per cent "C" ratings, 5 per cent "F" ratings (worst).
- A handful of machining suppliers were ISO 9002 certified.
- There were 10-15 reportable quality problems per month.
- Sub-tier suppliers were responsible for many of the quality problems.
- There were three-four significant quality problems per year.
- Root cause analysis and corrective action plans were generally weak.

Continuous improvement

- Suppliers were skilled at optimizing their mass production system.
- Machining suppliers achieved productivity improvements 2-4 per cent per year, which were used primarily to partially absorb sub-tier supplier cost increases or improve margins.
- Over the last ten years, set-up time was reduced from 10-20 hours to 2-4 hours per operation (Note: there may be five-ten machining operations required to produce a part).
- The average lot size decreased from ~400 pieces to ~100 pieces over an eight year period.
- None of the suppliers had formal continuous improvement programmes in place.
- None of the suppliers posted metrics.
- Shops ranged from very clean to dirty.
- A few suppliers had formal employee training programmes in place.

It should be apparent from the summary points presented that the machined parts suppliers had not been previously challenged by LAC or other major customers to significantly improve their overall business performance. Machined parts was one of the last commodities to be managed tactically, in part due to the lack of attention normally received by less expensive parts. This was unfortunate because end-use customer expectations and requirements were rapidly moving towards the same level of performance as that which was expected from larger publicly held companies – especially cost reduction. In addition, the aerospace industry was recovering from a major downturn and would require much higher volumes and faster response times to accommodate anticipated demand starting in 1995 and lasting through 1998.

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LAC supply management

LAC had initiated large-scale continuous improvement programmes within its own manufacturing shops during the low point of the business cycle in the early 1990s. The initiative focused on internally manufactured products, which accounted for 35 per cent of product cost, and was patterned after the Toyota Production System (Ohno, 1988; Shingo, 1988). LAC utilized experienced consultants to facilitate change. There were dramatic (50-90 per cent) reductions in lead-time, cycle time, walking distance, part travel, scrap, floor space, etc., all of which helped reduce product costs. By 1995, senior management had witnessed first-hand the impressive results that can be achieved using the methods developed by Toyota and other lean producers (Womack *et al.*, 1990; Womack and Jones, 1996).

Attention turned to the 65 per cent of cost that was produced by external supply chains by mid-1996. LAC senior management was late in addressing this component of product cost because:

- "Purchasing" was not viewed as a strategic function.
- The people in "purchasing" were viewed as having a low skill level compared to engineering, manufacturing, finance, legal, MIS, quality, and even human resources.
- Supplier relationships were historically limited to the first-tier.
- LAC decided to develop lean production competencies internally, prior to seeking the participation of external suppliers.
- LAC believed that it did not have enough resources to develop lean suppliers.
- Multiple workforce reductions pre-occupied executives, managers, and employees.

There was tremendous pressure to reduce cost, reduce lead-time, improve delivery performance, improve quality, and demonstrate large gains from continuous improvement. Time was quickly running out for the machined parts supply chain, which was considerably less knowledgeable on how to improve performance compared to larger aerospace suppliers. They lacked the skills, resources, mindset, market awareness, sense of mutual dependence, and customer focus needed to introduce significant change. For example, machining suppliers were unable to compete against larger companies for more knowledgeable people that might have recognized the need for change sooner because the latter offered better salaries and benefits. In addition, entrepreneurial-minded small business owners rarely shared or relinquished control to those who would challenge practices that were known to have been successful in the past. Lastly, LAC's supplier initiatives were invariably reserved for major suppliers with serious cost or delivery performance problems, or where a historical relationship had been established due to their exclusive position in the industry or where the spend was highest. The machined parts suppliers did not warrant attention; that is until LAC's financial performance became a bigger issue to external investors.

Despite these barriers, which were truly known only to lower level "purchasing" people – because access to senior management was limited – LAC's senior management was "raising the bar" faster than the machined parts supply chain could respond. Indeed, even LAC's lean supply chain team had difficulty precipitating the necessary changes in the supply chain because they were not yet aware of the totality of the dynamics that were operating between multiple stakeholders. They did not fully understand the history of LAC's relationships with first-tier suppliers nor how deeply the culture and paradigms that guided people's behaviours were rooted.

The procurement people that managed machined parts in 1995 had survived many layoffs in the previous eight years. As a result, the buyer workforce was reduced by about 75 per cent so that one person typically did the work of four people just a few years earlier. Each buyer thus procured an average of about 1,000 part numbers, which was two-three times the amount of parts that can be effectively managed. Unfortunately, LAC's purchasing information systems and procedures had not changed significantly or rapidly enough during 1988-1995, a period of immense market upheaval where orders fell by 50 per cent.

It was difficult to find buyers because the machined parts commodity was viewed as a purchasing "backwater" where the least capable people ended up. This, of course, was not completely true; the buyers worked very

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hard and took their responsibilities seriously. However, their strength was in traditional purchasing practices which LAC management correctly determined to be an outdated and a high cost way of doing business. Buyers were physically separated, often by several kilometers, from their internal customer and important functions such as engineering, materials management, and finance. In addition, problems with low cost parts were seen as low priority by just about everyone except the buyers and their internal and external customers. As a result, their calls for help were rarely answered, and so the buyers largely gave up asking for help. This generated a lot of hostility that would affect the future integration and functionality of co-located cross-functional teams.

The machined parts purchasing group did respond to some of senior management's initiatives in the 1988-1995 time frame, such as cost reduction and supplier reduction. The cost of purchased parts fell during the depth of the downturn due to oversupply of capacity and the traditional use of verbal threats; buyers would stop quoting unco-operative suppliers or cancel purchase orders if they did not quickly comply with the needed cost reduction. For years LAC and other aerospace customers regularly "beat-up" the machining suppliers to achieve cost reduction and never acknowledged the cost inputs from sub-tier suppliers. As might be expected, LAC's customers were using the same tactics to force cost reduction and other performance improvements.

The number of suppliers was successfully reduced from 80-50 over an eight-year period. However, quality and delivery performance remained inconsistent. LAC and its machining suppliers had little experience with effective root cause problem solving, so cost, delivery, and quality problems remained systemic obstacles to end-use customer satisfaction. This cultural weakness would threaten LAC's ability to win new business when production volumes started to return in the last half of 1996.

LAC introduced cross-functional product development teams in the early 1990s to overcome the ingrained habit of throwing the blueprint "over the wall" to manufacturing. The concept worked reasonably well for high cost parts, but was not effective for lower cost machined parts that crossed multiple engineering groups and product platforms. So the machined parts commodity continued to be managed tactically – i.e. "place and chase" – through 1995. A new organisation was then created that was designed to move from tactical "purchasing" to strategic "supply management". Managers and staff from all relevant functions were co-located to improve tactical response and achieve strategic business goals. The strategic goals were:

- Reduce the machining supply base by 20 per cent.
- Teach continuous improvement to machining suppliers.
- Source parts in product or process families.
- Reduce unit cost by 5-10 per cent.
- Improve quality by 50 per cent.
- Improve on-time delivery performance by 25 per cent.
- Reduce lead-times by 30 per cent.
- Stabilize prices by establishing long-term agreements.

Most of the functions integrated well with the buyers except for engineering and continuous improvement, which were seen as outsiders. Engineering staff were, at first, slow and unresponsive to the demands of the production environment; they lacked a sense of urgency. It took over one year to correct this deficiency, partly because the pool of engineers to draw from was small. Very few engineers were willing to: leave their functional "home"; work in manufacturing; work on low-prestige machined parts; work with suppliers that were judged to be subordinate in intellect; and risk their career for unknown learnings or rewards. In fact, the first engineers to participate in this new organisational structure found their experience in manufacturing to be personally fulfilling. However, on returning to engineering after completion of the rotational assignment, they were initially shunned by their peers and were not adequately rewarded by their management for the personal risks and challenges that they engaged in. Nor were they recognized for the vast improvement in technical, business, and interpersonal skills that most engineers acquired.

Manufacturing engineers from internal shop operations that had recently learned the various improvement tools staffed the continuous improvement team. Buyers regarded the manufacturing engineers as the people most capable of ruining their

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supplier's delivery performance by instituting product or process cells. The buyers were very sensitive to this because it was their name that appeared on parts shortage reports; not the manufacturing engineer, not the supply manager, and not the supply management team. Indeed, some early attempts to install product cells had mixed results, which reinforced the buyers' perceptions that continuous improvement was not effective and that suppliers, using traditional batch and queue methods, knew best how to manufacture parts.

In addition, buyers viewed lean production as the latest "fad" that would not last. Successes were not communicated well, and early failures tended to dominate the buyers' opinions, their current conversations, and near-term future actions. Word soon spread throughout the machining supply base (primarily by LAC's buyers and field quality personnel) that LAC's "help" had actually hurt the machining suppliers that participated in the continuous improvement events. It was not until much later, after additional successes and more suppliers began to embrace continuous improvement, that buyers began to partially support the lean supply chain initiative. Buyer support was a critical achievement because suppliers listen very closely to buyers; if individual buyers sincerely support an initiative, then suppliers will eventually follow suit. In small businesses, the owner is the key person that has to be convinced.

The establishment of long-term purchasing agreements (LTAs) was an integral part of the lean supply chain initiative. However, buyers were reluctant to support this strategy because they believed that LTAs would result in the loss of their job. Their fears were not unfounded, since they witnessed other purchasing organisations that had suffered this very fate. So the buyers overtly undermined the initiative and its leadership by keeping the machining suppliers focused on tactical delivery and cost issues. In addition, executives in the supply management organisation had a poor understanding of lean production and did not know how to support the initiative. Thus, they tacitly undermined the initiative as well. This reinforced
suppliers' and buyers' assumptions that continuous improvement would be a passing fad. The machining suppliers shunned LTAs since a few of LAC's recent fixed price contacts with suppliers in a related commodity contributed to very poor financial results. In addition, LAC was slow to respond to suppliers' requests for price adjustments due to significant increases in raw material prices.

An integral part of the LTA strategy was to source products via part or process families, which would lower product cost by reducing set-up times, scrap, lead-times, etc. The initial work focused on establishing part families. LAC's manufacturing engineers sorted hundreds of blueprints into logical groups and presented their results to selected machining suppliers. Supplier feedback showed that LAC's understanding of part families differed from how machining suppliers would group parts. In the next iteration, LAC's supply management team sought input from machining suppliers on how best to establish part families based on primary manufacturing processes. The owners of the machining suppliers balked when they saw the results because they assumed that they would lose their most profitable parts to other suppliers and gain potentially less profitable parts that they had not previously made. Also, most of the machining suppliers were unwilling to specialize in the production of a narrow group of parts, preferring instead to maintain a broad range of machining capabilities.

So, the initial attempts at sourcing part families was not very successful. It was clear that the lean supply chain team did not fully understand what constitutes risk in the eyes of the machining suppliers. In addition, volumes were ramping up starting in mid-1996, and LAC's lean supply chain team drifted back towards tactical "purchasing" and away from strategic "supply management". Efforts to establish LTAs were inadvertently put on hold.

Supplier perspective

The machining suppliers were a hard working and very dedicated group of people. Most of them were dependent on LAC for 50 per cent or more of their sales. However, they lacked a uniform understanding of the marketplace and the speed with which the business model was changing. They were far removed from the end-use customer, and LAC management was not successful in convincing suppliers that they needed to make major changes in

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their production system. Senior management would hold annual conferences where attendance was always limited to first-tier suppliers with spend greater than £6 million.

That threshold excluded most of the machining suppliers. Executives would show chart after chart depicting changing business conditions, and the suppliers were told many times what they had to do in order to keep doing business with LAC. Not surprisingly, the meetings were interpreted as one-sided and confrontational. The content and tone of the meeting rapidly spread from the few machining suppliers in attendance to the many smaller first-tier machining suppliers. The feedback was almost always negative, which reinforced the machining supplier's view that LAC did not understand their business. The lack of credibility stemmed from the fact that LAC's senior management had never addressed systemic complaints from its suppliers. The primary complaints were:

- High schedule variation.
- Lack of engineering support.
- Suppliers not involved in design.
- Business was a "one-way street".
- Price increases from Tier 2/3 suppliers.
- LAC behaved inconsistently.

It is clear that the machining suppliers had for years operated under conditions of high uncertainty and low trust which negatively influenced their thoughts and actions. Real or implied threats resulted in an impulsive desire to fight back (Nicholson, 1998), albeit usually in subtle ways that were generally very effective at slowing change initiatives.

The machining supplier's concept of customer focus was limited to the tactical demands of cost, delivery, and quality. The daily conversations between buyers and suppliers rarely included discussion of broader strategic issues affecting the machined parts supply chain. They apparently saw no need to educate suppliers on market-driven issues that could affect their future existence. There were vast quantities of information readily available to individual buyers from internal and external sources that showed a major shift was happening right before their eyes. But the buyers effectively ignored this data. Perhaps this was because LAC senior management lacked credibility with its employees, and therefore the ability to effectively influence them. It is very important to note that continuous improvement was not yet a part of the buyer's vocabulary, even though it was rapidly becoming the common language of people in LAC's internal shop operations. The machining suppliers reasoned that if the buyers were not supporting lean production, then they did not have to support it either. In addition, buyers continued to receive rewards from management for sporadic successes in tactical purchasing that were most often related to heroic efforts to meet delivery requirements.

For years the first-tier machining suppliers were told, often explicitly by the buyers and purchasing managers, to avoid specialization. LAC, like most other aerospace companies, valued suppliers with a broad range of machining skills to help them get out of never-ending part shortages. The machining supplier, in turn, learned from previous downturns that having a wide range of skills would help ensure survival of their business. LAC was no different, having also learned that a wide range of skills helped them better manage large fluctuations in business volume. So there was good alignment in business strategy, which worked well as long as LAC could tell its customers what products they wanted and the price that they should pay. But the alignment crumbled in about 1988, when customers started telling LAC what they wanted and at what price they were willing to pay.

LAC began to deploy manufacturing engineers into the machining supply base in 1995 to train them on the continuous improvement tools developed by successful lean producers. Most of the suppliers resisted LAC's help because they had seen many previous initiatives come and go with little or no results. Common complaints about the lean supply chain initiative included:

- "It's just the latest fad."
- "We don't make car parts!"
- "We're not in Japan."
- "Your manufacturing engineers don't know how to make these kinds of parts."
- "It won't work [because production is low volume, high diversity]."
- "I don't want to share information with my employees."
- "I don't want to specialize."

The concept of lean production was a major shift in thinking for the machining suppliers and constituted a significant amount of risk in

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their eyes – especially since their other customers were not yet asking for this capability. The magnitude of the shift was at first underestimated by the lean supply chain initiative team, and it was very difficult to concisely explain to LAC senior management why the machined parts commodity continued to perform poorly on cost, delivery, and quality. Senior management had little patience and had planned on many "quick wins" that would immediately flow to the bottom line.

Because most the machining suppliers were slow to buy-in to lean production, the lean supply chain initiative team did not rely on them to deliver the lean production message to their sub-tier suppliers. Nor did the lean initiative team assume that the benefits of lean production were self-evident. So, significant effort was made using a variety of methods to consistently communicate the many benefits simultaneously to Tier 1/2/3 suppliers. The benefits included improvement in:

- cash flow,
- profit,
- inventory turns,
- customer satisfaction,
- delivery performance,
- new product introduction,
- workplace safety,
- shop and office cleanliness,
- employee involvement,
- equipment up-time,
- morale,
- speed,
- capacity,

and reduction in:

- scrap,
- inventory,
- non-conformances,
- set-up time,
- cost,
- work-in-process,
- walking distance,
- part travel,
- cycle time,
- capital expense,
- mistakes,
- variation,
- re-work.

Continuous improvement events were a primary approach for introducing lean production concepts to machining suppliers. Machining suppliers would learn the tools and techniques of continuous improvement by direct experience, and facilitated by an LAC expert or outside consultant. LAC thought that the week-long continuous improvement event format that it used internally would also be applicable to machined parts suppliers. A few suppliers were eager to participate, but most resisted, citing a lack of resources. The suppliers said they were not able to devote 10-25 per cent of their workforce to participate in a continuous improvement event for several days and still maintain on-time delivery performance.

LAC's lean supply chain initiative team suffered a short-term loss of credibility by not recognizing the resource constraints of the machining suppliers and the magnitude of the paradigm shift that lean production was to them. After many unsuccessful attempts to overcome the resource obstacle, LAC recognized that the continuous improvement event format would have to be flexible in order to meet the needs of the suppliers. So a menu of continuous improvement events was developed that focused on the basic tools such as 5S, reducing part travel, reducing walking distance, set-up reduction, and mistake proofing (Robinson, 1990). Some continuous improvement events were as short as one-half day, which resulted in greater participation among a wider group of machining suppliers.

LAC did not charge suppliers any money for the help it provided. Instead, the initial approach was to simply exchange training in continuous improvement for reduced part cost, reduced lead-time, and improved quality. The contract was verbal. Improvements in quality were passed directly to LAC with no qualification. However, commitments to reduce lead-times were not easily obtained because the raw materials were single-sourced or because most of the parts had secondary operations performed by outside suppliers. The machining suppliers were not in control of these businesses whose performance was often erratic. So the machining suppliers would usually hold in reserve most improvements in lead-time as a safeguard against future unknown problems. This was not acceptable to LAC since its customers were demanding significant reductions in lead-time. It was clear that prior neglect of sub-tier suppliers by LAC would become a major barrier to implementing a lean supply chain for machined parts.

LAC told the machining suppliers that "in return for our help, we want to split cost

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reductions 50-50". Most suppliers were very reluctant to share in any cost reduction for three primary reasons. First, about half of the part cost came from sub-tier suppliers that had a history of annual price increases. The machining suppliers had fixed price purchase orders and thus had to absorb these increases. Second, high schedule variation forced the machining suppliers to regularly split lots to meet LAC's delivery demands. This required them to pay high minimum lot size charges that were not normally passed along to LAC. Third, machining suppliers saw an opportunity to improve their margins after having endured several years with little or no profit. Thus, LAC's business practices coupled with sub-tier supplier non-performance created opportunistic behaviour patterns among the machining suppliers.

Lastly, complete buy-in was difficult to obtain because the suppliers were small, privately held companies that had a strong sense of independence. The very reason why they were in business for themselves was to be independent of the hierarchy normally found in larger publicly-held companies. In addition, the inability of LAC to respond to systemic complaints strengthened the belief that they were alone and independent. LAC's talk of "teamwork" and "partnering" rang hollow because their input was consistently ignored. This, in effect, provided a strong disincentive to participate in the transformation to lean production.

Conclusions

This case study illustrates the many factors involved in the deployment of lean production in an aerospace machined parts supply chain. LAC's culture and business practices are typical of that exhibited by many large mature companies because their behaviours are rooted in the teachings of mass production (Ansari *et al.*, 1997). The legacy of past practices impaired LAC's ability to drive needed change within its own operations as well in the machined parts supply chain. Successful transition from mass production to lean production requires a deep understanding of the differences in cultural and behavioural attributes, as well as the elimination of contradictions that create uncertainty and confusion (Argyris, 1998). Some of LAC's difficulties stemmed from the fact that it did not fully understand the concept of how to eliminate waste in production (Womack and Jones, 1996). Nor did it recognize the parallel challenge of how to eliminate wasteful human behaviours.

It is apparent that there were a large number of complex and interdependent issues that affected LAC's strategy, planning, implementation, and results. Despite many obstacles, the lean supply chain team was able to achieve a moderate level of success in a relatively short period of time – about three years. Factors judged to be the greatest obstacles were: (1) LAC's past business practices; (2) poor alignment within LAC; (3) confusion over roles and responsibilities; (4) the independent mindset of the owners of the machining suppliers; and (5) the batch and queue system that had previously delivered personal and financial success to the business owners in the machined parts supply chain. In general, LAC underestimated the strength of existing paradigms, the depth of operating norms between people within the machining supply chain, and the complex interrelationship between tacit and explicit knowledge when implementing a major change programme.

The sub-tier suppliers remain a significant source of opportunity for performance improvement. LAC has discovered, just as Toyota did 35 years ago, that the mindset and performance of the sub-tier suppliers limits first-tier supplier performance. LAC is continuing its quest to develop lean supply chains, with additional emphasis on the sub-tier suppliers. The following is a concise summary of the successes and key lessons learned from LAC's lean supply chain initiative.

Successes

- LAC improved its credibility by responding to many supplier complaints.
- LAC's lean supply initiative team developed a consistent message and communicated it to suppliers every day. They played an interpretive role in explaining why this initiative was needed, how it responded to both local and global interests, and how it could be a sustaining source of competitive advantage for decades to come.
- The internal competencies that LAC gained in lean production, coupled with widespread dissemination of success

stories, eliminated the ability of suppliers to say that it could not be done in the aerospace business.
- Continuous improvement event formats and content were changed to better meet the needs of small businesses and resulted in greater participation.
- After three years, about 30 per cent of LAC's machining suppliers cognitively understood lean production or were on the path of implementation. Less than 10 per cent of the sub-tier suppliers were implementing lean production.

Improvement opportunities
- Ensure that all of the people that interact with suppliers – executives, managers, buyers, field quality personnel, engineers, etc. – have a shared understanding of lean production. Suggest classroom training, followed by site visits to successful lean producers, followed by classroom dialogue, followed by additional site visits to lean producers, etc.
- Understand what you are doing from the perspective of multiple stakeholders.
- Resolve systemic supply chain complaints prior to launching a lean initiative.
- Have a clear understanding of how the sub-tier suppliers operate.
- Deploy lean production with Tier 2/3 suppliers, slightly ahead of Tier 1 suppliers.
- Require suppliers to share in cost reductions – or be prepared to reduce order backlog.
- Customers must see suppliers as people that they can learn from.

Recommendations
- Centralize commodity management to reduce the number of buyer interfaces and avoid sending confusing signals to the supply chain.
- Commodity management should include the entire supply chain and related industries that affect their performance.
- Visit many Tier 1/2/3 suppliers to better understand dependencies and constraints, and to help plan the initiative.
- Reduce schedule variation.
- Aerospace supply management executives should join together and co-author letter of joint expectations for lean production to their supply chains. They should publish this letter often in various trade journals.
- Understand risk in the eyes of small businesses. Distinguish between acceptable stretch goals and unrealistic goals that generate negativity and cynicism.
- Structure continuous improvement activities to the realities of small businesses.
- Assign people to work on the project full-time and establish regular dialogue meetings.
- Always co-locate cross-functional lean supply chain teams.
- Be patient – lean production is not a "quick win" initiative. Major changes in mindset and skills take time: at least one-two years for basic understanding, another three-four years for training and implementation, and two-four more years to achieve sustaining skills and behaviours.

Note

1 LAC is a supplier of engineered components to both small and large airplane manufacturers, with a turnover in excess of £1 billion. The names used in this case study have been changed to ensure confidentiality.

References

Ansari, S., Bell, J., Klammer, T. and Lawrence, C. (1997), *Management Accounting in the Age of Lean Production*, Irwin McGraw-Hill, New York, NY.

Argyris, C. (1998), "Empowerment: The Emperor's New Clothes", *Harvard Business Review*, Vol. 76 No. 3, pp. 98-105.

Goleman, D. (1995), *Emotional Intelligence*, Bantam Books, New York, NY.

Nelson, D., Mayo, R. and Moody, P.E. (1998), *Powered by Honda*, John Wiley & Sons, New York, NY.

Nicholson, N. (1998), "How hard wired is human behavior?", *Harvard Business Review*, Vol. 76 No. 4, pp. 135-47.

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Robinson, A. (1990), *Modern Approaches to Manufacturing Improvement*, Productivity Press, Portland, OR.

Shingo, S. (1988), *The Shingo Production Management System*, Productivity Press, Portland, OR.

Womack, J.P. and Jones, D.T. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J.P., Jones, D.T. and Roos, D. (1990), *The Machine that Changed the World*, HarperCollins, New York, NY.

Cracking the code of business

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Ethics, Investor relations, Leadership, Lean production, Organizational behaviour, Productivity

Abstract
Large public companies restructure themselves on a regular basis with the primary goals of achieving better financial performance and demonstrating responsiveness to shareholder interests. However, it is well-known that such discontinuities typically result in great stress and confusion amongst employees, particularly over how to achieve new stretch goals. Key functions such as engineering, manufacturing, purchasing, quality, and finance often pursue separate paths to achieve function-specific goals. This paper utilizes the principles and tools of lean production to decode the CEO's mandates and deliver practical, solutions-oriented tools to employees to help achieve stretch business goals. This creates an effective bridge between the language of the CEO and engineering, manufacturing, purchasing, quality, and finance functions. Coupled with LEAN BEHAVIORS[SM], an environment can be created that enables widespread employee alignment and commitment to challenging business conditions. The result is the first framework that unifies technical and behavioral components of management.

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Introduction

Amorphous Conglomerate Company is being hammered by the marketplace. Revenues are off by 13 percent, cash flow is nearly half of net income, and pre-tax income is down 37 percent. Market share is down 4 points. Once high profit products are now becoming commodities. Prices are falling and competition is intensifying due to recent mergers. There is excess capacity in the industry. Costs are rising. High quality imported products are beginning to enter the market. Investment analysts cry "sell". The stock price drops 31 percent. The complacent board has been activated. It is time for a new chief executive officer. New leadership and bold new initiatives are needed!

The new CEO arrives and the first order of business is a series of senior executive meetings to develop new strategies. They scrutinize past financial performance, market share, profit projections, manager and employee skills gaps, quality performance, new products under development, marketing strategies, and the incentive compensation structure. The CEO is watching each executive closely for clues to determine who will likely be cast aside and who will thrive in the upcoming restructuring. A list of mandates is formulated and employee meetings are scheduled to communicate the new strategic plan.

The auditorium is filled to capacity. Employees wait quietly for the CEO to arrive. The CEO presents the strategy and employees listen intently to the new plan. The central features of the strategy are to grow sales, reduce costs, streamline operations, and speed up decision making to make the organization more efficient. The company will reorganize from strategic business units to global product centers to better serve customers. Two factories will be closed this year, the workforce will be reduced by 18 percent, and one large acquisition will be made to establish a presence in services. The mandates include:

1 double net income;
2 increase cash flow by 100 percent;
3 increase working capital turnover by 30 percent per year;
4 double inventory turns;
5 introduce ten new products over two years;
6 develop new products in half the time with half the money;
7 reduce costs by 30 percent;
8 improve product quality by 50 percent.

The CEO assures employees that they are intelligent people and will find ways to achieve these goals. Working in teams, they will generate remarkable solutions. The company has a great history and will make it through this dark period by coming together as a family. There are no barriers, the CEO declares. It will be a tough fight for survival, problems must be attacked with urgency, the enemy has been identified, and our objectives are clear. The war has begun – take no prisoners. Courageous leadership will make the difference.

The CEO tells employees to just put their heads down and grind it out. Working harder and working smarter will improve competitiveness and speed to market. We will meet our commitments, guaranteed, and failure is not an option. The CEO says that the company and its shareholders must win; anything less is unacceptable. A new era of personal accountability for performance has been declared. Make commitments and meet them; no excuses. What gets measured gets managed. A balanced scorecard is introduced as a means of focusing employees' efforts (Figure 1). Investment analysts cheer the aggressive cost cutting and revenue growth plans. The stock price jumps 8 percent.

Figure 1
Example of a typical balanced scorecard whose focus is mostly internal

Finance	Customer
• Return on Sales • Return on Net Assets • Inventory Turns	• Returns • Overdue • Complaints • Market Share
Innovation	**Internal**
• New Products • New Markets	• Order-to-Ship • Mfg. Productivity • Quality • Response Time

Amorphous Conglomerate Co. is clearly back on track.

After the meeting, most employees are thinking the same things. Yet another re-structuring – the third one in 11 years. More layoffs, morale is deteriorating, loyalty is gone. Why didn't the last two restructurings work? Will I be one of the 18 percent to go? How are we going to achieve such aggressive goals? Where do we start? What must I do differently? Cynicism creeps in, and employees grow further apart from management.

And so the corporate transformation begins. Each executive develops plans and delivers them to lower-level managers and employees for implementation. Employees, lacking specific, actionable behaviors proceed to work in an uncoordinated fashion. Each department seeks to optimize its own area with the hope of meeting stretch targets. Everyone knows that people who do not meet their commitments will likely be dismissed. It is a time for results, not just good effort. The stakes are high, so implied threats weigh heavily upon employees' minds. People are highly motivated, right?

Will the company survive? Probably, in some form or another. Is this the best way to manage a turnaround? No, because the new executive teams' analysis and CEO's resulting call to action concentrates primarily on financial parameters that are understandable to only a select group of people. The new strategy is confusing, so it will need to be forced on to the organization. The CEO will be at risk if the organization is unable to execute the new strategic plan in accord with investors' expectations (Charan and Colvin, 1999).

What is lacking is critical thinking, an intellectually disciplined process whereby ideas, assumptions, reasoning, implications, and espoused knowledge are closely examined to ensure that they are logical and consistent. Critical thinking can yield a common language and set of activities that align key functional areas and stakeholders together in times of change. This paper describes a way to accomplish this by integrating lean production and lean behaviors.

The importance of critical thinking – part 1

Eiji Toyoda visited the Ford Motor Company in 1950 to benchmark their production system. What he saw was the world's leading mass production system – a best practice of its day with its great history, growth, and sales figures to prove it. Mr Toyoda could have returned to Japan and implemented such a system in his own factory. But he did not. Why? Probably because he could not afford to replicate the infrastructure due to a lack of human, financial, material and physical resources. And he may not have been aligned with the values and methods of batch-and-queue mass production, or thought that significantly higher quality must be achieved, and the only way to do this was through relentless process improvement. So, through a constructive combination of factors – constraints, dissatisfaction with leading production methods, vision, and critical thought processes – he and his colleagues created a new way to produce automobiles (Womack *et al.*, 1990).

Lean production was developed beginning in the 1950s by Eiji Toyoda and Taiichi Ohno of the Toyota Motor Co., and Shigeo Shingo, a consultant to Toyota and other Japanese manufacturers (Ohno, 1988). They systematically developed a disciplined process-focused production system whose objective was to minimize the consumption of resources that add no value to a product. They determined that there were seven major wastes in production: defects, transportation, overproduction, waiting, processing, movement, and inventory. A key concept in lean production is to understand value as seen by the end-use customer. From this viewpoint, activities and actions that do not add value can be identified and eliminated. The result is a business system that is capable of achieving remarkable performance across the extended enterprise. The five fundamental concepts are (Womack and Jones, 1996):

1 Specify value – see value as defined by the end-use customer.
2 Identify the value stream – understand all the activities required to produce a product, then optimize the whole process from the view of the end-use customer.
3 Flow – getting the activities that add value to flow without interruption.
4 Pull – respond to the demand of the customer.
5 Perfection – systematically identify and eliminate waste in production.

Lean production employs the process of continuous improvement to products, processes, or services, with the goal of reducing waste and improving performance over time. The fundamental tool is Kaizen, in which cross-functional teams systematically analyze processes to identify and eliminate waste. Kaizen events, typically one to five days in duration, can yield 50-90 percent reductions in waste compared to the 1-5 percent level of improvement sporadically obtained in unstructured mass production process improvement efforts. The application of Kaizen is supported by numerous process analysis and improvement tools.

The primary support tools include: 5S, visual factory, total productive maintenance, set-up reduction, mistake-proofing, standard work, one-piece flow, and kanban (Robinson, 1991). The 5Ss stand for: sort, straighten, shine, standardize, and sustain. In other words, a clean and organized workplace eliminates the waste of time and effort spent walking around trying to find things. Visual factory is a method of organization such that the work, current conditions, schedule, and abnormalities are made obvious to even the casual observer. Extensive use is made of visual and audio controls to make normal or abnormal conditions readily apparent. Total productive maintenance is a methodology that permanently improves the effectiveness of equipment such that unscheduled down-time is eliminated. Set-up reduction is a process whereby machine set-up time is reduced from hours to minutes, thus making it affordable to produce small quantities of goods. Mistake-proofing is the creation of simple, inexpensive devices that allow work to be performed defect-free at all times.

Standard work is the precise description of a work process upon which future improvements can be made. One-piece flow is a technique used to manufacture components in a cellular environment, such that no part is allowed to go to the next operation until the previous operation has been successfully completed. The goals of one-piece flow are to make one part at a time, correctly all the time, and to achieve this without unplanned interruptions or lengthy queue times. Conversely, in batch-and-queue production no part can move to the next operation until the entire batch is processed which results in lengthy queue times and larger numbers of defects. Kanban is a method for replenishing materials on a just-in-time basis, thereby eliminating the waste of overproduction.

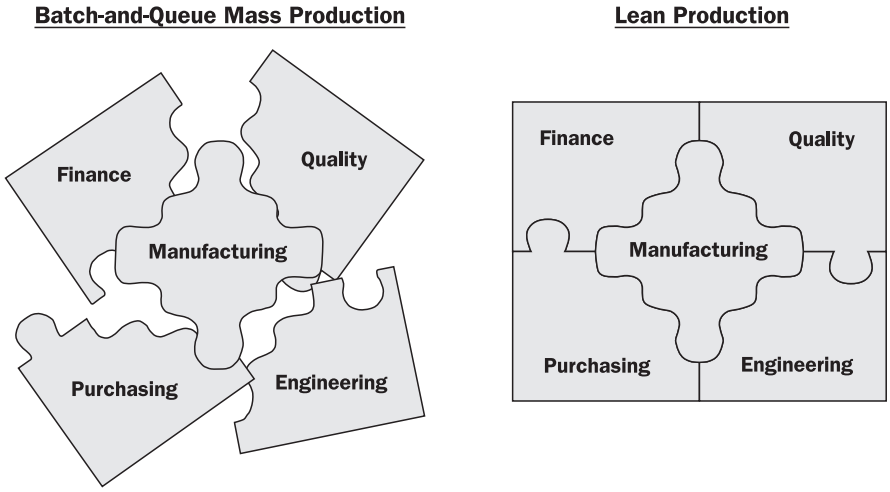
Lean production cannot succeed without the disciplined use of effective tools to determine the root cause of variation or abnormal conditions. For example, one-piece flow simply cannot be achieved with recurring interruptions or quality turnbacks. So extensive use is made of Pareto charts, scatter diagrams, fishbone diagrams, and similar tools to determine the root cause of variation and implement corrective actions that ensure the elimination of repeat occurrences. Another simple and effective tool is the "5 Whys", which involves asking "why?" five or more times until the root cause is identified.

Lean production has many remarkable features, eight of which are particularly worth noting. First, the business philosophy is simple and can be easily understood by any employee. Second, it engages all employees, regardless of function or position, in a blame-free environment focused on improving processes and eliminating waste using well-defined tools. Third, employees need only to understand arithmetic to utilize the process improvement tools. Fourth, lean production integrates product design, manufacturing, and distribution so that the whole is optimized for the benefit of the end-use customer. In contrast, the batch-and-queue mass production philosophy optimizes the individual parts for the benefit of competing departments (Figure 2). Fifth, the lean production system, while counter-intuitive compared to traditional batch-and-queue mass production, yields sustainable competitive advantage if implemented properly. Sixth, improvement does not have an end point, unlike in batch-and-queue mass production where learning curves imply the existence of improvement limits. Seventh, lean production is inexpensive to implement and maintain. Eighth, lean production is the lowest cost, highest quality, and most responsive production system.

The importance of critical thinking – part 2

Leading people remains one of the most challenging aspects of modern business. Hundreds of useful models and tools have

Figure 2
Batch-and-queue mass production strongly promotes optimization of individual functions while lean production seeks to link these functions together, including external stakeholders



been developed since Frederick Taylor's *Principles of Scientific Management* was first published in 1911 (Taylor, 1967). The models and tools of Argyris, Bennis, Covey, Deming, Drucker, Follett, the Gilbreths, Goleman, Handy, Kets de Vries, Maslow, Myers-Briggs, Pfeffer, Schein, Senge, Tichy, Vroom, and others demonstrate both the importance and the challenge of effective management in complex organizations. The philosophical and analytical contributions made by these people are great and unquestionable. All are substantially correct in their observations and prescriptions. However, the persistent dissatisfaction of employees demonstrates that most managers apparently remain unconvinced of the merits of generative behaviors upon organizational effectiveness. How can this be?

There is no doubt that the daily pressure of business brought by stakeholders, particularly investors and customers, leads to a persistent focus upon their issues. Because investor and customer concerns shift often, and perhaps without much warning, the work of operating managers will tend to focus on results at the expense of process. The feedback from these stakeholders is rapid and very effective in quickly changing management's behavior. In addition, management may believe that having a process focus conflicts with the flexibility required to respond to the shifting needs of investors or customers. Results tend to be highly valued in organizations that lack well-defined processes.

The importance of stock price and stock-based compensation cannot be overstated since it profoundly influences management's behavior. Thus, not all stakeholders are equal. In fact, management can treat some of its stakeholders quite poorly, like employees, suppliers, or labor unions, and still make a lot of money. Why? Making a list of the things that senior management typically does to increase stock price leads to a curious result (Table I). Of the 26 items listed, none relates to the management of employees. The items listed can keep management busy for decades without them ever having to worry about

Table I
Traditional CEO playlist

Layoffs
New management
Close facilities
Share re-purchase
Acquire
Merge
Divest/spin off assets
Incentive compensation
Develop new markets
Develop new products
Exclusivity
Discontinue non-performing products
Reduce debt
Accounting methods
Reduce taxes
Consolidate
New technology
New business model
Outsource
Reduce purchased material expense
Process improvements
Legal/patent position
Challenge/threaten rivals
Price cuts
Reduce discretionary expenses (perks)
Tariffs

generative management practices. Further, employee concerns are often seen as problems that have no practical or quick solutions. So why spend much time worrying about them? We thus come to the realization that the management of employees is essentially an *independent variable* in business. This is a key factor in explaining why many good management models fail to produce permanent and widespread changes in behavior.

Non-executive employees are a unique type of stakeholder because they generally have limited access to executives and less influence, either as individuals or groups. Companies with perpetually unresolved conflicts, such as confusion over the meaning and applicability of terms like empowerment, help ensure the status quo. Thus, an employee's desire to contribute new ideas based upon expert knowledge can conflict with senior management's view of employees as either non-experts or narrowly-focused people whose primary function is to faithfully execute top-down business plans.

In addition, management models are seen as theoretical constructs that are not generally applicable to actual business conditions (Mills *et al.*, 1998; Sturges and Brewerton, 1999). What we learn about management in business school is "nice to know", but we quickly learn from experience that there may be little or no reward for actually practicing such behaviors. Rather than evolving to higher practices, we devolve in response to fundamental business realities such as meeting cost, delivery, quality, or product performance goals, not to mention quarterly earnings. How can it be that actual management practices are so disconnected from the needs of employees?

One reason is that management models can be complex, hard to understand or remember, or difficult to make actionable, which makes them unlikely to be used under real business conditions. The models address a variety of personal and interpersonal competencies that may not appear to be applicable to all stakeholders, thus undermining consistent application. An effective management model must be congruent with real world conditions in order to have a chance of actually being applied. Further, the solution must be a simple process that is easy to understand and one that complements, rather than conflicts with, the pressures imposed by investors and customers. What would such a solution look like?

Knowledge of the history of management coupled with the current practice of management in many large manufacturing businesses demonstrates that existing solutions have yet to meet the needs of practitioners. We can think of this as an engineering problem in which there exists variation whose root cause must be understood. Critical analysis of this variation first leads one to think about the differences in production systems used by companies that manufacture goods. The distinctive feature of batch-and-queue mass production is that it maximizes the consumption of resources, while lean production seeks to minimize waste. This, in turn, leads to careful thought about the behaviors that are used in day-to-day human interactions and the realization that they may not be congruent. In fact, direct observation of human interactions within and between batch-and-queue mass production businesses reveals an abundance of wasteful behaviors (Table II). In other words, using wasteful "hard" (technical) skills supports the daily use of wasteful "soft" (interpersonal) skills. If this is true, then can lean "hard" skills support the daily use of lean "soft" skills?

Lean behavior (see Appendix) is the application of lean production principles and tools to the management of personal and organizational behaviors with the goal of eliminating behavioral waste (Emiliani, 1998a). Stated another way, lean behavior is a method of improving "soft" skills using the same "hard" skills practiced by lean producers in the manufacture of goods. The opposite of lean behavior is called "fat behavior", and is defined as any activity or action that creates or perpetuates behavioral waste. Table III shows a comparison of these behavioral attributes, while Table IV presents the consequences of fat behavior. What is significant about lean behavior is that its structure maps directly on to lean production, thus creating a parallel, rather than orthogonal, business management model (Figure 3). This is a breakthrough in organization design because all activities in a manufacturing business can now be aligned.

As in lean production, a key element in lean behaviors is to understand value as seen by the end-use customer. From this viewpoint, behavioral activities and actions that do not add value can be identified and eliminated. The five fundamental concepts are:

1 Specify value – understand the wants and expectations of the people that we interact with.
2 Identify the value stream – understanding what people do and why they do it.

3 Flow – behave in a manner that minimizes or eliminates delays or stoppages in the work performed by others.
4 Pull – recognize that people operate under many different mental models which require us to adjust our styles or approach often.
5 Perfection – systematically identify and eliminate behavioral waste.

Lean behaviors employ the process of continuous improvement to one self or an organization with the goal of reducing behavioral waste and improving performance over time. The fundamental tool is also Kaizen, where behaviors are systematically analyzed in order to identify and eliminate waste and yield a life-long learning mindset. The application of Kaizen in the behavioral context is supported by the same process analysis and improvement tools as used in lean production, including:

Table II
General characteristics of production systems

Batch-and-queue mass production	Lean production
Functional focus	Business focus
Management directs	Management teaches
Delegate	Support
Fear of failure	Share successes
Blame people	Improvement opportunities
Heroes and goats	Real teamwork
Us versus them	Community
Results focused	Process focused
Me (producer)	You (customer)
Status quo	Change to improve
Forecast	Make to demand
Presentations	Key metrics
Dedicated equipment	Flexible equipment
Slow changeover	Quick changeover
Narrow skills	Multi-skilled workers
Managers control	Workers control
Supplier is enemy	Supplier is friend
Guard information	Share information
Customer as buyer	Customer as resource
Linear design	Concurrent design
Volume lowers cost	Analyze cost drivers
Local optimization	Value stream optimization
Complex inventory management	Simple inventory management
Direct cost reporting	Indirect cost reporting
Internal focus	External focus
Shallow process knowledge	Deep process knowledge
Quality problems	Quality commitment
Hierarchy	Flat organization
Short-term thinking	Long-term thinking
Individual accountability	Team accountability
Rewards: money	Rewards: money, pride, etc.
Competition	Cooperation
Complex	Simpler
Intuitive	Counter-intuitive
Maximize consumption of resources	Eliminate waste

Table III
Comparison of behavior attributes*

Fat behaviors	Lean behaviors
Confusion	Self-awareness
Unnecessary commentary	Humility
Irrelevant observations	Compassion
Random thoughts	Suspension
Self-imposed barriers	Deference
Ego	Calmness
Irrationality	Quietude
Revenge	Reflection
Inaction	Honesty
Positions	Benevolence
Interpretations	Consistency
Uncertainty	Generosity
Negativity	Patience
Excess	Humor
Gossip	Understanding
Sarcasm	Respect
Preoccupation	Listening
Ambiguity	Observation
Extreme flattery	Trust
Cynicism	Sincerity
Subjectivity	Equanimity
Bias/prejudice	Objectivity
Deception	Discipline
Selfishness	Rectitude
Pride	Wisdom
Criticism	Balance

Note: *Not intended to represent one-to-one correspondences

5S, visual/audio control, total productive maintenance, set-up reduction, mistake-proofing, standard work, one-piece flow, and kanban (Emiliani, 1998b).

The 5Ss stand for: sort, simplify, sustain, self-discipline, and spirit. In other words, a workplace, work habit, and mind that are organized and energized eliminate the waste caused by inconsistent behavior. Visual and audio controls are the visible and audible expressions used by people that indicate their emotional state and willingness to engage in human interactions. Managers should be mindful of their facial expressions and tone of voice if they expect to promote successful encounters with other people. Total productive maintenance is the maintenance of the mind and body, since our personal effectiveness is affected by how we think and feel.

Set-up reduction is a process whereby the time needed to achieve change in business practices, and concomitant employee buy-in, is reduced from years to months. Mistake-proofing is the creation of simple devices that allow humans to interact with fewer conflicts. Standard work is a method for reducing wide variations in management's

Table IV
Consequences of fat behaviors

Threats, real or implied
Micromanagement
Disappointing employee surveys
Few improvement suggestions
Employees stuck in functional area
Scarcity mentality/limited resources
Low turnout at meetings
Calls not returned
Annoyed stakeholders
Slow response to changing conditions
Employee turnover
Rumors
Transactional focus
Crisis management
Failure not tolerated
Unclear expectations
Little or no feedback
Appearance over substance
Favoritism
Many procedures
Low trust
Talk not walked
Management secrets
Few rewards
Ego-driven decisions
Department or functional focus
Unmet stakeholder needs
Relentless pace
Poor listening skills
Broken promises
Elitism
Delays in action
Confusion
Destructive politics
Declining market share
Fear
Ignorance
Blind obedience
Reduced loyalty
Mistakes repeated
Conflict

interpretation of business conditions with the goal of achieving greater alignment and consistency. One-piece flow means performing each activity as it is presented and being responsive to all stakeholders. It is the development of a "do it now" mindset, as opposed to letting business matters sit in a queue waiting for disposition or purposely creating waste in non-production activities. Kanban means that managers are responsive to employees; that they provide them with what they need, when they need it, to help eliminate waste caused by delays or inaction.

The same root cause problem-solving tools used in lean production can also be used in lean behaviors: Pareto charts, scatter diagrams, fishbone diagrams, 5 Whys, etc. These tools help classify and determine the cause of variation in personal or organizational behavior for which corrective actions can then be applied. The most important application of these tools may be in the determination of the root cause of failed management initiatives, coupled with codification of lessons learned into databases and applying the principles of Kaizen to past initiatives.

This new framework rigorously aligns the production work performed in lean factories to the development of leadership and management skills. Lean behaviors are simpler and more practical compared to other solutions, and thus should enable faster results with greater chance for long-term sustainability. The key concept is the elimination of waste, be it in production or human behaviors.

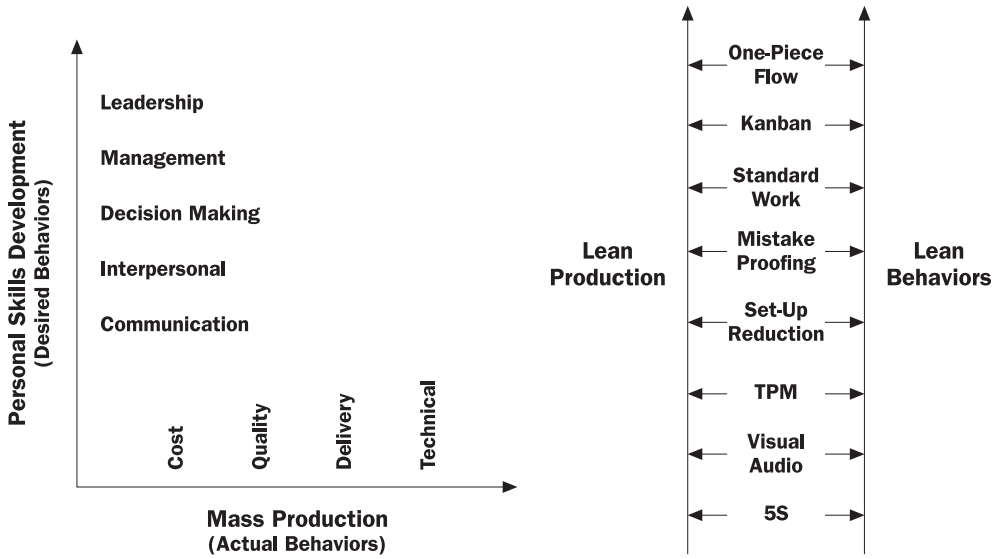
The language of business

The language we use depends upon what part of the business we participate in. The language of senior management is dominated by terms related to money. For most public companies, the focus is on shareholders, not stakeholders, though some companies are now becoming more aware of stakeholder interests and realize that satisfying these interests need not come at the expense of shareholders, and can lead to greater shareholder value. Stakeholders can include employees, suppliers, customers, labor unions, federal governments, towns, environmental groups, and local educational institutions, and even competitors, to name a few.

Senior management speaks in terms of return on revenues, net income, cash flow, earnings per share, working capital, net operating assets, return on equity, return on capital, price/earnings ratio, inventory turns, return on net assets, etc. We can assume that the finance people know what the CEO means, but the typical non-financial employee does not understand these terms very well because they speak and think in different languages. This demonstrates the power of functional languages in shaping perceived roles and responsibilities in business settings.

Engineering people speak of tolerances, tensile strength, high-cycle fatigue, heat transfer rate, compressible flow, power, contact resistance, natural frequencies, and other terms. Manufacturing speaks of standard hours, machine capability, cycle time, batches, overtime, queue time, set-up, labor grievances, etc. Purchasing people

Figure 3
Batch-and-queue mass production practices and leadership skills development generally oppose each other (left), while the lean business model (right) aligns both production and behavioral practices



speak of price, purchase price variance, on-time delivery, purchase orders, supplements, fill rate, expediting, terms and conditions, commodities, etc. Quality people speak of non-conformances, statistical process control, process capability index, qualified suppliers, defects-per-million, root cause, corrective action, audits, etc. Accounting and finance people speak of budgets, labor hours, fixed costs, variable costs, controllable costs, uncontrollable costs, manufacturing overhead, SG&A, cost of capital, etc. Different functions focus employees into different worlds.

The various languages used by these key functional areas help ensure that responsibilities remain neatly divided, even in companies that practice teamwork. The CEO often reinforces such distinctions simply by the manner in which work is delegated. For example, customer complaints related to product performance are handed to the Vice President of Engineering for action. Customer complaints related to delivery performance are handed to the Vice President of Manufacturing. Customer complaints related to product cost are handed to the Vice President of Purchasing, and customer complaints related to product quality are handed to the Vice President of Quality. The common view, rooted in the mass production mindset (Table II), is that these customer complaints are not related to each other.

Management often cannot effectively explain to employees the importance of financial indicators in investor valuation, corporate financial performance, or value stream management. Further, these measures are not effectively translated into operating practices and behaviors that employees in diverse functional areas can effectively respond to because responsibilities are divided. Thus, not critically thinking about how these different functions interact together can lead to conflict, and explains why the performance of most teams fall well below the expectations of senior management.

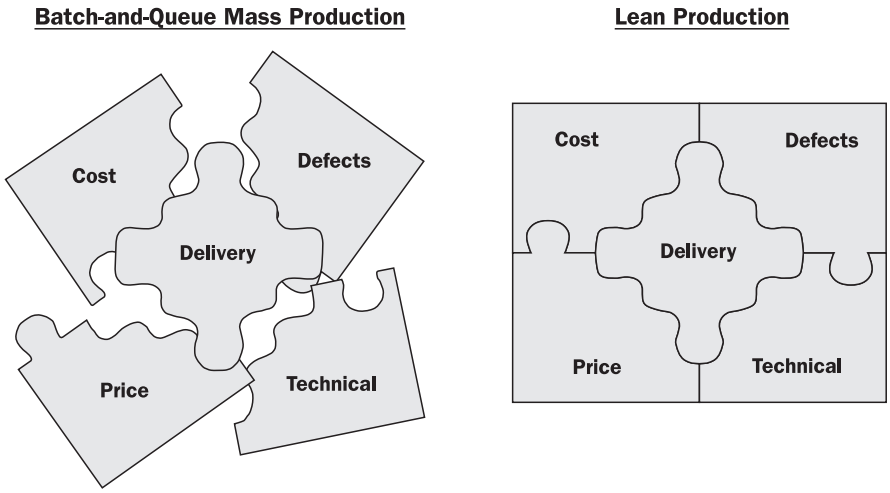
In addition, incentive compensation systems for senior managers often lead to a "coin operated" behavior designed to ensure focused response to temporal business demands or the concerns of selected stakeholders, which creates schisms between key functions, operating performance, and stakeholder satisfaction. For example, it is easy to find examples of metrics in one functional area that conflict with the metrics of another functional area or stakeholder (Figure 4). Rarely are such wasteful inconsistencies eliminated because most companies do not work effectively across functional or other types of boundaries.

Making mandates actionable

Recall that the new CEO of Amorphous Conglomerate Co. made the following mandates:

1 double net income;
2 increase cash flow by 100 percent;

Figure 4
Batch-and-queue mass production strongly promotes optimization of individual metrics while lean production seeks to link the metrics together from the customer's perspective. The critical differences are results versus process focus and maximizing the consumption of resources versus eliminating waste



3 increase working capital turnover by 30 percent per year;
4 double inventory turns;
5 introduce ten new products over two years;
6 develop new products in half the time with half the money;
7 reduce costs by 30 percent;
8 improve product quality by 50 percent.

What might the people from the various functional groups think when they hear these mandates as they are uttered by the new CEO? Which of these mandates will they accept responsibility for, and which ones will they assume to be the responsibility of their colleagues in other departments? The outcome could be as follows:

- Engineering – Items 5, 6 – possibly Items 7 and 8.
- Manufacturing – Item 4, 6, 7 – possibly Items 5 and 8.
- Purchasing – Items 4, 7 – possibly Items 6 and 8.
- Quality – Item 8 – possibly Item 7.
- Finance – Items 1, 2, 3, 4, 7 – possibly Item 6.

Each functional area typically selects only those items that resonate with what they perceive to be within the domain of their current roles and responsibilities; i.e. that which is consistent with their function, metrics, or core educational experience (Table V), as is typically done in batch-and-queue mass production businesses.

In this example, all five functional areas believe that it is their responsibility, at least in part, to reduce costs by 30 percent. On the surface, this would appear to be quite good, and senior management might even rejoice in the alignment that appears to exist for this particular goal among employees. However, this may not be as good as it seems, especially if the methods used by each functional area to achieve these goals are substantially different – as would likely be the case in large or decentralized companies. Managers lacking common or standard approaches will likely invoke traditional methods, perhaps slightly improved, that are known to be capable of delivering quick results and thus avoid personal risk. And the sense of urgency delivered by the new CEO will reinforce management's view that traditional methods performed faster will be sufficient to get the job done. This can also result in conflicting metrics that create waste through confusion and delays.

Following the CEO's call to action is local planning and execution. Given the crisis that Amorphous Conglomerate Co. faces, there is likely to be more implementation than planning. Figure 5 schematically depicts the two categories that most companies fall into regarding planning and execution. Most companies start with minimum planning and then proceed directly into widespread execution. The planning component rarely becomes dominant because employees are not rewarded for planning, only for results.

In contrast, fewer but usually better managed companies engage in a large amount of planning at the onset of new initiatives. They think critically about the types of leaders needed, roles, responsibilities, how people are affected by new processes, resources, key milestones, desired outcomes, and stakeholder

participation, to name a few. The result is a more focused, better thought-out plan that has a greater chance for technical and human success.

The next item to examine is the specific actions that people in these different functional areas will do to achieve the stretch goals that they think they are responsible for. Having a functional mindset will focus people into doing the types of things that are normally done in distressing times, but perhaps with some modification to ensure currency with prevailing business practices. Table VI shows the activities undertaken by the employees of Amorphous Conglomerate Co. in response to the new CEO's mandates. Note that this example is intended to illustrate the types of things that batch-and-queue manufacturers typically do as a first response to business challenges. It is not intended to represent all activities that could potentially be undertaken.

Table V
Mass production responsibility matrix

	Function				
Metric	**Engineering**	**Manufacturing**	**Purchasing**	**Quality**	**Finance**
Cost	◇	◇	•		•
Delivery		•	◇		
Quality	◇	◇	◇	•	
Technical performance	•				

Notes: • = Primary responsibility
◇ = Secondary responsibility

Figure 5
Schematic diagram showing the primary approaches to launching new initiatives. The quick results profile minimizes planning and maximizes the time spent on execution. The long-term results profile engages in significantly more planning and managing the details associated with execution

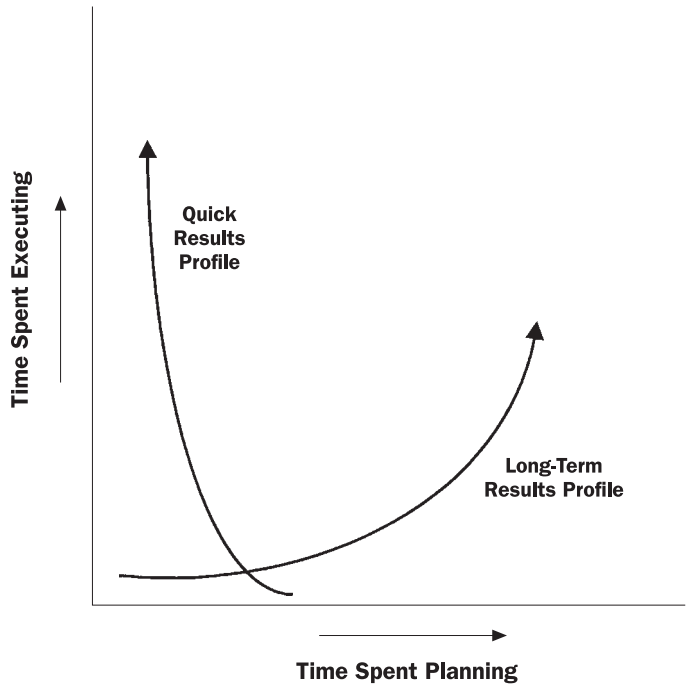


Table VI shows that each function performs activities that are unique to their perceived area of responsibility resulting in different responses. In addition, some activities clearly conflict with each other including:

- Engineering's focus on product performance, leaving manufacturing and purchasing to manage product cost.
- Engineering asking purchasing to increase purchase volumes and purchasing's goal of minimizing inventory.
- Manufacturing's desire to outsource while purchasing seeks to reduce the supply base.
- Increase outsourcing while finance recommends workforce reductions in purchasing.
- Quality seeks to eliminate suppliers with poor quality while purchasing seeks the lowest price suppliers.

Other activities will lead to mediocre results, such as generating new forecasts because they will likely be wrong and lead to either excess of unwanted materials or shortage of needed materials. Forcing suppliers to reduce price, imposing financial penalties for non-conformances, and extending payment periods will damage relationships with these key stakeholders. Haphazardly troubleshooting manufacturing processes to reduce scrap and re-work may lead to short-term gains but also ensures the likelihood of repeat occurrences. Finding more defects is not the same as permanently eliminating them.

If the actions shown in Table VI are not the right things to do, then what are? First, let us look at the CEO's mandates more closely to determine their exact meanings. Table VII presents the CEO mandates, definition of key terms, and two levels of translation that must occur for the mandates to become more meaningful to workers. The translations help clarify the CEO's mandates into terms that can be better understood. But even so, people in engineering, manufacturing, purchasing, quality, and finance may still have difficulty relating their daily roles and responsibilities to some of the items listed. This will result in delays that will be difficult to overcome because the batch-and-queue mass production system is confusing and lacks a unifying theme such as the elimination of waste.

Amorphous Conglomerate Company, well known for its formidable batch-and-queue mass production system, competes with Crystalline Manufacturing Company, which has been practicing lean production for seven years. Thus, all employees understand the basic concepts and apply the tools of lean production every day. The responsibilities of each function at Crystalline Manufacturing Co. will be better balanced (Table VIII) and more supportive of each other (Table II). Assume that the CEO of Crystalline Manufacturing made the same eight mandates as the new CEO from Amorphous Conglomerate Co. a few years earlier (a poor assumption since lean producers do not typically manage this way) – minus the factory closings, layoffs, and acquisition. How might employees in engineering, manufacturing, purchasing, quality, and finance respond to make the CEO's mandates actionable within the context of their daily activities?

Table IX illustrates a balanced approach that can be significantly more responsive to challenging business conditions. First, engineering accepts responsibility for a few key parameters that address value as seen by customers and the ability of the company and its suppliers to operate as effective businesses. These include value engineering, design to target cost, using existing production parts in new designs, design to process capability, using common materials and processes, and designing products with short supply chains. Doing these things ensures that the customers' needs are met, while at the same time reducing part travel, lead-time, and production costs. This greatly helps eliminate waste in downstream

Table VI
Traditional mass production: functional focus

What the CEO says	What engineering people do	What manufacturing people do	What purchasing people do	What quality people do	What finance people do
1. Double net income					Figure out how many people to lay off, which budget category to cut and how much
2. Increase cash flow by 100%					Extend payments from 30 to 45 days Reduce collections from 45 to 30 days
3. Increase working capital turnover by 30% per year					Extend payments from 30 to 45 days Reduce collections from 45 to 30 days
4. Double inventory turns		Create new forecasts Reduce work-in-process Scrap aged inventory	Create new forecasts Buy less material Scrap aged inventory		Set inventory targets Track/control inventory more closely
5. Introduce ten new products over two years	Get budget for new product design work Create designs using evolutionary methods	Get budget for manufacturing new products	Get budget for purchasing new products		
6. Develop new products in half the time with half the money	Adhere to schedule and budget Focus on technical performance	Wait for engineering to complete new design	Wait for engineering to complete new design		Allocate budgets consistent with new product development financial targets
7. Reduce costs by 30%	Ask purchasing to increase purchase volumes	Ensure compliance with new manufacturing cost targets Outsource	Force suppliers to reduce prices Leverage/reduce supply base	Identify defects Increase sampling inspection frequency Audit internal/supplier quality systems Suspend suppliers for quality problems	Figure out how many people to lay off, which budget category to cut and how much Focus on unit cost
8. Improve product quality by 50%	Incorporate technical lessons learned from previous designs	Reduce scrap and re-work Troubleshoot processes	Make suppliers comply with new quality targets Impose financial penalty for non-conformances	Identify defects Increase sampling inspection frequency Audit internal/supplier quality systems Determine cause and corrective action	

Note: The items contained in this Table represent the activities that batch-and-queue manufacturers typically do as a first response to challenging CEO mandates. It does not represent all activities that are normally undertaken

Table VII
Translating CEO mandates

CEO mandate	First-level translation	Second-level translation
1. Double net income	Increase sales/market share	Reduce lead-time
Definition:	Decrease expenses	Reduce direct costs
Net income = revenues – expenses		Reduce indirect costs
2. Increase cash flow by 100%	Increase net income	Increase revenues
Definition:	Improve asset utilization	Utilize existing human,
Cash flow = cash receipts – cash disbursements	Decrease cash disbursements	financial, physical, and material resources
3. Increase working capital turnover by 30% per year	Increase sales	Reduce lead-time
Definitions:	Decrease average working capital	Reduce accounts payable
Working capital turnover = sales ÷ average working capital		
Average working capital = current assets – current liabilities		
4. Double inventory turns	Reduce cost of goods sold	Reduce direct costs
Definition:	Reduce inventory	Reduce amount of work-in-process
Inventory turnover = cost of goods sold ÷ average inventory		Reduce lead-time
5. Introduce ten new products over two years	Increase sales	Reduce lead-time
6. Develop new products in half the time with half the money	Revolutionary change in design practices	Apply best practices in design
	Improve asset utilization	Utilize existing human, financial, physical, and material resources
7. Reduce cost by 30%	Reduce cost of goods sold	Reduce direct costs
Definitions:		Reduce indirect costs
Direct cost = expenses that can be associated with specific products	Improve asset utilization	Utilize existing human, financial, physical, and material resources
Indirect cost = expenses that cannot be associated with specific products		
8. Improve product quality by 50%	Reduce non-conformances, scrap, re-work, and warranty costs	Eliminate variation

activities such as manufacturing, purchasing, and quality assurance. In other words, engineering helps set up the business to succeed in the marketplace by designing high quality and affordable products that meet the needs of customers.

Manufacturing then utilizes disciplined lean production processes and tools that ensure responsiveness to the changing conditions of the marketplace. Cost performance, on-time delivery, and quality become congruent, rather than conflicting goals. Purchasing, no longer relegated to chasing parts and forcing cost reductions upon suppliers, can now focus on strategic management of supply chains. Purchasing, in cooperation with engineering, manufacturing, quality, and finance, develop valuable skills in commodity management, target costing, managing cost drivers, and root cause problem solving.

Because engineering and manufacturing accept responsibility for product quality, the quality organization can focus on eliminating defects rather than finding them. In addition, quality works with purchasing to develop suppliers' capabilities. Instead of reinforcing adversarial customer-supplier relationship, quality collaborates with suppliers to teach them lean production, root cause problem-solving methods, and defect elimination tools. The finance organization, no longer focused on unit cost and head-count reduction, participates with engineering, manufacturing, and purchasing in target costing, the identification of cost variances, total cost analyses, and root cause problem solving. And in times of distress, the finance organization helps find ways to better utilize human resources rather than treat them as variable costs to be eliminated.

Some of the solutions contained in Table IX might, at first glance, appear to be rigid or limit the creativity that employees normally

Table VIII
Lean production responsibility matrix

	Function				
Metric	**Engineering**	**Manufacturing**	**Purchasing**	**Quality**	**Finance**
Cost	●	●	●	●	●
Delivery	●	●	●	●	◇
Quality	●	●	●	●	◇
Technical performance	●	◇	◇	◇	

Notes: ● = Primary responsibility
◇ = Secondary responsibility

apply to problem solving. But appearance is not reality. The application of lean production tools results in much greater opportunities for employees to exhibit creativity compared to the opportunities normally present in batch-and-queue mass production (Robinson, 1991). In fact, a saying often uttered in Kaizen events, "spend ideas, not dollars", is designed to focus people's efforts on their own deep capacity for generating effective and low-cost solutions to difficult problems. It works.

Tables V, VI,VIII and IX illustrate a remarkable shift in responsibilities and the type of activities that are performed in mass and lean production businesses. Manufacturing businesses practicing lean production exhibit a greater amount of shared responsibility and the disciplined use of methods designed to increase asset utilization. The latter is particularly important because it leads to total cost leadership. For example, current production parts are assets that can be used when designing new products. Designing new products that contain 25 percent existing production parts can reduce development costs, lead-time, tooling expense, non-conformances, and warranty expense. It can also increase speed to market, simplify

Table IX
Contemporary lean production: business/process focus

What the CEO says	What engineering people do	What manufacturing people do	What purchasing people do	What quality people do	What finance people do
1. Double net income	Design products with short supply chains Eliminate long lead-time products/services	Set-up reduction, one-piece flow, kanban, TPM, Kaizen, mistake-proofing, etc.	Limit size of supply base Teach lean methods to suppliers	Teach root cause methods Eliminate defects	Identify ways to re-deploy human assets
2. Increase cash flow by 100%	Design new products with 25% existing production parts	Set-up reduction, one-piece flow, kanban, TPM, Kaizen, mistake-proofing, etc.	Limit size of supply base Consolidate material requirements	Teach root cause methods Eliminate defects	Identify ways to re-deploy human assets Determine root cause of cost variances
3. Increase working capital turnover by 30% per year	Design new products with 25% existing production parts Eliminate long lead-time products/services	Set-up reduction, one-piece flow, kanban, TPM, Kaizen, mistake-proofing, etc.	Limit size of supply base Teach lean methods to suppliers	Teach root cause methods Eliminate defects	Identify cost drivers Determine root cause of cost variances
4. Double inventory turns	Design new products with 25% existing production parts	Set-up reduction, one-piece flow, kanban, TPM, Kaizen, mistake-proofing, etc.	Teach lean methods to suppliers	Teach root cause methods Eliminate defects	Support internal/ supply chain lean production activities
5. Introduce ten new products over two years	Value engineering Design to target costs	Make to demand Kaizen	Know supply chain capabilities	Improve supplier quality systems	Support target cost discipline
6. Develop new products in half the time with half the money	Design new products with 25% existing production parts Use common materials and processes	Set-up reduction, one-piece flow, kanban, TPM, Kaizen, mistake-proofing, etc.	Kaizen purchasing process Teach lean methods to suppliers	Teach root cause methods Eliminate defects	Determine process costs Determine root cause of cost variances Identify cost drivers
7. Reduce costs by 30%	Design new products with 25% existing production parts Use common materials and processes Design to process capability	5S, Visual factory, TPM, set-up reduction, mistake-proofing, standard work, one-piece flow, kanban Kaizen Identify cost drivers	Use target costing Select lean suppliers Source parts in process families Identify cost drivers	Teach root cause methods Eliminate defects	Perform total cost analysis Target costing Identify cost drivers Identify ways to re-deploy human assets
8. Improve product quality by 50%	Use common materials and processes Design to process capability Participate in root cause analysis	5S, total productive maintenance 5 Whys, fishbone, etc. Mistake-proofing Participate in root cause analysis	Select lean suppliers Source parts in process families Participate in root cause analysis	Participate in root cause analysis Eliminate defects	Identify cost drivers Participate in root cause analysis

Notes: The items contained in this Table represent the activities that lean producers typically do, or should do, as a first response to challenging CEO mandates. It does not represent all activities that are normally undertaken. The functional boundaries in Table IX are not intended to be as distinct as indicated in Table VI

materials management, limit growth of the supply base, and help achieve target costs. Common materials and processes are lower cost assets that, if utilized, will help reduce lead-times, improve on-time delivery performance, achieve cost targets, and reduce scrap and re-work.

Purchasing's asset is its supply chains. These assets are much better utilized in lean production because suppliers are closely aligned with their customers' interests, focused on core competencies, and synchronized to reliably meet their customers' needs. The relationship is viewed as long-term and one of mutual benefit, resulting in smaller numbers of high performing suppliers. Kaizen activities also focus on ways to better utilize assets and allow the business to do more with existing resources. The overall result is significantly better utilization of human, financial, physical, and material resources. Conducting business in this manner can result in fewer contradictions, thus giving the primary stakeholders a much better chance of success.

Engaging key stakeholders

The new CEO of Amorphous Conglomerate Co. is off to a great start with the investment community. But what about the employees? If employees do not understand the mandates, then their response to them will be ineffective and could indicate to the CEO that they cannot get the job done, possibly resulting in additional layoffs. Employees' fear of layoffs can then make both non-performance and future layoffs a self-fulfilling prophecy.

In addition to not understanding what the new mandates mean, employees are further confused by the well intentioned yet mixed messages expressed by the CEO. There are numerous contradictions, summarized in Table X, which typically lead to defective outcomes. In general, confusion over mixed messages damages the business, as well as the people involved, by making the environment more threatening. The normal response is to develop an inward focus, fight amongst each other, create winners and losers, and look for ways to shift the blame to others. People will adhere to what they know how to do and avoid experimenting with new methods. In other words, the corporate culture becomes highly political, and, over time, it becomes more acceptable for functions, departments, or business units to battle against each other instead of the competition. Corporate politics is one of the most potent forms of behavioral waste because the interests of external stakeholders become greatly diminished.

So rather than engaging employees, the CEO has inadvertently divided them. The organization will surely misbehave (Table X). Amorphous Conglomerate Co.'s supply chains will also likely suffer in two ways. First, businesses that make up the extended enterprise will also be confused by the CEO's mixed messages such as "the company and shareholders must win". To many that is translated to mean: "The CEO says it's OK for suppliers to lose" – probably through higher variable costs or reduced profits brought on by having to conform to unusual business practices. Second, employees preoccupied with internal politics will be forced to spend their efforts ensuring internal survival rather than respond to the needs of external suppliers. Customers and investors face a similar dilemma, while astute competitors will know how to exploit this opportunity-rich situation for many years to come.

It is logical that employees cannot execute the business plan if they do not understand what the mandates mean to them in the context of their daily work or are confused by the CEO's mixed messages. So in this example, the top leader and most highly paid executive has set the company on an unproductive course in both operations and human behaviors (Tables II, III and IV) due to poor critical thinking skills. But the investment community is happy, for now, because the CEO appears to have established a solid recovery plan. They too must lack critical thinking skills.

This sets off another interesting layer of unresolvable conflict. Predictably, Amorphous Conglomerate Company's human resource managers become locked in a never-ending struggle with other functional departments over who is responsible for human assets, conveniently divided into two parts: mind and body. The human resources department typically accepts responsibility for only the body since operating managers control the minds. Operating managers, however, want to own the body and expect human resources to fix the mind that they have damaged in their quest to meet the CEO's mandates. The human asset thus remains forever underutilized. Expensive training programs are usually developed by human resource specialists to try and re-claim employees' minds on behalf of operating managers. This is fundamentally flawed since the training is orthogonal to management's actual practices (Figure 3), and the return on investment will surely be negative. At least the operating managers cannot say that

Table X
Effectiveness of the CEO's comments

What the CEO said	Contradiction	Possible outcomes
Close two factories and reduce workforce by 18%	Come together as a family	Family feuds Deteriorating morale and loyalty
Reduce the workforce by 18%	Acquiring a new business increases headcount and fixed costs	Debilitating internal focus Difficulty integrating cultures
Work together in teams	Reduce the workforce by 18%	Fearing layoffs, people compete against each other Knowledge is hoarded Debilitating internal focus Environment becomes more political
Fight, attack the enemy, take no prisoners, survive	Work together in teams Come together as a family	In-fighting Beat up suppliers for cost reduction Severe lapses in ethical behavior
The situation is urgent	Work harder and smarter	Little planning Focus on results Use traditional tools and methods Go for the quick wins
Put your head down and grind it out	Work together in teams	Don't think, just do Debilitating internal focus Reduced employee feedback
Employees are intelligent and will find ways to achieve the goals	Put your head down and grind it out	Do what comes easy to satisfy management Little planning Focus on results Go for the quick wins
Company and shareholders must win	Someone else must lose Come together as a family	Employees lose Suppliers lose Customers lose
New era of personal accountability for performance	Come together as a family Work together in teams	Only good news is delivered Blame others In-fighting Go for the quick wins Focus on results Environment becomes more political Severe lapses in ethical behavior
Reorganize from strategic business units to global product centers to better serve customers	Reorganizations require intense internal focus	Additional hierarchy Environment becomes more political Investment community becomes concerned
Reduce costs	Spend money on new acquisition	In-fighting Don't deliver bad news
There are no barriers	There are many significant barriers	Confusion over what is a barrier and what isn't Difficulty overcoming barriers Don't deliver bad news

human resources are not doing something about their problem – a non-value added political victory for both groups, but a clear loss for employees and the company.

How might the management team of Crystalline Manufacturing Company respond to new competitive threats? Facing yet another business challenge, the CEO discovers that there is congruence between the concepts of eliminating waste in production and the elimination of behavioral waste (Tables II and III, Figure 6). The company understands the former well, and the management team sees an opportunity to gain additional competitive advantage against Amorphous Conglomerate Co. by identifying and modeling human behaviors that are valued by key stakeholders. A new type of balanced scorecard is introduced to employees for their evaluation (Figure 7). The scorecard better addresses the interests of the four key stakeholders – customers, investors, employees, and suppliers – within a framework that integrates both production and behavioral elements of work. The solution is lean behaviors.

What the management team of Crystalline Manufacturing Co. has done is simply to recognize that human behavior is a tremendous asset that can be more effectively utilized than previously thought. But in order to do this, the behavioral solution must be practiced by all managers. If successful, employees will naturally replicate their behavior without the need for numerous expensive leadership training programs.

There is a tremendous amount of waste in production as evidenced by the results of Kaizen events where 50-90 percent improvements are typically realized. Learning to see waste in production is a skill that is developed over time. Likewise, learning to see behavioral waste is also a skill acquired over time, but it is not a separate skill. The congruence of lean production and lean behaviors makes it easier to develop these competencies in tandem. Eliminating behavioral waste will have many positive benefits to a company and its stakeholders, on both personal and organizational levels.

For example, knowledge is an asset that remains forever locked in people's minds when they face threats. Information – not knowledge – is traded, often on a tit-for-tat basis, when people are required to do so. Compliance is the main reason for sharing information in defective organizations.

Figure 6
An iceberg depicts the waste normally present in human behaviors that is both clearly visible and less visible. The words written above the water line show those behaviors, sounds, thoughts, feelings, or expressions that are easily seen by other people through the course of normal interaction. The words written below the surface depict the thoughts, behaviors, feelings, actions, or expressions that are less likely to be seen by others because they may be hidden in one's mind. Behavioral waste can exist both above and below the water line. In either case we should seek to eliminate behavioral waste where it is possible to do so

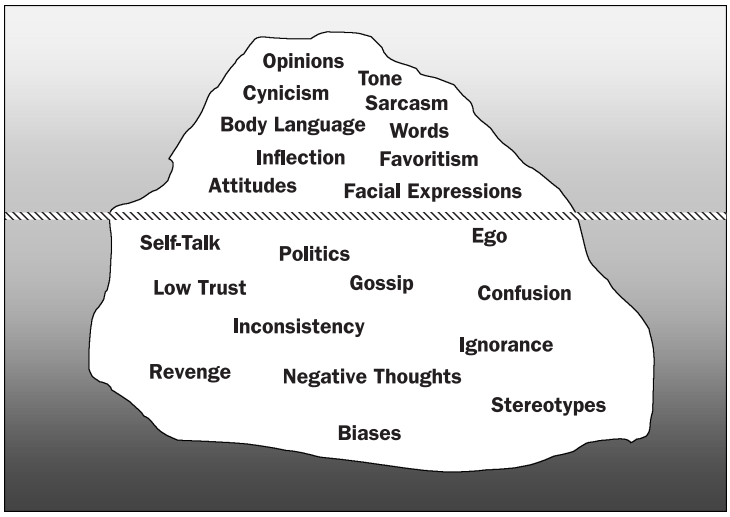


Figure 7
Example of a new "re-balanced" scorecard that is more evenly distributed between key internal and external stakeholders. This scorecard can eliminate the problems that typically occur when management focuses on one stakeholder at the expense of others

Customer	**Employees**
• Returns • Overdue • Customer Satisfaction • Market Share	• Employee Satisfaction Survey • Retention Rate • Compensation • Skill Gaps
Investors	**Suppliers**
• Earnings per Share • Net Income • Cash Flow • Inventory Turns • Return on Invested Capital	• Quality • Lead-Time • On-Time Delivery • Cost Performance • Supplier Satisfaction

Conversely, people working in environments free of threatening fat behaviors more easily share knowledge, and lean behaviors help free this asset for productive use. With the appropriate information technology infrastructure, the potential of knowledge management can now be realized. New ideas are valued and can be transformed into action more quickly to deliver competitive advantage.

The rate of productivity improvement is widely believed by economists, even those specializing in manufacturing productivity, to be limited to the low single digits on an annualized basis (Schlesinger, 1999). This view is rooted in the mass production mindset, particularly the notion of learning curves which indicate diminishing returns after a process is learned-out (Figure 8). Lean production, however, demonstrates that productivity can be continuously improved, with no limit, by identifying and eliminating waste using Kaizen and related tools. So no matter how hard you squeeze the lemon, it always produces more juice. Properly applied, lean production benefits all stakeholders.

Lean behaviors extend the definition of productivity to include human behaviors (Figure 6). The amount of waste present in human behaviors is probably greater than the waste that exists in production. Finding and eliminating behavioral waste can have a profound impact on overall business productivity and sustain high rates of productivity improvement. This is the

opportunity that the senior managers of Crystalline Manufacturing Company want to pursue, and subsequent decision making will center upon the principles of lean production and lean behaviors (Table XI).

Table XI
The new CEO playlist

Lean production
Lean behaviors

The *nouveau* investment analyst

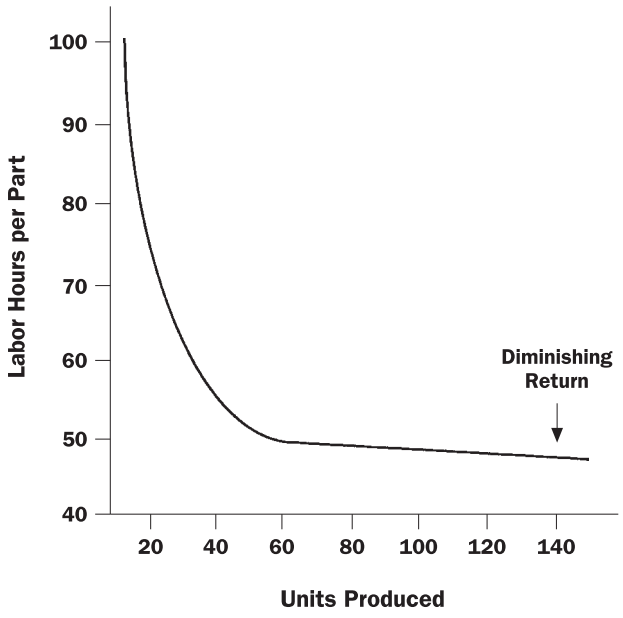
The problems that Amorphous Conglomerate Co. will encounter during its re-structuring are due in large part to a lack of critical thinking by the executive team. Another significant component is the strong influence of the single-minded investment community. They expect to hear bold mandates and stretch targets followed by aggressive and effective execution and readily accept fat behaviors as effective demonstration of leadership. If the CEO's focused response to the investment community's interests generally results in a large amount of chaos for some stakeholders, then a few simple questions must be asked: Is the investment community providing the correct direction to the company? Can they give better guidance to the CEO? Should their interests weigh more heavily upon the CEO compared to other stakeholders? If so, then by how much?

To answer these questions we must first understand what an investment analyst does. In a nutshell, they determine which companies do the best job of creating shareholder value. So what do investment analysts look for when they evaluate the current health and estimate the future financial performance of a company? They analyze earning per share growth, cash flow, earnings before interest and taxes, net income, return on invested capital, inventory turnover. They use financial ratios to determine liquidity, leverage, profitability, and market value. And they also look at other factors that can affect the company's financial performance such as lawsuits, commodity prices, market share, pricing structure, foreign currency fluctuations, pension fund liabilities, environmental issues, etc. While many non-financial factors are analyzed, the net result is always to relate this information back to fundamental financial performance.

Analysts generally like to follow a few key fundamental performance indicators such as earnings per share growth, net income, cash flow, or return on invested capital. In other words, they focus on the income statement. This, in turn, is what CEOs do to meet investors' demands that financial assets be efficiently utilized. Compensation systems are appropriately aligned to ensure financial results that meet investors' expectations. However, the balance sheet is becoming a more important indicator as new business models require far fewer assets to compete against asset-rich businesses, thus creating vastly different demands for working capital and the returns that can be achieved from it.

Analysts may advise CEOs to "keep it simple" when discussing ways to improve the company's financial performance. This is easier to do if the focus is only on financial performance. But in reality, business is usually very complex and involves more than just one stakeholder – a point that may be under-appreciated by investment analysts positioned on the outside looking in. Advice from highly influential shareholders to "keep it simple" will have great appeal to CEOs facing hundreds of complex issues. Too bad for the other stakeholders that the company depends on for success. Investment analysts may also urge executives to "think outside of the box" in order help them break free of business traditions that impair financial performance in competitive markets. It is easy advice to give but hard for managers to

Figure 8
This 90 percent learning curve implies that learning is a continuous function and that there is a limit to the amount of improvement that can be achieved. It suggests that workers accept that significant improvement cannot be achieved beyond about 140 units. The learning curve does not exist in lean production because waste can be eliminated through ongoing Kaizen activities and the labor required per part is independent of the number of units produced in one-piece flow production



make actionable in companies dependent upon fat behaviors. Do analysts "think outside of the box" in how they value corporations? No, they are firmly positioned inside the box. But what if they were not? What might investment analysts look for when they evaluate the current health and estimate the future financial performance of a company?

First, we must acknowledge that the way sustainable value is created is by stakeholders working together to achieve common goals. Second, the investment community could improve their methods of analysis to better reflect the complex environment that large public companies actually operate in, which brings us back to the re-balanced scorecard shown in Figure 7. Investors could put their tremendous influence and regular access to senior executives to even better use. They could ask senior management a few extra questions to determine their commitment and responsiveness to the interests of the other three key stakeholders – customers, employees, and suppliers – and ask how waste is being eliminated in business processes that include these stakeholders. This would put appropriate pressure on senior management to ensure that the basic needs of customers, employees, and suppliers are met in order to ensure prosperity for everyone.

Prompted by investors, senior managers would begin to see the other stakeholders from different perspectives. Managers would soon realize that wasteful fat behaviors are tremendously unproductive and do not even serve their own self-centered interests. Customers, employees, and suppliers might then be viewed as important assets that can be better utilized by applying Kaizen methods to workplace behaviors. For example, from a supplier's perspective, the companies it sells to compete for its goods or services. Suppliers will invariably prefer to do business with only the best customers – typically those whose business practices are low cost, reliable, and fair. Every executive wants to delight shareholders. Most executives want to delight customers. Why not try to delight employees and suppliers as well?

Investment analysts could benefit by asking senior management pointed questions related to the metrics contained in the scorecard shown in Figure 7. For example, they will gain a better understanding of a company's performance across important dimensions that are not typically discussed today but which ultimately determine its total position and future performance in the marketplace. Specifically, the ongoing supply of customers, talented employees, and leading providers of goods and services. A company that is inconsistent generally has poor working relationships with its stakeholders and fosters expensive opportunistic behaviors.

Stakeholders working from the same scorecard would help eliminate confusion and conflicting interests. Investors should also begin to evaluate the level of excellence in support functions such as human resources, marketing, communications, training, EH&S, legal, sales, MIS, facilities, etc., by asking what these important functions are doing to eliminate waste. After all, what stakeholder wants to pay for wasteful fat behaviors or non-manufacturing business processes that create waste?

Summary

Past attempts to unify business and leadership models have not been successful because the basic assumptions are rooted in traditional thinking. Perhaps the most obvious example is the common view that technical and interpersonal (i.e. emotional) are separate, albeit synergistic, skills (Goleman, 1998). This results in corporate training programs that typically target one skill or another, but not both simultaneously. The solution outlined in this paper integrates technical and behavioral components, and utilizes the more easily learned technical skills to serve as the anchor for improving behavioral skills.

The integrated lean production + lean behaviors solution provides a structured approach to change in business settings, and is based upon a simple idea that most people can relate to: the elimination of waste in production and behaviors. It is not a "program of the month", but a way of life. The lean production + lean behaviors solution sets clear direction, identifies specific activities to perform, aligns people, and establishes the foundation for motivating people. Behavioral waste and confusion are reduced so that people can focus on doing work that adds value in the eyes of the customer, which ultimately benefits employees, suppliers, and investors.

The leaders of companies seeking to implement the lean production + lean behaviors solution must be mindful of the challenges that they are subscribing to because it requires dedicated unlearning of embedded mindsets and habits. Operating productivity can often be achieved by fiat, but the wellspring of behavioral productivity

cannot. Key success factors in implementation include:

- Long-term and unwavering personal commitment by all senior managers.
- Gaining a deep understanding of both lean production and lean behaviors.
- Understanding current business processes and the behaviors that limit productivity through stakeholder feedback and root cause analysis.
- Defining the desired future business processes and behaviors.
- Engaging in daily practice of the unified system (i.e. action learning).
- Educating key stakeholders on plans, process, and progress.
- Documenting and sharing experiences.
- Resisting temptations to engage in corrupted forms of lean production and lean behaviors.

Lean production + lean behaviors solution is applicable not just to automobile makers, but to all types of manufacturers interested in developing a truly lean business. The basic principles also apply to service businesses. In addition, the lean production + lean behaviors solution is a more ethical solution for business decision making. It encompasses the interests of key stakeholders in complementary rather than conflicting ways, and assigns responsibility, perhaps even a moral obligation, to management for achieving behavioral productivity in tandem with operating productivity. Think critically about the inescapable ethical traps, moral dilemmas, and unintended consequences of the discontinuous actions regularly performed by most CEOs, as well as the complexity, contradictions, distrust, and confusion inherent to orthogonal management systems compared to aligned lean business systems.

References

Charan, R. and Colvin, G. (1999), "Why CEOs fail", *Fortune*, Vol. 139 No. 12, June 21, pp. 69-78.

Emiliani, M.L. (1998a), "Lean behaviors", *Management Decision*, Vol. 36 No, 9, pp. 615-31.

Emiliani, M.L. (1998b), "Continuous personal improvement", *Journal of Workplace Learning*, Vol. 10 No. 1, pp. 29-38.

Goleman, D. (1998), *Working with Emotional Intelligence*, Bantam Books, New York, NY, pp. 22-4, 242-5.

Hammer, M. and Champy, J. (1993), *Reengineering the Corporation*, HarperBusiness, New York, NY.

Mills, J., Neely, A., Platts, K. and Gregory, M. (1998), "Manufacturing strategy: a pictorial representation", *International Journal of Operations & Production Management*, Vol. 18 No. 11, pp. 1067-85.

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Robinson, A. (Ed.) (1991), *Continuous Improvement in Operations*, Productivity Press, Portland, OR.

Schlesinger, J.B. (1999), "Greenspan warns on productivity gains", *The Wall Street Journal*, Vol. 233 No. 115, June 15, p. A2.

Sturges, D.L. and Brewerton, F.J. (1999), "Organizational engineering", a working paper for International Business Class No. INTB 4365, University of Texas-Pan American, http://www.baclass.panam.edu/courses/intb4365/wpapers/reliability.html

Taylor, F.W. (1967), *The Principles of Scientific Management*, W.W. Norton, Co., New York, NY.

Womack, J.P. and Fitzpatrick, D. (1999), "The next century of flight", *Aviation Week & Space Technology*, Vol. 150 No. 8, February 22, p. 86.

Womack, J.P. and Jones, D.T. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J.P., Jones, D.T. and Roos, D. (1990), *The Machine That Changed the World*, HarperCollins, New York, NY.

Further reading

Ansari, S., Bell, J., Klammer, T. and Lawrence, C. (1997), *Management Accounting in the Age of Lean Production*, Irwin McGraw-Hill, New York, NY.

Appendix. Corrupting lean behaviors

Properly applied, lean behaviors can benefit all stakeholders. But like any new idea, lean behaviors can become corrupted by those who latch on to it before gaining a full understanding of its meaning. This has happened many times over the years, starting with Taylor's scientific management principles, Hammer's re-engineering model (Hammer and Champy, 1993), and more recently with Toyota's lean production system (Womack and Fitzpatrick, 1999). Selective application or even misapplication of these management methods has resulted in unintended consequences and inaccurate characterizations.

Lean behaviors could become corrupted if adopted by a highly political organization that continues to exhibit wasteful fat behaviors. Practicing lean behaviors (Emiliani, 1998a, 1998b) could become "politically correct", which would only perpetuate fat behaviors such as defensive routines, blame, confusion, and negativity. People might also start labeling each other as lean or fat, or comparing people that behave lean with those that possess a preponderance of fat behaviors. Such comparisons would be very wasteful. Labels could also be used to gain advantage by tarnishing the reputation of colleagues or adversaries. People could

also spend their time talking about who behaves lean and who exhibits fat behaviors – yet another form of waste.

The interpretation of fat or lean behaviors could become subjective or situation-specific. Productive behaviors may become confused with non-productive behaviors depending upon the context. People could play games and try to provoke fat behaviors in front of others to test one's commitment to lean behaviors. Organizations undergoing significant change or those expecting quick results will likely have difficulty developing lean behaviors because business results may be more highly valued than commitment to processes that consistently yield sustainable results.

Defensive behaviors caused by misuse of lean behaviors will likely prevent potentially helpful dialog, discussion, or debate – necessary components of teamwork, problem solving, and creativity in business. And thinking that lean behaviors mean that we should operate or behave in the absence of feelings or emotions would be another way of corrupting lean behaviors. So would thinking that lean behaviors mean we should be silent, or that total self-control is the most desirable state. In addition, inventing new metrics for the purpose of measuring specific personal or organizational lean behaviors would be counterproductive.

Lastly, thinking that everyone will one day be free of fat behaviors is another way to corrupt lean behaviors. Behavioral waste will continue to exist, and there may be specific conditions under which this is acceptable. For example, disagreements and other types of interpersonal tension can be important contributors to creativity or the development of people, organizations, products, or services. However, managers must be extremely mindful of fat behaviors because they can be potent destroyers of trust, morale, commitment, and self-esteem.

Application questions

1 How would you see the integrated lean production + lean behaviours solution helping your company?

2 Do you think the interests of all key stakeholders can be accommodated, making behaviours "lean"? How would you go about educating both staff and stakeholders?

The false promise of "what gets measured gets managed"

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Keywords
Management, Measurement, Share prices, Waste, Logic

Abstract
Discusses the importance of precise communication as a prerequisite to achieving alignment between internal and external stakeholders. Consideration is given to popular management catch-phrases in general, with specific analysis of the widely-used statement: "what gets measured gets managed". The application of mathematical logic shows this to be a false statement, yet one that precipitates the management of measurements that may not add value as seen by the end-use customer.

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Introduction

Senior executives, particularly those managing large public-owned business, often speak in general terms when addressing key stakeholders such as employees, suppliers, customers, and investors. Management's statements become grander, but usually more vague, as the need for significant change increases (Table I). The words sound good and give the clear impression that management understands the issues facing the company, and that they have suitable remedies for lacklustre performance. The remedies, some of which are presented as "quick hits", have great appeal to institutional investors and can result in higher stock prices. Rapid positive feedback from the investment community, people who are also presumed to be quite knowledgeable, affirms the effectiveness of senior management's rhetoric.

Is it safe to assume that the senior managers understand their own rhetoric? Perhaps in a few cases, but generally not, as evidenced by the fact that most change initiatives fall short of expectations or fail all together (Morden, 1997; Longenecker *et al.*, 1999; Appelbaum *et al.,* 1999a; 1999b; 1999c). Senior management generally has difficulty comprehending the totality of the changes that they seek to implement, including both gross and subtle dependencies (Mikami, 1982; Emiliani, 2000a). In practice, the ordinary outcome is widespread confusion, frustration, and dissatisfaction. These are forms of waste that management often ignores, preferring instead to force results in order to meet commitments made in public (Emiliani, 1998).

Senior managers often utter the phrase "what gets measured gets managed" (Martin and Kover, 1996; Browne, 1997; Yoder, 1998; Silverstein, 1999). It implies pushing accountability to lower levels and more active management of new or existing business measurements, in order to achieve the desired goals. This phrase is stated as an axiom, a self-evident or universally recognized truth, and is accepted without formal proof.

Most people readily assume that if senior managers utter such an expansive statement, then it must automatically be true, as he or she must surely have the real-world experience to be able to claim its veracity under all conditions. The executive's experience, rank, responsibility, authority, pay, or respect granted by others helps to cement this common view. The purpose of this paper is to examine the statement "what gets measured gets managed" to determine its truth by using mathematical logic.

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Proof using mathematical logic

The statement "what gets measured get managed" can be written as: "if X gets measured, then X gets managed", where X is any business measure under consideration. Statements structured as "if-then" are called conditional statements in mathematical logic (Solow, 1990) and consist of two simpler statements: the hypothesis "if X gets measured" and the conclusion "then X gets managed". In mathematical terms,
Hypothesis p: "if X gets measured"
Conclusion q: "then X gets managed"

Symbolically written as:

$$p \rightarrow q$$

or in words as:

"if p, then q"

The arrow pointing to the right is referred to as the conditional operator. In order for this

Table I
Managements statements and unanswered questions?

What the manager says	Unanswered questions
"We will rationalize our R&D portfolio"	How? By what process? Who should be involved?
"Our goal is to leverage our brands and become the market leader"	Will regional marketing become centralized? Will new products be introduced in a coordinated fashion world-wide? Will packaging be standardized?
"Becoming a learning organization is critical to our future success"	What is a learning organization? How will we know when we become one?
"We must partner with our key suppliers"	Who are our key suppliers? Why types of individual behaviors support partnerships?
"Knowledge management must become a core competency"	Is knowledge management the same as information technology? Will managers have to behave differently to facilitate knowledge management?
"Customer satisfaction is our number 1 priority"	Who is the customer? How will customer satisfaction be measured? What must we do to become customer-focused?

statement to be true, the conditions shown in Table II must be satisfied.

Table II is called a "truth table". Constructing a table for the statement "if X gets measured, then X gets managed" yields the results shown in Table III.

Notice that the truth values for $p \rightarrow q$ in Table III differs from that shown in Table II. Thus, the statement "if X gets measured, then X gets managed" is false. But why is this so? The explanation is shown in Table IV.

In other words, there are conditions in business under which measurements and management of the measures are dissonant. We know this from direct experience. It is critical to note that there is an assumption contained in the statement "what gets measured gets managed". It is that the measure gets managed effectively, which means that the desired effect is achieved. But often the desired effect is not achieved (Beck, 2000; Schrage, 2000; Holmes and Leeds, 2000), or it can come at the expense of one stakeholder over another (Maremont and Berner, 1999; Julien, 2000). Again, we know this from direct experience, which further supports the outcome shown in Table III.

Table II
Truth table

p	q	$p \rightarrow q$
True	True	True
True	False	False
False	True	True
False	False	True

Table III
If X gets measured, then X gets managed

p	q	$p \rightarrow q$
If X gets measured	Then X gets managed	False
If X gets measured	Then X does not get managed	True
If X does not get measured	Then X gets managed	True
If X does not get measured	Then X does not get managed	False

Table IV
Explanation of the measurement and management of X

$p \rightarrow q$	Rationale
False	Measuring X does not require X to be managed
True	Measuring X does not mean that X gets managed
True	Not measuring X does not mean that X gets managed
False	Not measuring X does not mean that X will not get managed

For example, purchase price variance remains a key measure for many purchasing organizations. It is designed to ensure conformance to purchased material budgets over specific periods of time, usually monthly. A buyer with a budget of $1,000 is doing a great job if he or she can obtain the required materials for $900 and a very poor job if the materials are purchased for $1100. But markets change, and materials can not always be purchased at prices contained in budgets developed many months earlier.

Regardless, the buyer's performance is considered poor if the price variance is unfavorable, and will likely have an impact upon the buyer's annual performance appraisal. As a result, buyers will mismanage or "game" the measure to ensure a more favorable outcome, even if it means resorting to questionable behaviors. Buyers may seek to hide large favorable variances on some parts, in order to make up for unfavorable variances on other parts. While an overall favorable variance

appears to have been achieved, the root cause of variance remains hidden. Which is the more valuable skill to possess: root cause analysis or gaming measures? Unfortunately, employees tend to mirror the behaviors of executives, many of which are skilled at gaming measures (Emiliani, 2000b).

Measures related to research and development are also subject to mismanagement through systems that strongly reward innovation. Without doubt, innovation is very important to the growth of companies and achieving customer satisfaction. However, this can come at the expense of fundamental operating performance. For example, many firms reward engineers for generating patents even if they are not closely related to the current or planned products. This can drive engineers towards the singular goal of obtaining patents, with a concomitant loss of customer focus.

However, manufacturing companies generate revenues from continuing operations, which in competitive markets demands cost performance. This can be achieved by using existing production parts in new product designs when possible. While not very glamorous from an engineer's perspective, the use of standard parts lowers development costs, shortens lead times, improves cash flow, reduces working capital, increases inventory turns, and lowers part cost. The benefits to the business are profound, and will generate benefits for the other key stakeholders as well. Thus, measures that balance both innovation and parts standardization will contribute greatly to competitive advantage.

Summary

The phrase "what gets measured gets managed" is usually accepted as a true statement without question, and is regularly presented as the appropriate way to think under all circumstances (Harris-Jones, 1998; Serven, 1999; Narayanan, 2000). However, this statement has been proven to be false under conditions where it is presented as an axiom. Therefore, great care must be taken to clarify its meaning and scope, in order to ensure proper application (Stone, 1998; Mazur, 2000) that results in value as viewed by the end-use customer (Ohno, 1988; Womack and Jones, 1996; Emiliani, 2000a).

Alignment among internal and external stakeholders can not be achieved if there is confusion over the meaning of statements made by senior managers (Emiliani, 2000a). Function-specific business measures within or between stakeholders can easily conflict with each other, yet they are rarely evaluated to ensure consistency and value-added. In addition, conflicting measures create conditions that support defective individual and organizational behaviors, which can result in a debilitating inward focus and loss of productivity (Emiliani, 1998).

References

Applebaum, S.H., Close, T.G. and Klasa, S. (1999a), "Downsizing: an examination of some successes and more failures", *Management Decision*, Vol. 37 No. 5, pp. 424-36.

Applebaum, S.H., Henson, D. and Knee, K. (1999b), "Downsizing failures: an examination of convergence/reorientation and antecedents – processes – outcomes", *Management Decision*, Vol. 37 No. 6, pp. 473-90.

Applebaum, S.H., Everard, A. and Hung, L.T.S. (1999c), "Strategic downsizing: critical success factors", *Management Decision*, Vol. 37 No. 7, pp. 535-52.

Beck, E. (2000), "Unilever to cut jobs, close factories after decline of 1999 pretax profit", *The Wall Street Journal*, 23 February.

Browne, J. (1997), "Climate change, the steps BP is taking", a speech by John Browne, CEO of British Petroleum, Stanford University, 19 May, http://www.bpamoco.com/speeches/sp_970519.htm

Emiliani, M.L. (1998), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-31.

Emiliani, M.L. (2000a), "Cracking the code of business", *Management Decision*, Vol. 38 No. 2, pp. 60-79.

Emiliani, M.L. (2000b), "The oath of management", *Management Decision*, Vol. 38 No. 5, pp. 261-2.

Harris-Jones, J. (1998), "Why treasury must take all the risk", *Corporate Finance*, No. 163, pp. 40-2.

Holmes, S. and Leeds, J. (2000), "Factory that built doomed jet had many problems", *Los Angeles Times*, 20 February.

Julien, A. (2000), "Doctors hope new CEO brings a more cooperative era", *The Hartford Courant*, 26 February, p. A9.

Longenecker, C.O., Simonetti, J.L. and Sharkey, T.W. (1999), "Why organizations fail: the view from the front-line", *Management Decision*, Vol. 37 No. 6, pp. 503-13.

Maremont, M. and Berner, R. (1999), "Rite aid's large cash deductions irk suppliers at bill-paying time", *The Wall Street Journal*, 31 March.

Martin, J. and Kover, A. (1996), "Tomorrow's CEOs", *Fortune*, 24 June, p. 76.

Mazur, L. (2000), "The measure of brands cannot be mechanical", *Marketing*, p. 14.
Mikami, T. (1982), *Management and Productivity Improvement in Japan*, JMA Consultants, Tokyo, Japan.
Morden, T. (1997), "A strategic re-evaluation of re-engineering, restructuring, de-layering, and downsizing policies as a flawed paradigm", *Management Decision*, Vol. 35 No. 3, pp. 240-9.
Narayanan, V.G. (2000), "Course No. 1316: cost measurement and management – measuring and driving corporate performance", Harvard University PhD Program in Health Policy, Management Concentration Course Description.
Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR, pp. 54-8.
Schrage, M. (2000), "How the bell curve cheats you", *Fortune*, Vol. 141 No. 4, 21 February, p. 296.
Serven, L. (1999), "Shareholder value", *Executive Excellence*, Vol. 16 No. 2, p. 13.
Silverstein, K. (1999), "Trimming the fat", *Utility Business,* Vol. 2 No. 10, pp. 30-2.
Solow, D. (1990), *How to Read and Do Proofs*, John Wiley & Sons, New York, NY.
Stone, N. (1998), "From the editor: measuring up", *Harvard Business Review*, Vol. 76 No. 1, January-February, p. 6.
Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.
Yoder, E. (1998), "Time for a change", *Government Executive*, Vol. 30 No. 5, pp. 53-6.

Application questions

1 What other popular management phrases have you said or heard that should be formally tested to prove their truth?
2 Would you continue to repeat such phrases if they are proven to be wrong?
3 Do senior management have an ethical responsibility to their stakeholders to ensure the truth of their rhetoric?

The oath of management

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Keywords
Management,
Organizational behaviour, Ethics

Abstract
Compares the management profession with the medical profession, in particular examining the Hippocratic oath. Suggests that as managers are the physicians of business, they should also abide by an oath, which is then proposed by the author.

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Introduction

Industrial management has become a much analyzed and discussed subject over the last 100 years. From Taylor (1911) to Drucker (1999), volumes have been written to elucidate the various management practices deemed to be most effective. Despite the tremendous amount of scholarly activity, the art and science of management is typically applied in a haphazard fashion by practitioners. Too often, situation-specific needs drive behaviors that negatively impact key stakeholders such as employees, suppliers, and customers (Stainer *et al.*, 1999). The primary focus is usually shareholder value, irrespective of its affect upon the life and health of people that contribute directly to the organization. Is there anything that can be done to improve this remarkably impoverished situation?

The medical profession

Physicians are the healers of people. Simply put, they are health managers. Their great responsibility is recognized by the administration of an oath upon graduation from most medical schools. The medical oath, named after Hippocrates – a very influential Greek physician living around the fifth century BC – has had a great impact on the ethics of medical practice for the last 2,500 years. Without doubt, there have been many corrupt physicians who have failed to honor the Hippocratic oath. But the majority of physicians appear to have honored it in recognition of their profound responsibility.

There are only a few professions that can have a great impact on the life and well being of large numbers of people. Management is one of them.

The management profession

Managers are the physicians of business. But are they the healers of business? They too have a great responsibility – the effective management of organizations. However, they graduate from business school without any oath of ethical practice for the management of people and organizations that make up the extended enterprise. This is truly amazing. Witness the layoffs and many other forms of organizational dysfunction of the 1980s and 1990s (Argyris, 1991; Kets de Vries, 1993). We all know that something is terribly wrong. There is abundant talk yet little meaningful or creative action.

I propose "The oath of management", based upon the modern representation of the hippocratic oath for the medical profession (see Table I). Business schools would administer "The oath of management", to students, primarily MBAs, upon graduation in order to clarify and strongly reinforce the importance of ethical management behavior. The deans and faculties of business schools have a responsibility to ensure that their graduates work with stakeholders to create more elegant solutions to business problems. Layoffs, after all, are the simplest solution that any dolt can implement. There is no leadership in authorizing massive layoffs. What is the root cause of such situations (Ohno, 1988)? Should not the highest paid managers be challenged by key stakeholders to think of more creative solutions (Emiliani, 1998a, 1998b, 2000)?

Can an "oath of management" make life better for the stakeholders of a business? The answer is surely yes, if, over time, managers take "The oath of management" and their significant responsibilities as seriously as most physicians have done over the last 2,500 years.

Table I
The oath of management

Modern Hippocratic oath	The oath of management
At the time of being admitted a member of the medical profession:	At the time of being admitted a member of the management profession:
I solemnly pledge myself to consecrate my life to the service of humanity	I solemnly pledge myself to consecrate my life to the service of humanity
I will give my teachers the respect and gratitude which is their due	I will give my teachers the respect and gratitude which is their due
I will practice my profession with conscience and dignity	I will practice my profession with conscience and dignity
The health of my patient will be my first consideration	The well being of my primary stakeholders – employees, suppliers, customers and investors – will be my first consideration
I will respect the secrets which are confided in me, even after the patient has died	I will respect the secrets which are confided in me, even after business relationships have ceased
I will maintain, by all means in my power, the honor and the noble traditions of the medical profession	I will maintain, by all means in my power, the honor and the noble traditions of the management profession
My colleagues will be my brothers	My colleagues will be my resources
I will not permit considerations of religion, nationality, race, party politics, or social standing to intervene between my duty and my patient	I will not permit considerations of religion, nationality, race, party politics, or social standing to intervene between my duty and my primary stakeholders
I will maintain the utmost respect for human life from the time of conception; even under threat I will not use my medical knowledge contrary to the laws of humanity	I will maintain the utmost respect for human beings; even under threat I will not use my management knowledge contrary to the laws of humanity
I make these promises solemnly, freely and upon my honor	I make these promises solemnly, freely and upon my honor

Source: World Medical Association, Geneva, 1948

References

Argyris, C. (1991), "Teaching smart people to learn", *Harvard Business Review*, May-June, pp. 99-109.

Drucker, P.F. (1999), *Management Challenges for the 21st Century*, Harperbusiness, New York, NY.

Emiliani, M.L. (1998a), "Continuous personal improvement", *Journal of Workplace Learning*, Vol. 10 No. 1, pp. 29-38.

Emiliani, M.L. (1998b), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-31.

Emiliani, M.L. (2000), "Cracking the code of business", *Management Decision*, Vol. 38 No. 2, pp. 60-79.

Kets de Vries, M.F.R. (1993), *Leaders, Fools, and Imposters*, Jossey-Bass, San Francisco, CA.

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR, pp. 17-20.

Stainer, L., Stainer, A. and Gully, A. (1999), "Ethics and performance management", *International Journal of Technology Management*, Vol. 17 Nos 7/8, pp. 776-85.

Taylor, F.W. (1911), *The Principles of Scientific Management*, W.W. Norton Co., New York, NY.

Application questions

1 Do you agree with the author that "managers are the physicians of business"?

2 Can you think of a time when the oath of management would have helped you in a business situation?

Techniques

Redefining the focus of investment analysts

M.L. Emiliani

"Citation of Excellence" Award Winner

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Keywords

Leadership, Investment analysis, Finance, Lean production, Ethics, Value, Waste

Abstract

Compares and contrasts the organizational routines and outcomes of businesses that are managed using practices grounded in batch-and-queue and lean production. The former is shown to be poor at providing senior management with timely and accurate information, thus obscuring or altering business realities, while the latter results in greater clarity and improved responsiveness to changing market conditions. It proposes that the primary work of the investment analyst should change to "muda analyst", whose focus is the elimination of waste in business processes between internal and external stakeholders, while the traditional work of investment analysts is positioned as a secondary activity. Identifies different types of questions to ask senior management in order to assess the underlying business and leadership practices.

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Introduction

Most large public businesses that are managed in the western tradition focus on satisfying the investors' interests. However, the investor is but one of many stakeholders in a business. Others include employees, suppliers, customers, governments, retirees, local communities, labor unions, and even competitors. Senior managers that adhere to a purely economic view of business tend to overlook these stakeholders or trade them off against one another in order to improve financial performance. They will also work to optimize individual parts of the business, as opposed to the whole (Figure 1), in the belief that this can further improve financial outcomes. The investment community has great influence over senior managers and is usually able to win them over to their point of view. Focusing on only one stakeholder makes the job of the CEO much easier.

This singular focus inevitably damages relationships between business stakeholders (Mikami, 1982; Basu, 1999; Caux, 2000; Emiliani, 2000b). We know this from everyday business experience. For example, should the mechanical engineer focus on just product design? Not having to think about how the part is manufactured and concomitant impact on cost, quality, or lead-time makes the job of the designer much easier. Manufacturing the part is someone else's responsibility and budget, and is therefore not something a design engineer should have to worry about. So the designer just ignores manufacturing. After all, they were not taught to think about such matters in engineering school. The engineering manager supports this behavior by steering engineers away from manufacturing and telling them how it is a constant firefight that will use up all of their time. It may sound foolish, but this is exactly what happens in most manufacturing businesses today. The typical result is high cost products that do not meet customers' expectations on quality, delivery, and functional performance. It also results in perpetual friction between engineering and operations.

Most CEOs of large public businesses behave exactly as the engineer in this example does. They accept the trade-offs that their bosses, the investment analysts, allow, and focus on narrow measures in order to secure their rewards. Given the resultant turmoil

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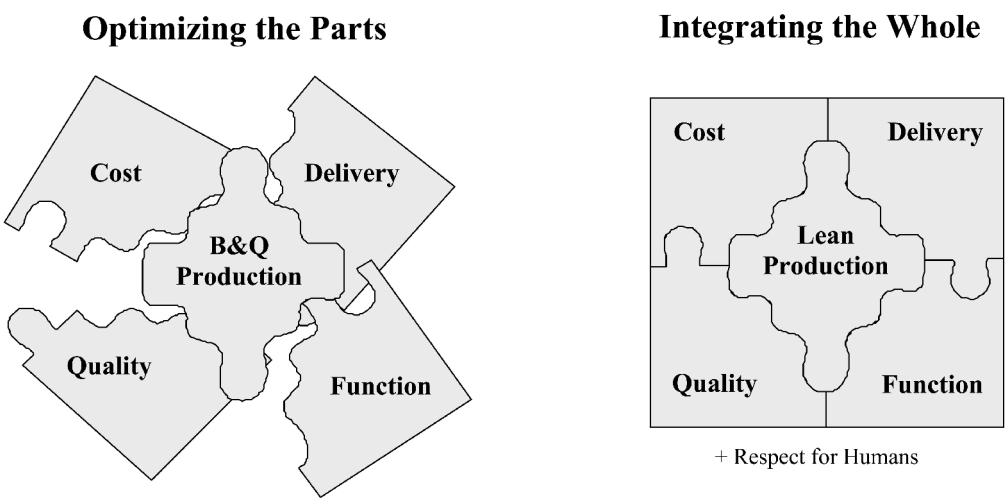
Figure 1 Optimizing the parts versus integrating the whole



Note: Batch-and-queue producers seek to optimize individual disciplines or operating metrics, which results in trade-offs that divide internal and external stakeholders. Lean producers utilize business philosophies and practices that seek to integrate the whole. As a result, internal and external stakeholders are more willing to work together to achieve shared objectives.

(Byrne, 1998; Beck, 2000; Gentry, 2000; Hechinger, 2000; Jacobs, 2000; Mollenkamp, 2000; Schultz, 2000), it is remarkable that the single-stakeholder perspective remains the dominant business archetype today and is even gaining in popularity (Taylor, 1999; Fairlamb and Ewing, 2000; Neff, 2000; Shirouzu, 2000).

So a simple question needs to be asked: Should investment analysts focus on financial performance? This seems like a rather dumb question. But is it? To focus on money as the unit of measure is the obvious thing to do and an easy way to keep score. But what would happen if instead investment analysts focused on business processes, i.e. the actual work performed that drives financial performance? Could this be an area of focus that can influence senior managers to achieve more favorable outcomes for all stakeholders?

Adding value and eliminating waste

The investment community views value through the lens of money. Creating shareholder value means that shareholders received a positive return on their investment through management's actions as driven by investors' interests. However, the fiduciary sense of value can be misleading as accounting methods, specifically revenue and expense recognition, can vary by company or industry (Loomis, 1999; Greenberg, 2000; Kahn, 2000). In addition, income from non-core business activities can make it difficult to gage the underlying performance of continuing operations (Kahn, 2000). Further, earnings-per-share growth derived from share buyback programs can make it appear as if the company's performance is continuing to improve (McLean, 2000).

As a result of these manipulations, the quality of earnings is judged by key investors to have been reduced, which in turn lowers the confidence of the investment community at large. When market cap shrinks due to missed quarterly earnings (Nelson and Deogun, 2000), it is often stated that "value has been destroyed". It is apparent that value can be easily manipulated when assessed from a purely financial perspective. Efforts by senior management to mollify influential investors often results in moral and ethical lapses (Beck, 2000; Eden, 2000; Jacobs, 2000; Schultz, 2000; Spurgeon, 2000) and even criminal prosecution (Loomis, 1999; Cloud, 2000).

The fundamental representation of value is the processing of materials or organization of activities that add value to a product or service. Value is defined by the final, or end-use customer (Ohno, 1988a; Womack and Jones, 1996a). Note that no other customer along the value stream defines value. This is a critical distinction, because

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only end-use customers know what constitutes value. The value of a product is classically expressed as (Monden, 1995a):

$$\text{Value} = \text{Functionality} \div \text{Cost}$$

or

$$\text{Value} = (\text{Functionality} \div \text{Cost}) \times \text{Speed}^2$$

which accounts for the importance of speed in determining customer value (Doi, 2000).

Waste is any non-value added activity that adds cost but does not add value as perceived by the end-use customer. In other words, internal and external resources are consumed without adding value to the product or service. These resources include time, money, mental energy, labor, equipment, space, raw materials, information, etc. Some types of waste, such as part travel or walking distance, can be eliminated quite easily, while other types of waste, such as transportation or packaging, may be more difficult to eliminate. Fundamentally, poor competitiveness is caused by the existence of large amounts of waste, or *muda* in Japanese. There are seven types of waste in production (Ohno, 1988a):
(1) overproduction;
(2) waiting;
(3) transportation;
(4) processing;
(5) inventory;
(6) movement; and
(7) defects.

The eighth waste is *behavioral*, where behavioral waste is defined as human behaviors that add no value and can be eliminated (Emiliani, 1998a; 1998b). The behavioral waste often exhibited by business leaders, and subsequently mirrored by followers, results in unsustainable levels of turmoil that negatively impact all stakeholders (Kets de Vries, 1993; Byrne, 1998; Carvell, 1998; Gentry, 2000). Behavioral waste is due to *arbitrary* conflict between stakeholders, often precipitated by the need to aggressively pursue financial goals. Leaders that perpetuate arbitrary conflict give explicit approval to employees to focus on issues related to individual personalities instead of wasteful business processes that fail to deliver value to end-use customers. Said another way, should not well-educated and highly paid business leaders ensure that end-use customers do not pay for destructive internal politics?

Adding value from a financial perspective is not the same as eliminating waste. In fact, it can increase waste, particularly behavioral waste (Emiliani, 1998b; 2000a). However, eliminating waste will always improve financial performance (Monden, 1995b; Fiume, 2000), as shown in the Appendix Table AII (Emiliani, 2000c). Investment analysts are rightly concerned about the competitiveness of the businesses that they invest in. However, the means by which competitiveness is valued is usually financial and not directly related to business processes in which the units of measure are non-financial, i.e. time, distance, space, days of inventory, percent on-time delivery, defects, productivity, customer satisfaction, etc. (Fiume, 2000).

Waste is eliminated by first gaining a detailed understanding how business processes are performed. However, most businesses do not understand their business processes and how work is actually performed because the focus is on achieving short-term results. When the president of the company says, "I don't care how you do it, we have to deliver the product at the end of this month!", he or she is giving people very clear direction. Namely, that the business process is not important; this mistake can be repeated in the future, and do not bother to figure out the root cause of the problem or spend any time on process improvement. As a result, the firefights are endless and the heroes receive the bulk of the rewards. The path to organizational dysfunction is remarkably short and direct (Byrne, 1998).

The false reality of batch-and-queue production

Batch-and-queue production is the dominant means by which goods and services are produced in business today because it is intuitive (Womack and Jones, 1996b). It is a corrupted form of flow production, first invented by Henry Ford and Charles Sorensen around 1913 (Ford, 1922; Sorensen, 1956). Batch-and-queue production is generally characterized by long set-up times, large batches of work moving slowly from one work area to another, and lower quality products since defects are not discovered until subsequent operations or in

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the finished product. It is also very slow to respond to changes in market conditions.

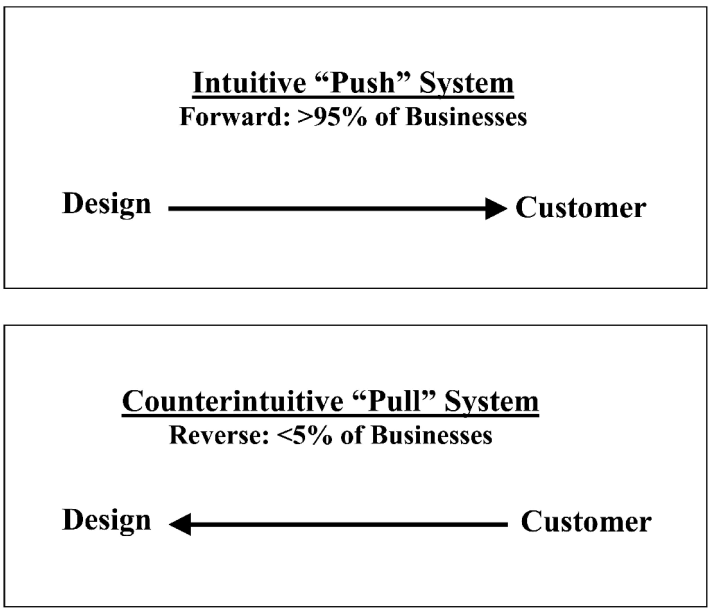
Most batch-and-queue producers plan the delivery of goods and services based upon forecasts, which are usually wrong and result in the overproduction of unwanted products or shortages of products desired by customers. In the former case costs are high, while in the latter sales are lost. This method of production is producer-focused, as it pushes products or services downstream onto the marketplace even if customer demand is not apparent (Figure 2). The net result is a production system that maximizes the consumption of internal and external resources. The financial implications of this type of production system are enormous, as the capital intensity is high and cash flow is low. In addition, public companies that miss consensus quarterly earnings targets will watch their market capitalization shrink 10-20 percent within just a few hours as investors rush to sell (Nelson and Deogun, 2000).

A never discussed characteristic of batch-and-queue production is that senior management is not able to recognize reality due to the existence of organizational routines and behaviors that foster perpetual confusion, low morale, and re-work (Emiliani, 1998b; 2000a; Ohno, 1988b; Welch, 2000). Constant delays and fire fighting greatly reduce the timeliness and accuracy of information (Argyris, 1986), making it difficult to implement long-lasting corrective action. Indeed, most of the problems that arise in "push" production systems are never solved, as evidenced by their periodic recurrence.

Examples of business activities, methods, and mindsets that make it impossible to recognize reality include:

- functional silos;
- economic order quantities;
- unit cost focus;
- standard cost;
- earned hours;
- make-to-forecast or make-to-stock; production;
- expediting;
- scrap/rework/repair budgets;
- designing perfectly engineered parts (that cannot be manufactured);
- threatening suppliers to achieve cost reductions;
- internal politics;
- blaming others;

Figure 2 Comparison between intuitive push and connterintuitive pull business systems



Note: Pushing products onto the marketplace is the intuitive way to deliver goods and services. It is a producer-focused system used by the vast majority of companies and typically results in periods of financial prosperity followed by periods of poor performance. Conversely, pull systems are designed so that the final process signals the need for additional materials from the preceding process all the way through the value stream. Pull systems are customer focused and structured to respond to customer demand, thus reducing cyclic financial performance.

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- business decisions based solely upon ROI calculations;
- goal setting without defining actionable processes;
- recurring layoffs;
- huge production schedule variation;
- reliance on complex technology or information systems;
- accepting tradeoffs;
- producer (output) focus; and
- complex contracts.

Table I summarizes key business activities that have poor records of success because batch-and-queue businesses do not transfer information effectively and are slow to identify and correct to errors (Argyris, 1994; Hammond *et al.*, 1998; Fujimoto, 1999).

It is important to note that these business problems are not limited to the manufacturing discipline. Recurring errors occur in service and support disciplines as well, since the batch-and-queue mindset and its methods permeate all activities. For example, finance creates annual budgets. But assumptions made in August often turn out to be wrong in January. Legal departments process their work in batches, resulting in a large amount of work in process and very slow resolution of pending cases. Procurement responds to suppliers' offer of economic order quantities in order to reduce the unit cost, but without regard to the impact of this decision on total cost. The sales and marketing department will offer volume discounts to induce customers to purchase a larger batch of goods or services, creating large variations in production volume that manufacturing cannot satisfy. Human resource policy requires managers to conduct annual (i.e. batch) reviews of employees and make adjustments in pay or promotion. Engineering focuses on their batch of work, typically viewing technical performance of the product as the key measure of value, with little regard to upstream and downstream business processes.

Thus, not understanding or acknowledging reality results in the institutionalization of wasteful practices, odd management behaviors, organizational dysfunction, and high stress (Ohno, 1988b; France, 2000; France and Hamm, 2000; Gentry, 2000). Employees and other stakeholders become confused and frustrated by senior management's behaviors and decisions (Bradsher, 2000; Nagy, 2000; Sherer, 2000) and will limit the information that gets to them (Argyris, 1986). Only good news flows. In addition, the values, morals, and ethics of senior managers become compromised if they cannot see and respond to reality (Hammond *et al.*, 1998; Gentry, 2000; Shellenbarger, 2000; Stainer *et al.*, 1999).

Given these circumstances, it is no surprise that the effective conduct of business is exceptionally difficult to achieve. The reality is that it is impossible to achieve in a batch-and-queue environment. Regardless, many senior managers believe that more MBAs from top business schools are needed to solve complex business problems. How often have you heard senior managers declare: "There is a shortage of management talent"? Could it be more likely that businesses are run in ways that even talented people cannot manage them? Or, are future managers not taught the right way to manage business?

The reality of lean production

What is reality in business? Some judge political business environments to be reality, while others judge reality to be an unachievable or ideal condition. In either case, businesses that possess such views will be at a considerable disadvantage compared to those businesses that can more accurately grasp and respond to the reality of competitive markets (Womack *et al.*, 1990). Reality embodies an understanding of situations as they actually exist, objectively, as discernable by fact, but not necessarily in the absence of emotion or goal-oriented conflict. Goal-oriented conflict is defined as conflict between internal and external stakeholders that is related to the primary objectives of lean production, which are the elimination of waste and improvement of customer satisfaction. In this context, goal oriented conflict itself is not waste, unlike arbitrary conflict.

In contrast to batch-and-queue, lean production is counterintuitive (Womack and Jones, 1996b) and requires the ability to think in reverse (Ohno, 1988a) (Figure 2). Pull production systems, also known as just-in-time, are enabled by *kanban*, or instruction cards, in which the final process signals the need for additional materials from the

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Table I Typical batch-and-queue business activities

Activity or practice that obstructs reality	The real impact
Functional silos or departments allowed to compete against each other	To be effective in business, people need to understand and value the work performed by other disciplines. Biases and stereotypes of different disciplines result in false teams and false teamwork. Company is slow to respond to changes in the marketplace, which reduces profitability and leads to lay-offs
Internal focus on performance	Often 50 percent or more of the cost of goods sold comes from materials and services purchased from suppliers. Business practices that result in the exclusion of key stakeholders ensure customer dissatisfaction
Repetitive lay-offs to improve competitiveness	Lay-offs reduce competitiveness by lowering employee morale and commitment. Product or service quality drops
Long-term purchasing agreements	Contracts are usually complex in order to account for changes in future business conditions. They are difficult to administer and result in blame and waste. Hence, the failure rate is high
Outsourcing overseas	Benefits of local sourcing are not understood or valued. Labor costs are not the root cause of the problem. Waste is
Downward price online auctions	Batch-and-queue businesses don't know how to manage costs effectively. So they rely on a technological solution to help meet investors' expectations. The root cause of poor cost management remains unrecognized
Senior management focuses on shareholders	OK. But don't expect other key stakeholders to be there when you need them
Learning organizations	All organizations learn. Some just learn the wrong things. Organizations that run on false reality will not learn the things that are needed to prosper in the long run
Knowledge management	People share explicit knowledge but they will not share tacit knowledge if the organization abuses people mentally or physically
Management slogan: "Flawless execution"	People learn by making mistakes. An executive that calls for "flawless execution" will witness a decline in innovation and experimentation as workers become risk-averse. People communicate only good news; information does not flow
Management slogan: "We must get better at forecasting"	Forecasts are usually wrong. Should instead say "We must reduce our emphasis on forecasting and learn how to make to actual customer demand using the principles of lean production"
Management slogan: "Business is complex"	Simplify business processes so that people of normal intelligence can participate in running the business
Management slogan: "We need quick hits"	Excessive short-term focus causes long-term problems. Quick hits lack process focus and are not repeatable
Management slogan: "What gets measured gets managed''	Too many measures become too difficult to manage, so people simply start ignoring them. Manipulating measures becomes a game when they are perceived to be non-value added

preceding process. The signals are repeated upstream through each earlier process and is paced by customer demand. Performing work in the sequence in which value is added, one piece at a time or in very small lots, coupled with rapid equipment change-over, results in the flow of goods or services. Recall that in batch-and-queue production, materials are pushed from earlier processes to later processes based upon market forecasts and results in discontinuous supply, incredible amounts of waste, and inferior financial performance.

Lean production is a disciplined, process-focused, production system whose objective is to minimize the consumption of resources that add no value to a product or service. Lean producers are adept at seeing and understanding the actual conditions that affect the business and its stakeholders, and respond to them using well-defined business processes and simple tools to analyze

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activities intended to add value (Shingijutsu, 1992; Rother and Shook, 1999). It employs the process of *kaizen*, or continuous improvement, in which cross-functional teams systematically analyze processes to identify and eliminate waste (Imai, 1997). Each *kaizen* event, typically one to five days in duration, can yield 50-500 percent or more reduction in waste compared to the 5-7 percent annual improvement sporadically achieved by batch-and-queue businesses. Investment analysts would be wise to participate in shop floor *kaizen* events and witness first-hand the elimination of waste and concomitant improvements in operating and financial performance.

As evidence of their recognition of reality, lean producers do two things that are of great importance which help eliminate waste: they produce to the rate of customer demand and utilize production leveling. For example, if the rate of customer demand is six, 20, 12, 32, and ten units per day, then the daily output is simply the average quantity, and the production area and work performed in it are designed to complete 16 units per day – or about two units per hour. This minimizes over- and under-production, ensuring that customers get what they want much closer to when they actually want it. If demand increases, then *kaizen* is applied to the work processes to increase capacity by eliminating waste. In contrast, batch-and-queue businesses, refusing to acknowledge reality, waste resources trying to improve forecasts and think that manufacturing can effectively respond to wild swings in production volume.

The consistent inability of batch-and-queue businesses to perform as planned forces senior managers to favor glamorous "quick hits" that can also imbue them with heroic leadership qualities. Competitive pressures that bring about focused initiatives designed to achieve a business result in a short period of time are usually forced upon stakeholders. For example, a high cost of goods sold will often propel senior management to adopt a supply chain management initiative whose early success will normally come through reductions in supplier's profit margins rather than fundamental process improvement (Tully, 2000; Emiliani, 2000e). In other words, threaten suppliers and save some money. Suppliers, which can account for 50 percent or more of the cost of goods sold, will remember this unkind act and strive to recover lost earnings when they regain leverage. But the buyer usually ignores the reality of this behavior.

This is in stunning contrast to the behaviors, methods, and tools used by lean producers to improve the capabilities and competitiveness of their supply chains (Womack *et al.*, 1990; Nishiguchi and Beaudet, 1998; Cooper and Slagmulder, 1999). The reality is that businesses need to behave in ways that improve the capability and competitiveness of their suppliers in order to help ensure the ongoing viability of the buyer as well as the extended enterprise. But this outcome cannot be achieved if the methods used by influential business leaders divide key stakeholders. The waste inherent in batch-and-queue production, coupled with the "quick hits" mentality and leadership's neglect of key stakeholders such as employees and suppliers (Caux, 2000; Vinten, 2000; Emiliani, 2000b), are important factors that can limit the life span of most businesses to about 30 years (de Geus, 1997).

Few business leaders, raised in the tradition of western management practices, seem to realize that the problems they face are difficult to solve simply because they cannot be solved. So instead they rely on trade-offs that make it impossible for stakeholders to cooperate to achieve shared business goals (Basu, 1999). What usually results is heightened concern regarding the appearance of success, rather than fundamental business performance. The behavioral waste that is exhibited in this type of environment destroys trust, people, businesses, and money (Emiliani, 1998b). The leaders of lean businesses, however, are more concerned about problem solving and have the mindset, methods, and tools to eliminate repeat non-conformances. They know that favorable appearances follow from one's ability to compete over decades and by minimizing the trade-offs between cost, delivery, quality, product functionality, or stakeholders.

Competitiveness in a lean business is achieved by eliminating waste. A business that encounters the same problems over and over again spends tremendous resources to manage waste but not eliminate it. Lean producers use simple tools, such as fishbone diagrams, or ask "why" five or more times until the root cause has been determined. Then, additional counter-measures are taken to mistake-proof the problem using simple,

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low-cost solutions, so that they never recur. The lean production philosophy stresses the importance of using the wisdom and ingenuity of workers to solve complex problems with little or no money. Employees learn a variety of simple problem-solving tools and methods for the elimination of non-conformances, which have the same power as complex statistical methods that require expert facilitators (Harry and Schroeder, 1999). Lean producers generally possess strong capabilities for organizational learning because the system relies on direct response to reality and does not focus on blaming people (Fujimoto, 1999).

This brief outline of lean production is intended to highlight some key areas that should be of interest to investment analysts. While the fundamentals of the lean production system can appear to be deceptively simple (Ohno, 1988a; 1988b), there are numerous subtle interconnections with regards to employees (Mikami, 1982), customers (Monden, 1993; Womack and Jones, 1996c), new product development (Fujimoto, 1999), financial management (Monden, 1993), supply chain management (Womack *et al.*, 1990; Fujimoto, 1999), and leadership practices (Emiliani, 1998b; Basu, 1999; Emiliani, 2000a; 2000d). Lean production, in its fullest form, can be difficult to replicate even in green field businesses. Transitioning a brown field business to lean production poses unique challenges but is achievable (Smith, 2000).

Most transitions to lean production fail or achieve only partial success even though businesses are using the same basic process improvement tools (Robinson, 1990; Shingijutsu, 1992; Imai, 1997). There are two reasons for this. First, the leadership does not have an accurate understanding of lean production philosophy and practice. Training by consultants is helpful but it is simply not good enough. Senior managers must participate in shop floor *kaizen* events to gain an appreciation of the behaviors, process, methods, and results. Leaders that want to lead with credibility must directly experience *kaizen* events, where equipment is moved and people are enthusiastic about implementing change.

The second pitfall is that the leaders generally exhibit legacy batch-and-queue behaviors that are inconsistent with the implementation of lean (Emiliani, 1998a). Said another way, batch-and-queue leadership behaviors are *intuitive*, while lean behaviors and the elimination of behavioral waste are *counterintuitive*. Anecdotal evidence indicates that less than 5 percent of business leaders possess the ability to demonstrate the behaviors that accompany lean business practices. Leaders can be trained to exhibit lean behaviors, but ultimately they must practice them in everyday business settings. The inability to model lean behaviors will rapidly reduce the commitment of stakeholders such as employees and suppliers. As a result, lean production runs the very real risk of becoming the next "flavor of the month" for many companies.

Why is every business not doing lean production?

Remarkably, very few investors know much about lean production. How can this be, when lean businesses outperform their batch-and-queue counterparts on almost every financial and non-financial metric (Monden, 1993; Womack and Jones, 1996c)? It should be apparent that there are compelling reasons for investors to gain a detailed understanding of lean production and influence senior managers to adopt more sustainable stakeholder-centered business practices (Caux, 2000; Basu, 1999).

Said another way, if lean production is so great then why is every business not doing it? Figure 3 is a classical representation of a fishbone diagram containing the five major cause categories: machines/equipment, people, methods, measurements, and materials. Each cause category contains the root causes of why lean production is not more prevalent today despite its primary reduction to practice in the mid-1960s (Ohno, 1988a). The root causes are explained as follows. First, machines and equipment are sized for batch-and-queue production, in order to produce large quantities of goods to sales forecasts. In addition, western business practices tend to rely on expensive technology to solve business problems, resulting in high fixed costs that managers find difficult to dispose of.

Second, the methods of western business practice are firmly entrenched. The concepts of value and waste are not understood, which results in the optimization of individual

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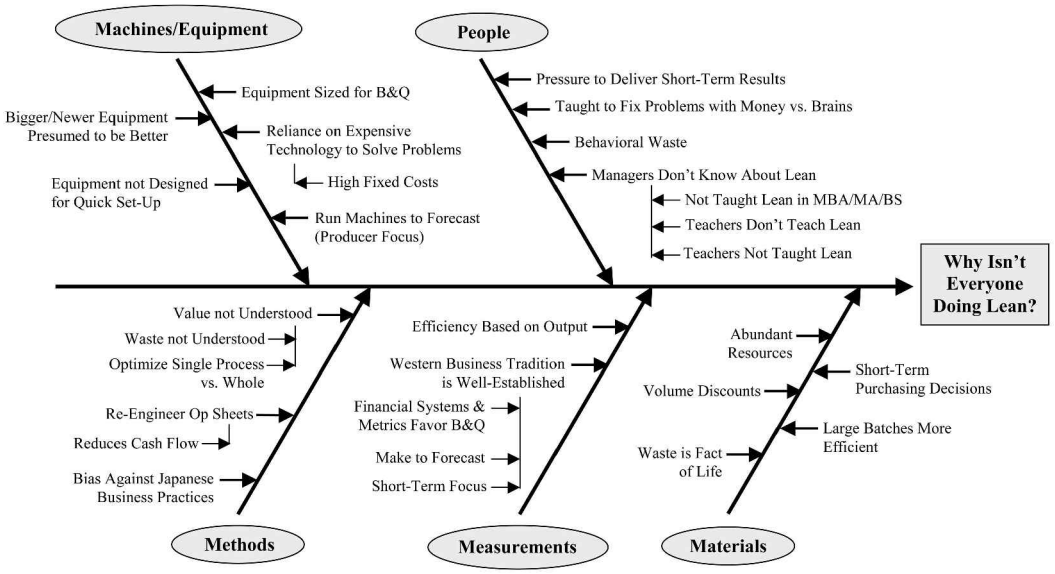
Figure 3 Fishbone diagram showing the root causes of why lean production is not more prevalent today despite an abundance of favorable attributes



process without understanding their impact on other business processes or stakeholders. Efficiency is incorrectly assumed be high if output is high (Ohno, 1988b). For example, if quality does not meet customer expectations, then total costs will increase even though factory costs are low. In addition, there is usually an unwillingness to re-evaluate the way work is performed because of the expense required to re-write manufacturing operations sheets. Western managers also may be unwilling to learn Japanese business practices, thinking that long-term continuous improvement is not as effective as short-term "quick hits" (Figure 4).

Third, there is the relative abundance of materials and natural resources in the West compared to Japan, as well as the belief that scrap/rework/and repair are normal consequences of manufacturing. Lean producers see this as waste and have devised simple and effective methods for eliminating defects (Shingo, 1986). In addition, volume discounts and short-term supplier relationships are ingrained business practices. Buyers typically solicit quotes from suppliers that require them to reduce prices as the quantity increases, in the belief that large batches are more efficient. This encourages suppliers to amortize the labor cost associated lengthy machine set-ups, often several hours in duration, over larger quantities of parts. In contrast, lean producers teach their suppliers how to reduce set-up times to a few minutes (Shingo, 1985), thus greatly reducing the dependency of price upon quantity (Figure 5). Customers that request quotes in this manner are sustaining the status quo and reducing the capabilities and competitiveness of their suppliers. Investors and suppliers would be wise to strongly question this practice.

The fourth reason is people. Many investment analysts condone "quick hits" and the questionable moral and ethical behavior exhibited by CEOs. But more importantly, lean production is not taught in college and graduate school. Specifically, many business schools give superficial treatment to methods such as just-in-time, preferring instead to highlight its shortcomings rather that show students how JIT can be made to work and the resulting benefit to all stakeholders. Lean production is treated as a peripheral topic, rather than as essential knowledge that permeates all subjects taught – from human resources to finance to new product development. This is due in part to the fact that lean production is learned by direct experience in industrial settings; an opportunity that is not usually available to career academics. In addition, we are not taught to understand the root causes of problems. Instead we fix problems by simply avoiding them or by spending money on technology-based solutions to fix perceived problems.

The fifth reason is measurements. Most financial systems are based on traditional

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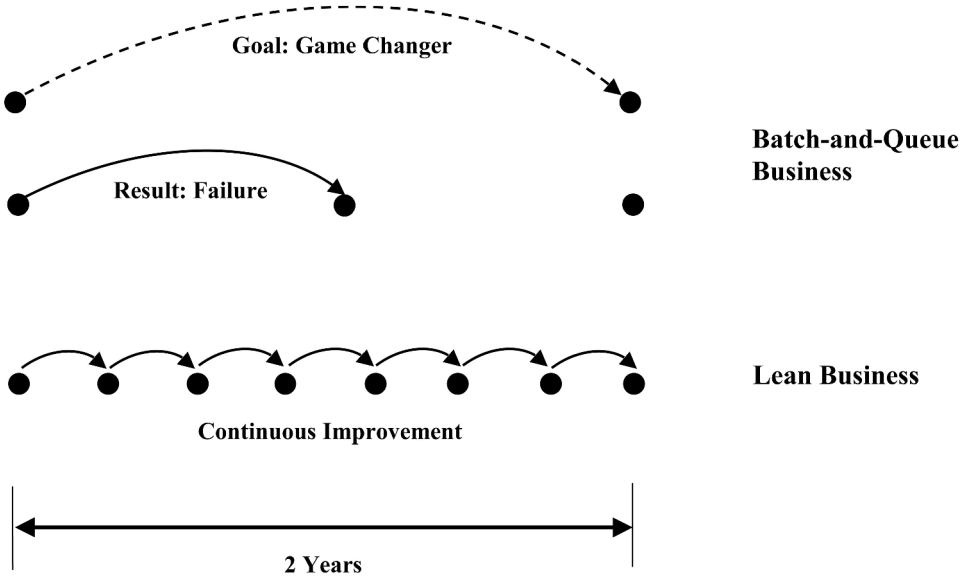
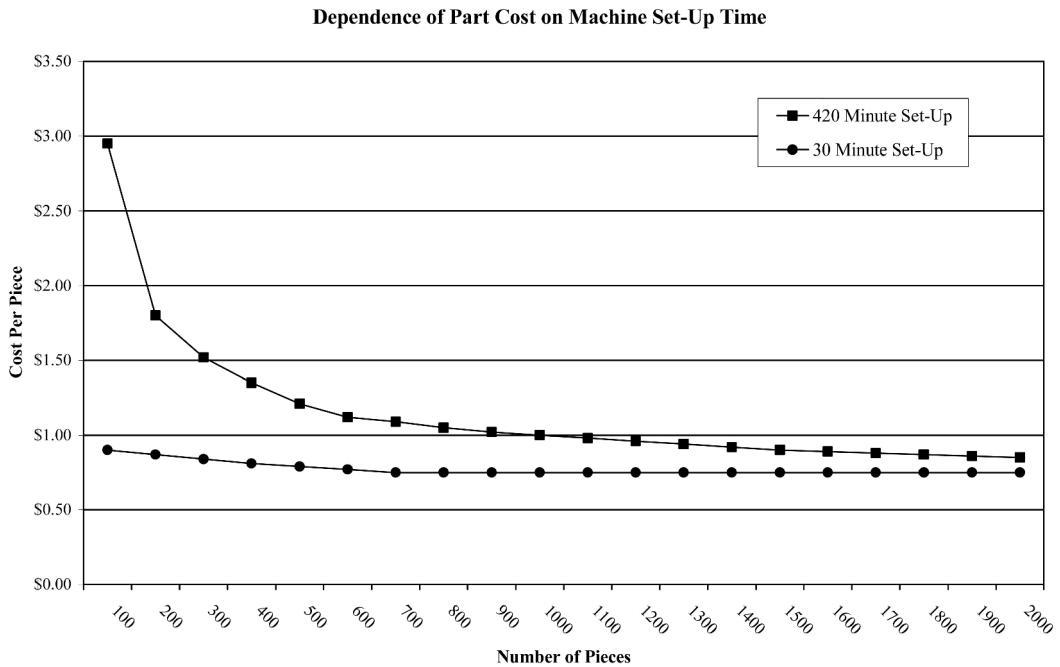
Figure 4 Comparison between batch-and-queue and lean business mindsets regarding improvement activities



Note: Batch-and-queue producers rely on new initiatives every few years to regain lost competitiveness but often fall short of intended goals. Partial or total failure results in the distribution of blame, making stakeholders such as employees and suppliers, weary of participating in future initiatives. Lean producers prefer to make steady progress in small increments, knowing that this increases stakeholder participation, learning, retention, and application to future business problems. As a result, lean producers can usually remain ahead of their batch-and-queue competitors.

Figure 5 Short set-up times greatly reduce the dependence of cost on volume



Note: Long machine set-up times, characteristic of batch-and-queue production, favors the processing of large lots of material to ensure that unit costs are competitive. Lean producers reduce set-up times by eliminating waste, thus greatly reducing the dependence of part cost on volume. This reduces lead times and enables more rapid response to changes in customer demand. World-class set-ups are under 9 minutes in duration.

Source: Simard, 2000

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manufacturing cost accounting principles rooted in batch-and-queue production practices. In addition, many businesses operate using financial and non-financial metrics that are generally known to drive incorrect behaviors. However, changing metrics is often perceived to be high risk because the impact on operations, individual performance, and rewards is not well understood. It seems that knowing how to manage bad metrics is preferable to eliminating them. In fact, people are often rewarded for the skills that they have developed to manipulate metrics. As a result, established metrics are perpetuated, thus retarding the implementation of lean.

Table II summarizes additional reasons why the vast majority of manufacturing and service business that have yet to adopt lean production. Furthermore, there are many misconceptions that retard the spread of lean production practices. Several are worth mentioning, including:

- it costs a lot of time and money to implement lean;
- there is a loss of output due to kaizen activities;
- *kaizen* does not deliver short-term results;
- just-in-time means zero inventories;
- simple solutions are not effective;
- implementing lean requires a large amount of resources;
- perfection is not achievable;
- lean only works in Japan;
- lean will not work for my product or service;
- lean will not work in a union environment; and
- lean will not work in low volume production.

Regarding the last item, "lean will not work in low volume production", it should be noted that lean production was born out of a low volume environment as the means to compete more effectively against high volume competitors (Kamiya, 1976; Toyoda, 1985)

Note that implementing lean production should not result in lay-offs. This is a common mistake made by senior managers that are deeply scripted in batch-and-queue production mindset and practices. Employees that witness lay-offs as a result of productivity improvements will refuse to participate in future productivity improvement activities (Mikami, 1982), resulting in false-lean business practices. Instead, managers should temporarily move excess workers to dedicated process improvement teams in order to eliminate waste in other business processes. In addition, senior managers must accept responsibility for growing the top line through increased sales and create employment opportunities for the excess workers.

Table II Reasons why lean production is not the mainstream

Reasons due to misconceptions
It seems complex
The business press characterizes lean as bad
Lean does not deliver short-term results
Simple solutions seen as ineffective
Lean means zero inventory
Japanese management practices won't work in the West
Lean won't work on my product or service
Need lots of resources to implement lean
It costs a lot of money to implement lean
It takes too long to implement lean
Lean will disrupt production
Hard to learn the language of lean and lean practices
Lean will not work in low volume environments
Reasons due to organizational routines:
Success breeds arrogance
Lean is counter-intuitive
"Not invented here" syndrome
Hard to unlearn western business practices
Lean is a major change in internal and external business practices
Inventory is regarded as an asset
Easier to blame others
Difficult to change business metrics
Peer group performance is good enough
Focus on internal politics instead of eliminating waste
Producer (output) focus vs customer focus
Easier to distrust people than to trust people
People are rewarded for reacting to the problem, not studying the problem
Preference for control vs understanding processes
Employees mirror the behaviors of their bosses

What should a "muda analyst" look for?

Investment analysts enjoy a level of influence and access to senior managers that no other stakeholder can match. The CEOs of large publicly traded companies listen closely to them and will institute drastic changes that negatively impact thousands of people in response to their objectives or concerns (Barrett, 2000; Jacobs, 2000). So a question needs to be asked: Can investment analysts

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give better guidance to the CEO than they currently give? The answer is "no" if their knowledge and role remain the same. But if their knowledge expanded, then the role could be modified to focus first on how companies can eliminate waste and second on financial performance. Let us call the new role a "*muda* analyst".

A *muda* analyst would first operate from the mindset that the key stakeholders in business – employees, suppliers, customers, and investors – enable success, and that favoring one over the other will lead to poor performance. Next, the *muda* analyst would be of a mindset to question all that they learned in school and at work about the intuitive ways in which most businesses are managed. They would be willing to unlearn mindset and methods of batch-and-queue and learn about lean production. They would then formulate new questions to ask the senior management team when they meet. Key questions include:

- *How do you reduce costs?* Rationale: the traditional methods include lay-offs, plant closings, squeezing suppliers, budget cutting, utilizing economic order quantities, forecasting systems, etc. The correct answer is by eliminating waste.
- *Do you use learning curves to predict future production costs?* Rationale: lean producers do not use learning curves because volume is nearly independent of cost when machine set-ups are only minutes in duration. Also, learning curves ignore the reality of changing conditions in the marketplace that affect the cost of labor and input materials, and create wasteful dysfunctional behavior.
- *Do purchase orders include range quoting?* Rationale: range quoting makes suppliers think that it is OK to amortize lengthy machine set-ups over larger production runs. The buyer should teach suppliers quick-change-over and eliminate range quoting.
- *Does your ordering system calculate "economic order quantities"?* Rationale: EOQs perpetuate lengthy machine set-ups, long lead times, and low inventory turnover. People do not learn how to eliminate waste when EOQs prevail. Should instead learn how to level production and institute sales and marketing practices that support leveling.
- *Do you use the metric "purchase order variance"?* Rationale: The POV metric helps ensure conformance to purchased material budgets, created months earlier, which often ignores actual market conditions and leads to incessant gaming designed to hide unfavorable variances. The buyer should instead understand value stream mapping to determine where value is added and how waste can be eliminated to reduce costs, instead of relying on economic order quantity.
- *Do you track "earned hours" in manufacturing?* Rationale: the earned hours metric often leads to overproduction in order to meet forecasted factory output, despite actual market conditions that demand less product. Earned hours are not real numbers. It does not reflect the actual labor required to manufacture goods and leads to excessive focus on the analysis of variances that do not help identify the root cause of problems. The company should make to the rate of customer demand and use standard work and standard work combination sheets instead.
- *Do you use a "standard cost" system?* Rationale: the actual price paid often differs greatly from the standard cost. Standard costs are imaginary numbers. The company should use real numbers, actual prices paid, instead of fake standard cost numbers. Also, standard cost systems for internally produced goods usually include reserves for long set-ups and scrap factors, which perpetuate waste.
- *Do you use a metric to track and minimize the number of engineering changes?* Rationale: 70 percent or more of the part cost comes from design. How can cost reduction goals be achieved if the goal is to reduce the number of design changes?
- *How do you reduce lead times?* Rationale: the way to reduce lead times is to eliminate the eight wastes. Set-up reduction and standardization (i.e. part or process commonality) are particularly powerful.
- *How do you reduce inventories? What specific methods do you use?* Rationale: the only effective methods are using existing production parts, standardization (i.e. part or process commonality), just-in-

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time (enabled by *kanban*), and set-up reduction. Traditional methods such as requiring suppliers to maintain inventories, scrapping aged inventory, schedule push-outs and pull-ins, closing the receiving well the last few days of the month, relying on improved forecasts, etc., perpetuate waste.

- *Does engineering's new product development process require the use of existing components and common materials and processes?* Rationale: engineers that think new product development gives them the opportunity to design 100 percent new part numbers will create a cost disadvantage and waste. Try creating new products with 50 percent new part numbers instead. Re-using existing production parts and common materials and processes will increase cash flow, reduce overhead burden, and reduce lead times.
- *How do you determine your production capacity?* Rationale: most companies simply do not understand their capacity or use a combination of dollars and units shipped. Capacity should be based on standard work, cycle time, and the rate of customer demand (i.e. take time).
- *Why do you need this new initiative (ask "why" five or more times)?* Rationale: the new initiative probably does not address the root cause of the problem that it is intended to fix. Employees and suppliers will not fully participate in yet another "flavor of the month" that will likely fail within a year or two.
- *What are the results of your employee satisfaction survey? What is the root cause of their primary dissatisfactions?* Rationale: unhappy employees = unhappy customers. The results of employee surveys are often not effectively addressed by senior management because they fail to understand the root cause of the dissatisfaction. Managers that make employees receive training in root cause analysis lose credibility when then do not apply root cause analysis to their own management problems. Ask to see a Pareto chart of the top ten employee complaints and a root cause analysis for each one.
- *Do your suppliers consider their relationship with you to be adversarial?* Rationale: adversarial relationships are caused by buyers seeking to optimize their own position in the supply chain at the expense of suppliers. However, suppliers are the buyers' "virtual employees". Annoying them will close communication to a valuable cost reduction resource. In many cases, the buyer's design or other requirement is what drives high costs. And do not forget that a large portion of the supplier's cost comes from sub-tier suppliers. Investors should survey suppliers, particularly small ones, to better understand the buyer's behavior. Target costing and *kaizen* costing should be used to transmit marketplace pressures for cost reduction through the supply chain.
- *Why are you using online auctions (ask "why" five or more times)?* Rationale: companies that use downward price online auctions are admitting defeat and resorting to destructive cost reduction tactics that drive stakeholders apart. Buyers do not understand the cost of the goods and services that they procure. Instead, they must institute joint design, value engineering, target costing, and *kaizen* costing in order to understand their costs and develop suppliers' capabilities.
- *What are the results of your customer satisfaction surveys? What is the root cause of their primary dissatisfactions?* Rationale: unhappy customers = lower earnings. Customer complaints are often not effectively addressed by senior management because they fail to understand their root cause. Senior managers need to apply root cause analysis to customer complaints. Ask to see a Pareto chart of the top ten customer complaints and a root cause analysis for each one.
- *What are support groups like finance, human resources, legal, sales and marketing, and MIS doing to eliminate waste?* Rationale: the elimination of waste is not just the job of people in engineering or manufacturing. Each department uses business processes that include both value-added and waste. In general, the amount of value-added is small and waste is large. Utilize *kaizen* and associated tools to analyze office processes and eliminate waste.
- *How do you measure total cost?* Rationale: batch-and-queue businesses spend lots of resources trying to develop total cost models. The answer should be "we don't"

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or "we can't". It is not easily measurable and efforts to measure it are wasteful. Instead, the senior mangers of lean companies are able to take a leap of faith and guide their decision making by asking: "Will this eliminate waste?" and "Will this improve customer satisfaction?"

These are just a few of the questions that investors should ask when meeting with senior management. These and other questions will start to give the investment analyst a better understanding of the company's underlying business practices, current performance, and impact on employees, suppliers, and customers. More importantly, these questions will reveal valuable information on the future performance of the extended enterprise and its ability to compete and grow earnings. In addition, the *muda* analyst should periodically visit the key companies that they invest in to again ask these questions and witness first-hand business practices such as *kaizen*, *kanban*, mistake-proofing, quick change-over, production cells, new product development process, root cause analysis, value stream mapping, etc. This knowledge (Figure 6), coupled with traditional financial analysis, will reveal preferred investment opportunities.

Figure 6 Hierarchy of business management systems

LEAN†

Clean, bright, well-organized, production cells, business processes are well understood, visual (at-a-glance) workplace control, and kaizen is part of everyday work. Is applying lean principles to business processes that include internal and external stakeholders. No blame environment, very low employee turnover, high customer and supplier satisfaction. Senior management understands the subtle facets of lean, integration between stakeholders, and is dedicated to eliminating waste.

QUASI-LEAN

Making good progress, but only within operations. Planning to apply lean principles to other internal disciplines and with external stakeholders such as customers and suppliers. Employees are engaged and understand that eliminating waste is the key to achieving lasting competitiveness. Management makes commitment to employees that they will not lose their job due to productivity improvements. Metrics are changed to reflect implementation of lean practices.

FALSE-LEAN

Senior management talks lean, but close examination reveals a core of batch-and-queue covered by a lean crust. Can demonstrate a few examples of short set-ups, mistake proofing, kanban, and one-piece flow. Employees not bought into lean due to continuing layoffs and suppliers still managed the old way. Kaizen is viewed as a monthly or quarterly activity, and does not include participation by senior management. Senior management continues to promote waste through internal politics. Key metrics not changed from batch-and queue days.

BATCH-AND-QUEUE

Disorganized workplace, large amounts of work in process, large lot sizes, long lead times, high scrap rates, and slow to introduce new products. Lots of delays, fire fighting, and complaints from customers, suppliers, and employees. Workers move so slowly that nobody goes home physically tired but are mentally exhausted. Relies on major initiatives every few years to improve competitiveness. Uses online auctions, layoffs, plant closings, economic order quantities, etc. to reduce costs.

Note: Long-term focus on the elimination of waste yields superior business performance. Lean businesses are a better investment as they are less prone to cyclic management behaviors. The problem is that relatively few businesses are quasi-lean or lean. Batch-and queue business can be an even better investment opportunity if investors support management teams that understand how to eliminate waste. † Note that a company can not be labeled "lean" since there is no known end point. It is appropriate to refer to them as lean businesses only when the capability to identify and eliminate waste is firmly embedded in the culture and operating practices.

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Summary

The overall ineffectiveness of batch-and-queue production is astonishing, as are the destructive consequences among key stakeholders. Batch-and-queue production does not provide senior management with timely and accurate information, and thus obscures business realities which results in stakeholder conflict. Investment analysts explicitly reward the false-reality exhibited by senior management when they allow themselves to be influenced by batch-and-queue mindset and behaviors.

In contrast, lean production promotes greater clarity and improved responsiveness to changing market conditions and is more capable of meeting the needs of stakeholders. High returns on investment need not come at the expense of one stakeholder over another.

Instead, influential investors can guide senior management towards the practice of lean production. But in order to do this, and do it well, the primary work of investment analysts must change to "*muda* analyst", whose focus is on companies that eliminate waste in business processes and between internal and external stakeholders. The traditional work of investment analysts remains very important, but can be positioned as a secondary activity since it is the elimination of waste that improves financial performance (Table AII).

Investment analysts should analyze the non-financial measures first because that is where the money really is, as lean producers know. Non-financial metrics such as time, distance, space, days of inventory, percent on-time delivery, defects, productivity, customer satisfaction, etc., are what drive financial performance and promote the integration of stakeholders to achieve sustainable business results.

Indeed, the work of financial analysis can be made easier when waste is eliminated because senior management is less inclined to manage earnings using deceptive accounting practices.

References

Argyris, C. (1986), "Skilled incompetence", Harvard Business Review, Vol. 64 No. 5, pp. 74-9.

Argyris, C. (1994), "Good communication that blocks learning", Harvard Business Review, Vol. 72 No. 4, pp. 77-85.

Barrett, A. (2000), "Honeywell: paying the price for rosy promises", Business Week, 24 July, p. 34.

Basu, S. (1999), Corporate Purpose, Garland Publishing, New York, NY.

Beck, E. (2000), "Unilever to cut jobs, close factories after decline of 1999 pre-tax profit", The Wall Street Journal, Interactive Edition, 23 February.

Bradsher, K. (2000), "Ford is conceding SUV. drawbacks", The New York Times on the Web, 12 May.

Byrne, J.A. (1998), "How Al Dunlap self-destructed", Business Week, 6 July, pp. 58-65.

Carvell, T. (1998), "By the way . . . your staff hates you", Fortune, 28 September, Vol. 138 No. 6, pp. 200-12.

Caux (2000), "Caux round table: principles for business", http://www.cauxroundtable.com

Cloud, D. (2000), "Former GM official is accused of giving confidential information to a competitor", The Wall Street Journal, Interactive Edition, 23 May.

Cooper, R. and Slagmulder, R. (1999), Supply Chain Development for the Lean Enterprise, Productivity, Portland, OR.

de Geus, A. (1997), "The living company", Harvard Business Review, Vol. 75 No. 2, March-April, pp. 51-9.

Doi, Y. (2000), Personal communication on the importance of speed in defining customer value.

Eden, S. (2000), "Xerox starts 2nd major reorg in 2 yrs; analysts cautious", The Wall Street Journal, Interactive Edition, 31 March.

Emiliani, M.L. (1998a), "Continuous personal improvement", Journal Workplace Learning, Vol. 10 No. 1, pp. 29-38.

Emiliani, M.L. (1998b), "Lean behaviors", Management Decision, Vol. 36 No. 9, pp. 615-31.

Emiliani, M.L. (2000a), "Cracking the code of business", Management Decision, Vol. 38 No. 2, pp. 60-79.

Emiliani, M.L. (2000b), "The oath of management", Management Decision, Vol. 38 No. 4, pp. 261-2.

Emiliani, M.L. (2000c), "The false promise of 'What gets measured gets managed'", Management Decision, Vol. 38 No. 9.

Emiliani, M.L. (2000d), "Emiliani's lean business management guide", unpublished work.

Emiliani, M.L. (2000e), "Business to business online auctions: key issues for purchasing process improvement", Supply Chain Management, An International Journal, Vol. 5 No. 4.

Fairlamb, D. and Ewing, J. (2000), "Auf Wiedersehen, Germany Inc.", Business Week, 21 February, p. 64.

Fiume, O.J. (2000), Management Accounting for Lean Businesses, a workshop sponsored by The Center for Lean Business Management, Rensselaer Polytechnic Institute, 10 and 17 May, Hartford, CT.

Ford, H. (1922), My Life and Work, Garden City Publishing, Garden City, NY, pp. 77-90.

France, M. (2000), "Fighting for market share is one thing . . .", Business Week, 8 May, p. 48.

France, M. and Hamm, S. (2000), "All the King's horses and all the King's men . . .", Business Week, 19 June, p. 47-50.

Fujimoto, T. (1999), The Evolution of a Manufacturing System at Toyota, Oxford University Press, New York, NY.

Gentry, C. (2000), "As Aetna's woes pile up, its chairman is under fire", The Wall Street Journal, Interactive Edition, 16 April.

Greenberg, H. (2000), "Alphabet dupe: why EBITDA falls short", Fortune, Vol. 142 No. 2, 10 July, pp. 240-1.
Hammond, J., Keeney, R. and Raffia, H. (1998), "The hidden traps in decision making", Harvard Business Review, Vol. 76 No. 5, pp. 47-58.
Harry, M. and Schroeder, R. (1999), Six Sigma, Currency Doubleday, New York, NY.
Hechinger, J. (2000), "Xerox won't meet yearly estimates, timetable for turnaround is uncertain", The Wall Street Journal, Interactive Edition, 27 July.
Imai, M. (1997), Gemba Kaizen, McGraw-Hill, New York, NY.
Jacobs, K. (2000), "Honeywell lowers earnings forecast for rest of year; will cut 6000 jobs", The Wall Street Journal, Interactive Edition, 11 July.
Kahn, J. (2000), "Presto chango! Sales are huge!", Fortune, 20 March, Vol. 141 No. 6, pp. 90-6.
Kamiya, S. (1976), My Life with Toyota, Toyota Motor Sales Co., Tokyo, pp. 103-11.
Kets de Vries, M.F.R. (1993), Leaders, Fools, and Imposters, Jossey-Bass, San Francisco, CA.
Loomis, C. (1999), "Lies, damned lies, and managed earnings", Fortune, 2 August, Vol. 140 No. 3, pp. 74-92.
McLean, B. (2000), "Hocus pocus", Fortune, 26 June, Vol. 142 No. 1, pp. 165-8.
Mikami, T. (1982), Management and Productivity Improvement in Japan, JMA Consultants, Inc., Tokyo, Japan.
Mollenkamp, C. (2000), "Bank of America sets cuts to help boost its growth", The Wall Street Journal, Interactive Edition, 31 July.
Monden, Y. (1993), Toyota Management System, Productivity, Portland, OR.
Monden, Y. (1995a), Target Costing and Kaizen Costing, Productivity, Portland, OR.
Monden, Y. (1995b), Target Costing and Kaizen Costing, Productivity, Portland, OR, pp. 309-16
Nagy, B. (2000), "Stinging comments from Dodd on UTC job cuts", The Hartford Courant, 8 February, p. A1.
Neff, R. (2000), "Japan: land of the hostile takeover?", Business Week, 19 April, p. 66E2.
Nelson, E. and Deogun, N. (2000), "Change was too fast at P&G; Jager goes, Pepper is reinstated", The Wall Street Journal, Interactive Edition, 9 June.
Nishiguchi, T. and Beaudet, A. (1998), "Case study: the Toyota Group and the Aisin fire", Sloan Management Review, Vol. 40 No. 1, pp. 49-59.
Ohno, T. (1988a), Toyota Production System, Productivity Press, Portland, OR.
Ohno, T. (1988b), Workplace Management, Productivity Press, Portland, OR.
Robinson, A. (1990), Modern Approaches to Manufacturing Improvement, Productivity, Portland, OR.
Rother, M. and Shook, J. (1999), Learning to See, The Lean Enterprise Institute, Brookline, MA.
Schultz, E. (2000), "Companies find host of ways to pare retirement payouts", The Wall Street Journal, Interactive Edition, 27 July.
Shellenbarger, S. (2000), "Is bad bosses' awful behavior from something in their past?", The Wall Street Journal, Interactive Edition, 10 May.
Sherer, P.M. (2000), "DLJ's ties to Ameriserve in bond fiasco draw scrutiny", The Wall Street Journal, Interactive Edition, 11 May.
Shingijutsu (1992), "How to implement KAIZEN in manufacturing", Shingijutsu Co. Ltd, Gifu.
Shingo, S. (1985), A Revolution in Manufacturing: The SMED System, Productivity, Portland, OR.
Shingo, S. (1986), Zero Quality Control: Source Inspection and the Poka-Yoke System, Productivity, Portland, OR.
Shirouzu, N. (2000), "Driven by necessity, and Ford, Mazda downsizes, US-style", The Wall Street Journal, Interactive Edition, 5 January.
Simard, E. (2000), "Money vs. brainpower", unpublished work.
Smith, J.H. (2000), Wiremold, A Century of Innovation, Greenwich Publishing Group, Lyme, CT.
Solow, D. (1990), How to Read and Do Proofs, J. Wiley & Sons, New York, NY.
Sorensen, C.E. (1956), My Forty Years with Ford, W.W. Norton Company, New York, NY, pp. 115-32.
Spurgeon, D. (2000), "Winn-Dixie to close 144 stores and trim workforce by 8 percent", The Wall Street Journal, Interactive Edition, 21 April.
Stainer, L., Stainer, A. and Gully, A. (1999), "Ethics and performance management", International Journal of Technology Management, Vol. 17 Nos 7/8, pp. 776-85.
Taylor, A. (1999), "The man who vows to change Japan inc.", Fortune, 20 December, Vol. 40 No. 12, pp. 189-98.
Toyoda, E. (1985), Toyota: Fifty Years in Motion, Kodansha International, New York, NY, pp. 57-8.
Tully, S. (2000), "Going, going, gone!", Fortune, Vol. 141, No. 6, pp. 132-45.
Vinten, G. (2000), "The stakeholder manager", Management Decision, Vol. 38 No. 6, pp. 377-83.
Welch, D. (2000), "Consumers to GM: you talking to me?", Business Week, 19 June, pp. 213-16.
Womack, D. and Jones, D. (1996a), Lean Thinking, Simon & Schuster, New York, NY, pp. 16-19.
Womack, D. and Jones, D. (1996b), Lean Thinking, Simon & Schuster, New York, NY, pp. 22-8.
Womack, D. and Jones, D. (1996c), Lean Thinking, Simon & Schuster, New York, NY.
Womack, J., Jones, D. and Roos, D. (1990), The Machine that Changed the World, Rawson Associates, New York, NY.

Appendix. Mathematical proof that eliminating waste will improve financial performance

The statement "eliminating waste will improve financial performance" can be written as: "if waste is eliminated, then financial performance is improved". The truth of this statement can be proved using mathematical logic (Solow, 1990; Emiliani, 2000c). This *conditional* statement consists of two simpler statements: the *hypothesis* "if waste is eliminated" and the conclusion "then

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financial performance is improved". In mathematical terms,

Hypothesis p: "if waste is eliminated"
Conclusion q: "then financial performance is improved".

Symbolically written as: $p \rightarrow q$, or in words as: "if p, then q". In order for this statement to be true, the conditions in Table AI must be satisfied.

Table AI is called a "truth table". Constructing a truth table for the statement "if waste is eliminated, then financial performance is improved" yields Table AII.

Notice that the truth values for $p \rightarrow q$ in Table AI are the same as shown in Table AII. Thus, the statement "if waste is eliminated, then financial performance is improved" is true and can thus be considered an axiom, or a true statement under all conditions.

Table AI

p	q	p → q
True	True	True
True	False	False
False	True	True
False	False	True

Table AII Proof using mathematical logic

p	q	p → q
If waste is eliminated	Then financial performance is improved	True
If waste is eliminated	Then financial performance is not improved	False
If waste is not eliminated	Then financial performance is improved	True
If waste is not eliminated	Then financial performance is not improved	True

Commentary

A worthwile investigation into the role of investment analysis.

A mathematical logic approach to the shareholder vs stakeholder debate

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Keywords
Leadership, Management, Shareholder value analysis, Stakeholders

Abstract
Uses an innovative approach to analyze the long-standing claim that companies exist to maximize shareholder value. Five statements supporting this claim are tested using mathematical logic. Each one is found to be false. The community of business theorists, consultants, academics, and management practitioners that espouse shareholder value as the singular purpose of business are thus shown, from this perspective, to be wrong.

Introduction

The overarching business practices of large, publicly traded, companies are typically divided into two categories: shareholder- or stakeholder-driven. The US model for business has been overwhelmingly shareholder-driven for the last 15 years (Rappaport, 1998), where most CEOs believe that their mission is to maximize shareholder value. In other countries, such as Japan and Germany, many companies are managed using stakeholder-centered business practices (Inamori, 1997; Matsushita, 1994; Nikkei, 2001a, b; Wessel, 2001). The success of the US economy in the late 1990s has propelled shareholders to pressure senior management for higher returns using US-style business practices (Taylor, 1999; Dvorak *et al.*, 2000; Shirouzu *et al.*, 2000; Shirouzu, 2000; Zaun, 2000; Wessel, 2001).

Senior managers that are strongly influenced by shareholders, or otherwise adhere to a purely economic view of business, must make tradeoffs between other key stakeholders such as: employees, suppliers, customers, governments, or labor unions (Fulghum, 1999; Maremont and Berner, 1999; Emiliani, 2000a; Greimel, 2000; Heilemann, 2000; Schultz, 2000; Deutsch, 2001; Geyelin and Martinez, 2001). Optimizing business performance along a single dimension, with principal accountability to only one stakeholder, suggests that success is best achieved by dividing, rather than leveraging, key stakeholders.

Importantly, local optimization diminishes senior management's ability to develop an accurate view of reality (Emiliani, 2001). Having an accurate view of reality would result in the spontaneous and universal characterization of business as a socio-economic activity. The true purpose of business would be clear and its course sustained over time with appropriate maintenance. But instead, witness the prevalence of business practices and metrics that distort reality (Emiliani, 2001) or are divisive (Brady, 2000; Green, 2000; Emiliani, 2000a; Richards, 2000; Tully, 2000; Ball, 2001).

Philosophical arguments are typically used to explore the validity of shareholder versus stakeholder views of business (Rappaport, 1998; Gabor, 2000; Kennedy, 2000). While intellectually challenging, philosophical arguments may not be sufficient to persuade senior managers to change their behaviors. Further, the shareholder versus stakeholder debate is rooted in subjective thought, with concomitant biases and stereotypes. This results in artificial barriers that ensure superficial treatment of an issue that is of great importance to all people that work for a living.

The purpose of this paper is to use formal logic in examining whether or not businesses exist to maximize shareholder value. Five simple statements are rigorously analyzed using mathematical logic (Solow, 1990; Emiliani, 2000b; 2001). The statements contain logical outcomes if the starting hypothesis is true, in support of the claim that businesses exist to maximize shareholder value. There are three simple preconditions that serve as the foundation for ensuing analyses:

1. the company is a for-profit;
2. the company is publicly traded via stock markets; and
3. the company's output is supported by various stakeholders, such as employees, suppliers, customers, investors, communities, labor unions, complementors, competitors, etc.

Note that these preconditions are not abstract. Rather, they are the plain reality of many companies yesterday, today, and tomorrow. The method of proof, truth tables, requires checks against reality to test

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pragmatic statements and their efficient outcomes. These are not inert academic arguments.

Proof of Statement No. 1

If companies exist to maximize shareholder value, then all stakeholders will focus on maximizing shareholder value.

This type of statement is called a conditional statement. It consists of two simpler statements: the hypothesis "if companies exist to maximize shareholder value" and the conclusion "then all stakeholders will focus on maximizing shareholder value". In mathematical terms:

Hypothesis p: if companies exist to maximize shareholder value,

Conclusion q: then all stakeholders will focus on maximizing shareholder value.

Symbolically this is written as $p \rightarrow q$, or in words as "if p, then q". In order for this statement to be true, the conditions defined in Table I must be satisfied:

Table I is called a "truth table". Constructing a truth table for the statement "if companies exist to maximize shareholder value, then all stakeholders will focus on maximizing shareholder value" yields results shown in Table II.

Notice that the truth values for $p \rightarrow q$ in Table II are different from those shown in Table I. Thus, the statement "if companies exist to maximize shareholder value, then all stakeholders will focus on maximizing shareholder value" is false. The rationale is shown in Table III.

These outcomes are consistent with what we know from direct experience in business, if we choose to acknowledge it.

Table I

p	q	p → q
True	True	True
True	False	False
False	True	True
False	False	True

Table II

p	q	p → q
If companies exist to maximize shareholder value	then all stakeholders will focus on maximizing shareholder value	False
If companies exist to maximize shareholder value	then all stakeholders will not focus on maximizing shareholder value	True
If companies do not exist to maximize shareholder value	then all stakeholders will focus on maximizing shareholder value	False
If companies do not exist to maximize shareholder value	then all stakeholders will not focus on maximizing shareholder value	True

Proof of Statement No. 2

If companies exist to maximize shareholder value, then all other stakeholders will willingly sacrifice their interests.

Hypothesis p: if companies exist to maximize shareholder value"

Conclusion q: then all other stakeholders will willingly sacrifice their interests''

The results yielded are shown in Table IV. The statement "if companies exist to maximize shareholder value, then all other stakeholders will willingly sacrifice their interests'' is false. The rationale is similar to that shown in Table III.

Proof of Statement No. 3

If companies exist to maximize shareholder value, then all other stakeholders will benefit.

Hypothesis p: if companies exist to maximize shareholder value.

Conclusion q: then all other stakeholders will benefit.

The results yielded are shown in Table V. The statement "if companies exist to maximize shareholder value, then all other stakeholders will benefit" is false. The rationale is similar to that shown in Table III.

Proof of Statement No. 4

If companies exist to maximize shareholder value, then shareholders will always be satisfied with the company's financial performance.

Hypothesis p: if companies exist to maximize shareholder value.

Conclusion q: then shareholders will always be satisfied with the company's financial performance.

The results yielded are shown in Table VI. The statement "if companies exist to maximize shareholder value, then shareholders will always be satisfied with the company's financial performance" is false.

The rationale is similar to that shown in Table III.

Proof of Statement No. 5

If companies exist to maximize shareholder value, then management's decisions will be acceptable to all stakeholders.

Hypothesis *p*: if companies exist to maximize shareholder value,
Conclusion *q*: then management's decisions will be acceptable to all stakeholders.

The results yielded are shown in Table VII. The statement "if companies exist to maximize shareholder value, then management's decisions will be acceptable to all stakeholders" is false. The rationale is similar to that shown in Table III.

Discussion

It is apparent from this analysis that companies do not exist solely to create shareholder value. The community of business theorists, consultants, academics, and practitioners that espouse shareholder value as the singular driver of business activity are simply wrong.

Companies operate in a socio-economic environment that functions more effectively when key stakeholders are included in business practices and decision making (Mikami, 1982; Ohno, 1988; Womack *et al.*, 1990; Nishiguchi, 1994; Nishiguchi and Beaudet, 1998; Cooper and Slagmulder, 1999; Fujimoto, 1999). Thus, businesses exist to fulfill many needs, not just shareholder value (Basu, 1999). Widespread recognition of this reality would no doubt improve both business education and work experiences (Emiliani, 2000c; Caux, 2001).

These results lead to an important question: Can senior managers rightfully be called "leaders" if they focus on optimizing individual parts of the business to maximize shareholder value (Emiliani, 2000d)? Are western business pundits correct in identifying Henry Ford, Alfred Sloan Jr, Thomas Watson Jr, Bill Gates, and Jack Welch, as the greatest business leaders of the twentieth century (Stewart *et al.*, 1999; Colvin, 1999)?

Or are senior managers that focus on optimizing the whole, minimizing or eliminating tradeoffs between key stakeholders, the real leaders (Emiliani 2000d)? Are eastern business pundits correct in identifying Konosuke Matushita, Soichiro Honda, Akio Morita, Masaru Ibuka, and Kiichiro Toyoda as the twentieth century's best business managers (Nikkei, 2001a, b)?

This paper argues, using mathematical logic, that companies do not exist to maximize shareholder value. While shareholder value is important, it should not be the driver. Balance must be achieved among other important factors such as:

Table III

p → q	Rationale
False	All stakeholders do not focus on maximizing shareholder value
True	Some stakeholders may focus on maximizing shareholder value
False	All stakeholders do not focus on maximizing shareholder value
True	Some stakeholders may focus on maximizing shareholder value

Table IV

p	q	p → q
If companies exist to maximize shareholder value	then all other stakeholders will willingly sacrifice their interests	False
If companies exist to maximize shareholder value	then all other stakeholders will not willingly sacrifice their interests	True
If companies do not exist to maximize shareholder value	then all other stakeholders will willingly sacrifice their interests	False
If companies do not exist to maximize shareholder value	then all other stakeholders will not willingly sacrifice their interests	True

Table V

p	q	p → q
If companies exist to maximize shareholder value	then all other stakeholders will benefit	False
If companies exist to maximize shareholder value	then all other stakeholders will not benefit	True
If companies do not exist to maximize shareholder value	then all other stakeholders will benefit	False
If companies do not exist to maximize shareholder value	then all other stakeholders will not benefit	True

Table VI

p	q	p → q
If companies exist to maximize shareholder value	then shareholders will always be satisfied with the company's financial performance	False
If companies exist to maximize shareholder value	then shareholders will not always be satisfied with the company's financial performance	True
If companies do not exist to maximize shareholder value	then shareholders will always be satisfied with the company's financial performance	False
If companies do not exist to maximize shareholder value	then shareholders will not always be satisfied with the company's financial performance	True

Table VII

p	q	p → q
If companies exist to maximize shareholder value	then management's decisions will be acceptable to all stakeholders	False
If companies exist to maximize shareholder value	then management's decisions will not be acceptable to all stakeholders	True
If companies do not exist to maximize shareholder value	then management's decisions will be acceptable to all stakeholders	False
If companies do not exist to maximize shareholder value	then management's decisions will not be acceptable to all stakeholders	True

- technological strength (inclusive of production practices);
- employment creation;
- contribution to society;
- management philosophy;
- environmental responsibility; and
- corporate behavior (Nikkei, 2001b).

The compass for true leadership points unmistakably to stakeholder-centered management practices.

Summary

The claim that companies exist to maximize shareholder value was formally tested using mathematical logic. Five statements that support the claim were analyzed. Each statement was found to be false.

A disturbing trend has recently emerged where companies that have a tradition of stakeholder-centered business practices are under increasing pressure to adopt US-style shareholder-centered business practices that are known to divide key stakeholders and result in wasteful turmoil. Investors demanding emulation of US-style business practices negate the reality that businesses have both economic and social responsibility. Senior managers are urged not to succumb to the influence of investors and seek alternatives to ensure balance.

References

Ball, J. (2001), "New Chrysler boss plans to cut jobs, squeeze suppliers in overhaul mission", *The Wall Street Journal Interactive Edition*, 22 January.

Basu, S. (1999), *Corporate Purpose: Why it Matters More than Strategy*, Garland Publishing, New York, NY.

Brady, D. (2000), "Why service stinks", *Business Week*, 23 October, pp. 118-28.

Caux (2001), "Caux round table: principles for business", http://www.cauxroundtable.org/ENGLISH.HTM

Colvin, G. (1999), "The ultimate manager", *Fortune*, Vol. 140 No. 10, 22 November, pp. 185-7.

Cooper, R. and Slagmulder, R. (1999), *Supply Chain Development for the Lean Enterprise*, Productivity Inc., Portland, OR.

Deutsch, C. (2001), "With income up 16%, GE warns of layoffs", *The New York Times*, online, 18 January.

Dvorak, P., Guth, R., Landers, P. and Zaun, T. (2000), "Japan's embrace of Western funds leads to a forced trade detente", *The Wall Street Journal Interactive Edition*, 28 December.

Emiliani, M.L. (2000a), "Business to business online auctions: key issues for purchasing process improvement", *Supply Chain Management*, Vol. 5 No. 4, pp. 176-86.

Emiliani, M.L. (2000b), "The false promise of 'what gets measured gets managed'", *Management Decision*, Vol. 38 No. 9, pp. 612-15.

Emiliani, M.L. (2000c), "The oath of management", *Management Decision*, Vol. 38 No. 4, pp. 261-2.
Emiliani, M.L. (2000d), "Cracking the code of business", *Management Decision*, Vol. 38 No. 2, pp. 60-79.
Emiliani, M.L. (2001), "Redefining the focus of investment analysts", *The TQM Magazine*, Vol. 13 No. 1, pp. 34-50.
Fujimoto, T. (1999), "The evolution of a manufacturing system at Toyota", Oxford University Press, Inc., New York, NY.
Fulghum, D. (1999), "Boeing layoffs seen as good business", *Aviation Week & Space Technology*, Vol. 150, No. 21, 24 May, p. 75.
Gabor, A. (2000), *The Capitalist Philosophers*, Times Business, New York, NY.
Geyelin, M. and Martinez, B. (2001), "Aetna may move to end fraud suit and improve ties to doctors and patients", *The Wall Street Journal Interactive Edition*, 17 January.
Green, J. (2000), "Can Chrysler get blood from a supplier?", *Business Week*, 25 December, p. 56.
Greimel, H. (2000), "Merger woes: big losses, little synergy at DaimlerChrysler", *The Detroit News*, 25 December.
Heilemann, J. (2000), "The truth, the whole truth, and nothing but the truth", *Wired*, Vol. 8 No. 11, November, pp. 260-311.
Inamori, K. (1997), *For People and for Profit*, Kodansha International, Ltd, Tokyo.
Kennedy, A. (2000), *The End of Shareholder Value*, Perseus Publishing, Cambridge, MA.
Maremont, M. and Berner, R. (1999), "Rite-aid's large cash deductions irk suppliers at bill-paying time", *The Wall Street Journal Interactive Edition*, 31 March.
Matsushita, K. (1994), *Not for Bread Alone*, Berkely Publishing Group, New York, NY.
Mikami, T. (1982), *Management and Productivity Improvement in Japan*, JMA Consultants, Inc., Tokyo.
Nikkei (2001a), "Matsushita wins best manager award", *The Nikkei Weekly*, Vol. 39 No. 1961, 15 January.
Nikkei (2001b), "Fifteen firms win achievement award", *The Nikkei Weekly*, Vol. 39 No. 1960, 8 January.
Nishiguchi, T. (1994), *Strategic Industrial Sourcing*, Oxford University Press, New York, NY.
Nishiguchi, T. and Beaudet, A. (1998), "Case study: the Toyota group and the Aisin Fire", *Sloan Management Review*, Vol. 40 No. 1, pp. 49-59.
Ohno, T. (1988), *Workplace Management*, Productivity Press, Portland, OR.
Rappaport, A. (1998), *Creating Shareholder Value*, The Free Press, New York, NY.
Richards, B. (2000), "Dear supplier: this is going to hurt you more than it hurts me . . .", *Ecompany Now*, Vol. 1 No. 1, pp. 136-42.
Schultz, E. (2000), "Companies quietly use mergers, spin-offs to cut worker benefits", *The Wall Street Journal Interactive Edition*, 27 December.
Shirouzu, N. (2000), "Leaner and meaner: driven by necessity – and by Ford – Mazda downsizes, US-style", *The Wall Street Journal Interactive Edition*, 5 January.
Shirouzu, N., White, J. and Zaun, T. (2000), "A revival at Nissan shows there's hope for Japan Inc.", *The Wall Street Journal Interactive Edition*, 16 November.
Solow, D. (1990), *How to Read and Do Proofs*, J. Wiley & Sons, New York, NY.
Stewart, T., Taylor, A., Petre, P. and Schlender, B. (1999), "Businessman of the century", *Fortune*, Vol. 140 No. 10, 22 November, pp. 108-28.
Taylor, A. (1999), "The man who vows to change Japan Inc.", *Fortune*, Vol. 140 No. 12, 20 December, pp. 189-96.
Tully, S. (2000), "The B2B tool that really is changing the world, *Fortune*, Vol. 141 No. 6, 20 March, pp. 132-45.
Wessel, D. (2001), "American economy is model that other nations envy, fear", *The Wall Street Journal Interactive Edition*, 18 January.
Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY, pp. 139-68.
Zaun, T. (2000), "Mazda retools, as its President gets more calls for a quick fix", *The Wall Street Journal Interactive Edition*, 20 November.

Application questions

1 In raising the debate from a philosophical to a factual, data-driven approach, has the author established a new standard for corporate responsibility?
2 What other business issues can be examined using this problem-solving technique? Use mathematical logic to test the truth of the following statement: "If stock options align management's interests with shareholders' interests, then management's decisions will always favor the interests of shareholders?".
3 What actions can shareholder-driven senior managers take to restore balance among stakeholders?

Linking leaders' beliefs to their behaviors and competencies

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Keywords
Beliefs, Behaviour, Competences, Leadership, Management styles

Abstract
Discusses how competency models are used with the intent to improve managers' leadership skills. Determines that competency models will not result in any substantive changes in behaviors because they fail to address managers' fundamental beliefs about the practice of business. A new construct is presented for conventional management practice that shows how leader's beliefs lead to behaviors, which, in turn, lead to competencies that most managers would find undesirable. The beliefs, behaviors, and competencies of leaders skilled in the lean management system are presented in contrast and shown to be remarkably different from that possessed by managers skilled in conventional management practices. The results illustrate important limitations of leadership competency models. The development of new leadership competencies is re-framed as a change-over problem. Coupled with *kaizen*, competencies that better serve the interests of a business and its key stakeholders can be more effectively realized.

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Introduction

Leadership development programs often include the identification of competencies and the creation of competency models. A competency is a specific skill, knowledge, or characteristic needed to perform a role effectively and to help a business meet its strategic objectives (Lucia and Lepsinger, 1999). A competency model is a written description of desired competencies and includes examples of the desired behaviors, known as indicators (Cooper, 2000). Competency models are used to establish qualifications and improve leadership effectiveness in relation to future business challenges. They may focus on transactional (i.e. contingent rewards or bargaining) or transformational (i.e. inspirational or charismatic) leadership characteristics, or a combination of the two (Thorn, 2002; Humphreys and Einstein, 2003).

Typical primary competency categories include:

- leadership;
- analytical thinking;
- communication;
- decision making;
- building relationships;
- strategic planning; or
- emotional intelligence.

Competency models can be function-specific – i.e. designed for the sales force, purchasing, or finance organization – or of a broader nature such as general management or leadership (Lucia and Lepsinger, 1999; Cooper, 2000). Table I presents a leadership competency model used by a *Fortune* 100 company that contains four categories:

1 leadership;
2 business acumen;
3 communication; and
4 personal" (LCM, 1999).

This competency model is typical of those that favor transformational leadership characteristics over traditional transactional leadership characteristics, which are considered ineffective at motivating followers to achieve the level of performance required in business today (Thorn, 2002).

The general approach taken is to hire a consultant, typically industrial psychologists, to facilitate the process of determining the desired competencies for an organization. The consultant will interview top executives to determine the business issues that they think are critical for future success. The data obtained is consolidated and presented to the executive team for review and discussion. Competencies will be changed, added, or deleted, as will the specific behaviors identified and indicators of achievement of the behaviors. At the end of the process the organization has a customized competency model that typically contains four to eight primary competencies, 12-24 secondary competencies, and 50-100 indicators.

Top executives are typically the first group to attend workshops, generally three to five days in duration, facilitated by the consultant and designed to assess their capabilities with respect to the competencies identified. The workshops are sometimes known as "leadership assessment centers" or "leadership development centers", and identify the executive's strengths and weaknesses relative to the competencies. Through consultation and mutual agreement, the executive will select two to four competencies to focus on, typically secondary competencies and one or more associated indicators within one or more primary competency category. The executive creates a one-page individual development plan that contains categories

Table I
Leadership competency model

Primary competency	Secondary competency	Indicators
Leadership	Strategic leadership – provides a clear vision to others of what the organization needs to ensure its future success	Establishes a clear vision that motivates others to accomplish what both the organization and customers need in the long run Takes ownership and responsibility for the future direction of the organization Consistently restates and reinforces one's direction Sets high expectations and goals, encouraging others to excel to support the organization Remains focused on guiding others toward the most important objectives of the organization
	Teamwork – creates an environment in which people are involved, included, and have a sense of ownership	Respects individual differences and utilizes the diverse thinking and contributions of all Works to get "buy-in" of individuals based on what they have to gain and the common good of the organization Keeps people informed and involves them appropriately in making decisions Provides help to others and acts as a resource without removing responsibility Works across organizational boundaries; encourages teamwork and a sense of partnership Displays organizational savvy; knows where to go to overcome barriers and to get the right people involved to solve problems
	Developing talent – achieves competitive advantage and fosters a learning environment by taking personal responsibility for identifying and developing people	Displays confidence in others' abilities and recognizes people for doing their best Selects the best people available from inside or outside the company Gives others direct, constructive, and actionable feedback in a way that they can understand it and use it Coaches others and prepares them for current and future business demands
	Customer focus – champions actions to exceed current and future internal/external customer needs	Listens to and fully understands the customer's needs Pursues the best customer-focused responses that add value to the business Anticipates marketplace opportunities and takes actions to ensure speed to market Considers the customer's perspective in making decisions Ensures customer commitments are met with quality products and services.
	Focus on results – drives obligations to closure with precision to benefit the organization and every constituent	Actively measures and evaluates performance with respect to business goals and customer requirements Conveys priorities with the right sense of urgency and importance Empowers others to achieve desired results and holds them accountable Conducts timely follow-up and keeps others informed on a need-to-know basis Rewards people when they have done well, and confronts them directly with actionable feedback when they don't demonstrate desired performance
Business acumen	Forward thinking – develops plans that anticipate short- and long-term business demands	Establishes an overall course of action considering immediate and future requirements Identifies what must be accomplished for successful completion of one's plans Anticipates resources needed to successfully implement one's plan Develops contingency plans, anticipating unexpected events or obstacles that can alter one's desired course of action

(continued)

Table I

Primary competency	Secondary competency	Indicators
		Prepares for external trends and alternative scenarios potentially impacting the business in the long term
	Business innovation – drives change and uses new or unique solutions in business situations	Champions change and continuous improvement and prepares others to respond positively
		Looks for breakthrough business ideas and practices, within and beyond the company, and encourages others to do likewise
		Uses unconventional approaches to solve customer and other business problems where standard approaches don't work
		Assumes new and difficult challenges and manages them as opportunities
		Finds creative ways to get things done with limited resources and pressing constraints
	Business judgment – determines alternative solutions to problems, evaluates courses of actions, and reaches sound business decisions.	Views problems from a total business perspective, considering economic opportunity, required investment, risks, and anticipated paybacks
		Judiciously weighs the pros and cons of various business alternatives
		Accurately evaluates the implications of new information or events
		Makes decisions that are relevant and timely; anticipates the internal and external implications of one's decisions
	Analytical thinking – identifies root causes of problems, secures relevant information, and identifies possible solutions	Asks the right questions to size up situations
		Seeks out data from several sources and accurately evaluates both operating and customer requirements
		Identifies patterns in conflicting information and events
		Generates alternative solutions
Communication	Listening – encourages others to engage in dialogue; listens actively	Accurately attends to the meaning of ideas that are exchanged
		"Hears" what is not said, i.e. the underlying attitudes and feelings behind the words
		Clarifies and extends the meaning of others' points for mutual understanding
		Willing to change ideas or perceptions based on new information or contrary evidence; persistent, yet flexible
	Communication skills – expresses ideas effectively to establish oneself as a credible and impactful leader	Communicates a clear understanding of one's subject-matter and offers informed positions
		Conveys ideas confidently and succinctly
		Delivers messages with personal energy, enthusiasm, and conviction
		Uses appealing and persuasive arguments
		Addresses issues of key importance to stakeholders
Personal	Adaptability – adjusts personally to high pressure, rapidly changing business conditions and uncertain business environments	Uses self-insights to capitalize on one's strengths and offset weaknesses
		Trusts one's own instincts and hunches in ambiguous or uncertain situations
		Keeps control of one's own feelings and behavior in high pressure situations
		Learns from personal experience and integrates experience to cope with new or untried events
		Seeks and utilizes opportunities for continuous learning and self-development

such as: personal development goals, rationale, competencies addressed, actions required, deadline, resources required, and target dates for progress review or completion. The executive reviews the individual development plan with their superior to gain agreement on the overall plan. Then both the executive and superior sign the individual development plan as an expression of commitment. Periodic progress reviews are typically conducted with the consultant, but may include

participation, either separately or concurrently, with the executive's superior.

The process is then repeated among the next lower-level tier of executives, then onto mid-level managers and supervisors. Competency models may change over time. Some competencies may be deleted if top executives think the competencies have become well established within the organization, while new competencies may be added later on. The cost of the assessment can range from US$5,000-$10,000 per person, and may be repeated in two to three year intervals. It is a significant investment in which senior management expects to receive tangible benefits, from both individual and operating performance perspectives. Indeed, this approach to leadership development can be very helpful to people that take it seriously.

However, there are important shortcomings to the process. For example, a person that has attended a workshop may decide against completing their individual development plan if they know that their superior does not value this approach to leadership improvement. In other words, they may cut short the process because they are not rewarded for achieving their leadership development goals. Often, the daily demands of business eclipse efforts to improve individual performance. In some organizations, leadership development using the competency model tool may be viewed as a "flavor of the month". and thus worth no more than symbolic participation. The competency model process may include the use of a 360° feedback instrument, whose results can be a tremendous shock to people previously unaware of serious flaws in their behavior. This may contribute to a desire to disengage from the process at the conclusion of the workshop.

Another important shortcoming is that the primary competencies, secondary competencies, and behavioral indicators, while perhaps defined in the competency model, are subject to interpretation (Lucia and Lepsinger, 1999; Cooper, 2000). For example, a communication competency may include non-specific behavioral indicators such as: "expresses ideas effectively", "conveys ideas confidently", or "listens actively", while a teamwork competency may include indicators such as: "encourages teamwork", "displays organizational savvy", or "works to get buy-in from individuals" (LCM, 1999). The indicator "works to get buy-in from individuals", for example, could be achieved in either threatening or non-coercive ways, while "business acumen" could be viewed as: knowing how to favorably manipulate a common business metric such as "earned hours", or recognizing how the "earned hours" metric drives poor decisions and eliminating it. A further complication is that most indicators are not usually actionable.

Importantly, the foundation for competency models is that behaviors led to competencies. The models and associated processes assume that a person's beliefs are not relevant, either explicitly or implicitly, to the expected behaviors that are needed to achieve the competency, or that all people share the same beliefs. The purpose of this paper is to examine how leaders' beliefs, rooted in management practice, influence their behaviors and resulting competencies. "Conventional management practice" and the "lean management system" (Emiliani, 2000; Emiliani *et al.*, 2003) are presented to illustrate the substantial differences in progression from belief to behavior to competency. The beliefs associated with conventional management practices are shown to result in less desirable competencies, while the beliefs associated with the lean management system result in more desirable competencies.

Dissonance between competencies and beliefs

The competency model process implicitly assumes that participants accept the competencies and indicators as being the correct ones for either themselves or for the business. For many people this assumption will be valid, while for some it will not be valid because they possess different beliefs. Importantly, the creation of competency models does not start with an assessment of the beliefs held by people in lower levels of the organization. Instead, it begins at the top of the organization and is driven by the perceptions of top executives regarding the competencies that are needed to meet future business challenges. While their perceptions may indeed be correct, the current issues that consume people's mental energy may be discounted as if they did not exist at all, thus making it more difficult to achieve the desired outcomes. In some organizations, the dissonance can be quite large, and represents an improvement opportunity regarding the use of competency models.

Most organizations possess a political landscape that people will easily recognize after a period of time. The degree to which an organization runs on politics can of course vary (Kets de Vries and Miller, 1986;

Kets de Vries, 1993). In highly political organizations, experienced people will quickly recognize a dissonance between the desired competencies and the way business is actually conducted – including formal and informal reward systems, and punishments. In less political organizations, such realizations may take longer or may not even be a barrier to leadership development though the use of competency models.

Table II shows the primary competency, secondary competency, and the deeply held beliefs that some people, likely many people, participating in a leadership development process possess. The beliefs are often driven by organizational routines that people experience every day at work (Argyris and Schon, 1974; Argyris, 1990, 1991; Mintzberg *et al.*, 2002). If people have different beliefs based on their actual work experience within an organization (Boyatzis *et al.*, 2002) or as a result of other extant factors, then the ability to realize the desired outcomes associated with competency models will be greatly compromised. The time and money spent on leadership development, while helpful to some, will be mostly wasted.

An important part of the process should include surveying people at different levels of the organization to understand their deeply held beliefs, identifying the ones that are at odds with the competencies, and then determining their root cause (Ohno, 1988). The countermeasures for addressing the root cause could then become part of the competency model, likely resulting in much better outcomes. The question, of course, is: Where does the dissonance come from?

Conventional management belief system

Most businesses, whether service or manufacturing, public or private, profit or non-profit, are managed principally according to conventional, or "batch-and-queue", practices. In batch-and-queue practice, materials are processed in large batches, which result in long queue times between operations. While the term batch-and-queue originated in manufacturing, the conventional way to deliver services is also batch-and-queue – e.g. processing information, documents, etc., in large batches, which again results in long queue times. Batch-and-queue processing – whether it is materials or information – has many serious deficiencies including long lead-times, lower quality, higher cost products or services, and customer dissatisfaction (Womack and Jones, 1996; Bowen and Youngdahl, 1998; Goland *et al.*, 1998; Brady, 2000; Barron, 2000; Emiliani, 2000). The source of these systemic problems is poor information flow, information that reflects a distorted view of reality, organizational politics, and blame (Emiliani *et al.*, 2003).

Businesses that operate using conventional management practices have some distinctive characteristics worth noting. For example, they typically focus on results, with little or no attention given to the processes that were used to achieve the results. Lacking awareness of the process means that good results are unlikely to be repeated, while poor results are likely to be encountered periodically. There is also an intense focus on locally optimizing the performance of individual functional departments, coupled with the common assumption that the gains achieved will accrue to the business as a whole. However, business metrics support local functional optimization routines usually come at the expense of other departments or metrics. For example, a classic conflict occurs between the "purchase price variance" metric used by purchasing departments and the "parts per million" metric used by quality departments. One of the purchasing department's key goals is to reduce the price of goods and services, which can result in the use of lower quality suppliers leading to unfavorable quality performance. The result is systemic blame between departments, which can become amplified by organizational politics (Bianco and Moore, 2001). In other words, companies forget about their customers, which could be an important reason why the lifespan of most businesses is about 30 years (de Geus, 1997). The reality is that business processes are connected (Womack and Jones, 1996; Rother and Shook, 1999; Emiliani *et al.*, 2003), yet most businesses are managed as if these connections did not exist.

To make matters more difficult, US corporate law and management practice in most large publicly owned businesses over the last 15 years or so advocates the primacy of shareholders (Kelly, 2001; Mitchell, 2001; Mintzberg *et al.*, 2002). The ultimate purpose of business, according to their view, is to "maximize shareholder value" – typically short-term. In order to achieve such an outcome, even in good economic times, tradeoffs must obviously be made against other key stakeholders. Managers practice "corporate unilateralism": they lay people off, close plants or offices, and squeeze supplier's profit margins to return greater financial rewards to themselves and investors. Throughout the 1990s the portion of executive compensation based on stock

Table II
Leadership competency model-belief system dissonance

Primary competency	Secondary competency	Belief
Leadership	Strategic leadership – provides a clear vision to others of what the organization needs to ensure its future success	"I will be here for only five years, so I am not really concerned about the future success of the company. Loyalty is dead – everyone knows that. I'm here just to build my résumé and do what is right for me. But I play the game"
	Teamwork – creates an environment in which people are involved, included, and have a sense of ownership	"I don't see the executives acting as a team, so I won't either. Besides, there is no reward for teamwork. People get promoted for the results they achieved, not how they achieved them. We have false teams"
	Developing talent – achieves competitive advantage and fosters a learning environment by taking personal responsibility for identifying and developing people	"Oh please! There is definitely no reward for me to spend my valuable time developing other people. I am on my own. The people who get promoted have been pre-selected by senior managers – it's the 'be-like-me club'. Talk about a learning environment . . . I learned this early on"
	Customer focus – champions actions to exceed current and future internal/external customer needs	"When I act as an advocate of our customers' interests, people look at me as if I am from another planet. Our real goal is 15 percent EPS growth, not customer focus"
	Focus on results – drives obligations to closure with precision to benefit the organization and every constituent	"This I do believe. People who worry about the process get beat-up. I just focus on the metrics in my area – even though everyone knows they drive the wrong behaviors"
Business acumen	Forward thinking – develops plans that anticipate short- and long-term business demands	"I have tried to present forward-thinking solutions in the past but always get a lukewarm reception. I know we are in a very competitive business and have to do some things differently, but I am struggling to be heard. I will keep trying"
	Business innovation – drives change and uses new or unique solutions in business situations	"We are mostly status quo-oriented – that is the reality. Innovation is driven top-down, not bottom-up. We participate in innovation if it is the boss's idea. My best, most innovative ideas have been consistently rejected. It is mostly because of budget constraints. The budget drives people's activities, not the other way around"
	Business judgment – determines alternative solutions to problems, evaluates courses of actions, and reaches sound business decisions	"My boss is in the driver's seat; I am just a passenger. He is not truly interested in my opinions. We solve problems the way he thinks they should be solved. Our course of action is pre-determined. I have no control over that"
	Analytical thinking – identifies root causes of problems, secures relevant information, and identifies possible solutions	"My boss thinks that finding the root cause of problems takes a lot of time, which is time away from my work. So she does not really support this activity. We firefight. That is the way it has always been"
Communication	Listening – encourages others to engage in dialogue, listens actively	"This is an important area for me to improve on and I am making some progress. However, dialogue is a time-consuming activity. We spend most of our time in discussion or endless debate. So that creates a lot of animosity. We are probably all saying the same thing in different ways. But we rarely get to the meat of an issue without it resulting in a lot of negative conflict. It is amazing we get anything done"

(continued)

Table II

Primary competency	Secondary competency	Belief
	Communication skills – expresses ideas effectively to establish oneself as a credible and impactful leader	"It is really hard to express ideas effectively when the conversation quickly slips into a debate. So we have learned to focus our communications on a simple transactional level, just to get the job done. I am not sure what it means to be an 'impactful leader'. The CEO is the leader, but I don't perceive her to be impactful. This is an unreasonable expectation for someone at my level"
Personal	Adaptability – adjusts personally to high pressure, rapidly changing business conditions, and uncertain business environments	"Anyone who works here has to be adaptable, by definition – otherwise they wouldn't be here! I don't enjoy the pressure or the politics – it really takes a lot out of me, and it's not how I want to live my life. I am learning a lot, but plan to move on in a few years. The grass is always greener ... right?"

options increased dramatically and surely contributed to this aggressive behavior (Fox, 2001; Loomis, 2001; Cassidy, 2002; Wolf, 2002). So it is likely that slavish devotion to economic output, at the expense of customers and appropriate balancing of social interests, is another important reason why the lifespan of most businesses is relatively short (de Geus, 1997; Handy, 2002).

Predictably, companies beholden to short-term shareholder value maximization eventually get into deep trouble (Byrne, 1998; Barsky *et al.*, 1999; Maremont and Berner, 1999; Bianco and Moore, 2001; Berman and Blumstein, 2001; Kaufman, 2001; Norris, 2001; Charan and Useem, 2002; Eichenwald, 2002; Frank and Solomon, 2002; Gasparino, 2002; Harris, 2002, 2003; Sandberg and Pulliam, 2002, Weil, 2003). The CEO will then mandate various actions to improve performance and specify certain goals to achieve, typically financial in nature. However, the goals will not be recognized by various parts of the organization as being applicable to them, in part because they are not specific or actionable (Emiliani, 2000). Instead, people will look for fast, easy solutions to systemic problems within their function, if required. The company comes to rely on and reward heroes, thus undermining well-intentioned efforts to promote teamwork.

Additional detailed features of conventional management practice have been previously reported (Emiliani, 2000; Emiliani *et al.*, 2003). The central point is that most businesses are managed, to one degree or another, in ways that result in conflicts between people. To those that work in such environments, conflict can become viewed as the inevitable outcome of postmodern management practice. The belief system that promulgates these characteristics may be established in business school education (Emiliani *et al.*, 2003), either directly or indirectly, or through business experience. If people initially believe in something different, they will, in most cases, adopt the company's belief system because it:

- may appear to be reasonable;
- is a means for advancement; or
- simply becomes a matter of survival.

Quite often people at all levels of the organization will sense that something is amiss, but they are unable to explicitly and systematically identify cause and effect.

Conventional management practice carries with it beliefs that drive certain behaviors, which over time result in managerial competencies. Table III shows this progression for over two-dozen beliefs. These are not intended to be a comprehensive account of all operative beliefs among managers. Rather, they simply illustrate many of the key beliefs that are in play and from which important management decisions are based upon (Emiliani, 2000; Emiliani *et al.*, 2003). The progression from beliefs to behaviors to competencies becomes increasingly less desirable. Few managers would want to be known as having such competencies, yet these are indeed what most possess.

Importantly, the competencies shown in Table III do not deliver the specific skills, knowledge, or characteristics needed to perform a role effectively and to help a business meet its strategic objectives (Lucia and Lepsinger, 1999) because competency model theory and practice does not take into account the beliefs possessed by leaders skilled in conventional management practice, which in turn forms the basis for individual and organizational learning (Senge, 2003). Instead, the unfortunate result is "skilled incompetence" (Argyris, 1986) – i.e.

Table III
Conventional leaders

Belief[a]	→ Behavior[b]	→ Competency[c]
People (employees, suppliers, etc.) understand what management says	Stop asking questions Be impatient	Speak in abstract terms Give direction that is not actionable
There is a shortage of management talent/cannot find skilled people	Search for the unattainable Seek expensive technological solutions	Ensure that work remains complex
Managers are élite	Arrogance/super-high ego Seek preferential treatment	Highlight differences between stakeholders Drive stakeholders apart
Economies increase with scale	Seek scale	Rely on scale to reduce cost
Labor unions are bad	Seek to minimize labor's position	Perpetuate power-based bargaining routines
Green policies add cost	Delay/avoid sustainable business practices	Slow to recognize changes in stakeholder sentiments Damage the environment
People are the problem	Blame people (e.g. employees)	Set negative tone/perpetuate fear of failure Unable to understand business processes Perpetuate power-based bargaining routines
Companies exist to maximize shareholder value	Negate existence of other stakeholders Divide key stakeholders	Find ways to maximize shareholder value: layoffs, plant closings, squeeze suppliers, reduce benefits, etc.
Cost is in manufacturing	Hold manufacturing accountable for cost reduction	Deny the true source of cost (i.e. product or service design) Maintain status quo in design/ engineering
Layoffs improve productivity	Lay people off when needed	Divide key stakeholders Ignore morale problems
We are in a low margin business	Search for higher margin products/services	Ignore the existence of waste
What gets measured gets managed	Create many conflicting measures	Perpetuate inaccurate paradigms Data assumed to be accurate and valuable
Low employee retention rate due to external factors	Deny management's role in determining employee satisfaction	Failure to recognize and respond to employee concerns
Purchasing people are clerks	Minimize purchasing's role and influence	Perpetuate wasteful stereotypes
High fill rates require more inventory	Overproduce unwanted goods or services	Increase the cost of goods sold
High quality costs more money	Managers determine acceptable level of quality	Perpetuate producer focus (vs customer focus)
Volume reduces cost	Find ways to increase volume/ maximize asset utilization	Game the business system and related metrics (i.e. channel stuffing)
Buyer has nothing to learn from suppliers	Ignore suggestions from suppliers	Remain inwardly focused Maintain the status quo
Delays and re-work are acceptable	Slow to resolve issues or act on opportunities	Maintain the status quo Miss opportunities
Sourcing to low-wage countries is a good solution to cost problems	Ignore costs not assignable to unit cost	Inability to recognize and understand total costs
Suppliers are the problem	Blame suppliers	Ignore the influence of buyers' business practices on supplier performance Perpetuate power-based bargaining routines

(continued)

Table III

Belief[a]	→ Behavior[b]	→ Competency[c]
Suppliers are responsible for themselves	Do nothing to help suppliers succeed	Ignore interdependence of buyers and sellers
Business is complex	Focus on complex solutions Rely on expensive software or technology	Make business more complex Locally optimize performance Slow decision making/maintain status quo
Must make trade-offs between cost, delivery, and quality	Seek trade-offs as solutions to common business problems	Perpetuate false paradigms Maintain status quo
Large variations in _____ are OK	Deal with problems as they arise	Avoid understanding root cause of variation Inability to reduce variation
Hard skills and soft skills are separate	Focus on hard skills	Align reward system with hard skills
Resources are scarce	Maintain internal focus Limit project scope and depth	Ineffectively utilize resources Perpetuate false paradigms Ignore existence of waste
Unit cost drives business performance	Do anything to reduce unit costs	Game the business system Ignore costs that fall into other budget categories
Anyone can be replaced (i.e. high management turnover is OK)	Assign meaningless work Hoard knowledge	Underutilize valuable human resources
What I learned in business school is correct	Defend knowledge areas, practices and results	Not receptive to new ideas Perpetuate the use of ineffective business practices
Can solve problems without going to the source	Talk about problems and solutions	Develop ineffective solutions to problems Repeat mistakes
Lean is cost reduction program	Limit application of Lean to a few tools	Failure to recognize the full potential of Lean

Notes: [a] Something accepted as true; [b] Conducted based on beliefs; [c] An established skill or capability

managers that are good at doing things that result in undesirable outcomes.

Lean management belief system

A small but growing number of companies practice a profoundly different type of management system rooted in the principles and practices of the "Toyota Production System" (Ohno, 1988; Womack *et al.*, 1990; Womack and Jones, 1996; Basu, 1999; Fujimoto, 1999). Leading practitioners include Toyota Motor Corporation, Honda Motor Company, the Wiremold Company (Emiliani *et al.*, 2003), Freudenberg-NOK, and Danaher Corporation. Many other companies, both large and small, have embarked on the path of conversion from conventional management practice to the lean management system (Shingo, 2003).

At its core, the lean management system is focused on eliminating waste (called "*muda*", in Japanese) – activities that do not add value and can be eliminated – and creating value for end-use customers using well-defined principles and practices (Ohno, 1988; Womack *et al.*, 1990; Womack and Jones, 1996; Imai, 1997; Basu, 1999). The typical result is superior financial and non-financial performance, the establishment of intra- and inter-organizational capability building routines, and improved time-based competitiveness (Fujimoto, 1999; Emiliani *et al.*, 2003). The lean management system is an effective means for realizing business strategies. Companies that can successfully transform themselves are formidable competitors in good economic times and usually outperform peer group companies in difficult economic times.

Businesses using the lean management system have some distinctive characteristics that are mostly the opposite of that found in conventionally managed businesses (Emiliani *et al.*, 2003). A principal shift is from results- to process-focus. Emphasis is placed on gaining a very detailed understanding the process used by people to perform an activity, and separating value-added work from non-value added but necessary work and waste. Teams of people then work to eliminate waste using simple processes and tools, which reduces lead-time

and cycle time, improves quality, and lowers cost. Focusing on the process also helps ensure that favorable results can be easily repeated. If unfavorable results are encountered, then teams work to quickly discover the root cause of problems and apply countermeasures. Establishing a no-blame environment is essential for getting information to flow without interruption and achieving continuous improvement. Lean management, done correctly, is not a layoff program.

The lean management system also focuses on improving the entire business system, rather than optimizing individual parts of the business. If an improvement is good only for one functional area but not good for the entire company or its customers, then the improvement is not undertaken (Toyota, 2001). Business metrics are mostly non-financial and do not conflict with other departments. Organizational politics are greatly reduced because day-to-day management of activities and processes are made visual using a variety of one-page charts, and business measures are simple and easy to understand by the people that perform the work. Complex, inaccurate, or misleading metrics such as earned hours, standard costs, purchase price variance, or machine utilization rates are not used. Lean businesses are less likely to lose sight of their customer's interests because they establish market discipline using tools such as quality function deployment, target costing and value engineering in the design process, *kaizen* costing and value analysis in production, and delivering products or services commensurate with the actual rate of customer demand (called *takt* time) using "pull" systems (Ohno, 1988; Akao, 1990; Monden, 1995, 1998). *Kaizen* is a Japanese word that means "change for the better", and is interpreted as "continuous improvement". It is a key process for making rapid improvements and establishing a new culture among managers and associates (Emiliani *et al.*, 2003). *Kaizen* is typically three to five days in duration, and there are normally dozens of *kaizens* each month.

Rather then seeking to "maximize shareholder value" in the literal financial sense (i.e. short-term), lean businesses seek to balance the interests of key stakeholders such as employees, customers, suppliers, investors, and the community. They instead use a non-literal interpretation of the term "maximize shareholder value", in which factors such as market share, product or service innovation, quality, etc., are considered important parts of the total value of a business. Balance, mutual co-existence, co-prosperity, and harmony between social and economic interests are important principles that guide management decision-making, without losing sight of the importance of generating profits (Toyota, 2001; Nikkei, 2003). Indeed, lean businesses usually outperform competitors because they use concepts, principles, processes, and tools that result in improved cost management and the creation of products and services that better satisfy customer needs (Emiliani *et al.*, 2003). "Corporate unilateralism" is not seen as an effective solution because it divides key stakeholders and forces people to act in their own self-interests. It is the last resort, rather than first resort, to business problems.

Lean businesses, like any other, are subject to market conditions. When problems arise, the CEO will mandate various actions to improve performance. In contrast to conventional management practice, the improvements identified will be largely non-financial and specific (Emiliani, 2000). Associates will know how to make the mandates actionable by using lean principles, processes, and tools that they use everyday to eliminate waste and create value for end-use customers. The CEO usually has deep knowledge of continuous improvement processes and will often participate in *kaizen*. Cross-functional teams work together to identify and implement solutions, and the reward system supports teamwork rather than heroic individuals. Favorable financial results, including creating shareholder value (long-term sense), are the outcome of such efforts and not the principal focus.

Additional detailed features of the lean management system have been previously reported (Emiliani, 2000; Emiliani *et al.*, 2003). A central point is that lean businesses are managed in ways that reduce or eliminate conflict between people because conflict is viewed as waste (Emiliani, 1998a). Conflict is not seen as the inevitable outcome of postmodern management practice. The belief system that promulgates these characteristics is not a regular feature of business school education. Rather, business school courses typically marginalize the lean management system and its many benefits due to a plethora of misconceptions and lack of first-hand experience among professors. However, people who directly experience well-executed lean management know that it is a more sensible way to conduct business and will have great difficulty returning to conventional management practices. The lean management system drives organic productivity improvement that leads to wealth, whereas waste eventually results in poverty from both human development and financial perspectives.

The lean management system also carries with it beliefs that drive certain behaviors, that over time results in managerial competencies. Table IV shows this progression for over two-dozen beliefs. Again, these are not intended to be a comprehensive account of all operative beliefs among managers. Rather, they simply illustrate many of the key beliefs that are in play and from which important management decisions are based on (Emiliani, 2000; Emiliani *et al.*, 2003). Note that the progression from beliefs to behaviors to competencies is more desirable than that shown in Table III. Most managers would want to be known as having such competencies, yet very few actually possess them because their beliefs are rooted in conventional management practice. Table V summarizes some of the key differences between conventional management competencies and lean management competencies.

Competencies-in-use vs competencies espoused

Argyris defines learning by humans as "the detection and correction of error", and differentiates between single-loop learning, "the correction of errors without altering the underlying governing values", and double-loop learning, where "errors are corrected by changing the governing values and then the actions" (Argyris, 2002). Argyris also identified two types of theories-of-action used by people. The first is theories-in-use, which are the actual behaviors people exhibit that are designed to control events, avoid threats, or circumvent undesirable outcomes. An important result is debilitating defensive routines, which inhibit learning and leads to mediocre individual and organizational performance. In short, defensive routines prevent people from taking action. The second is theories espoused, which is the behaviors that people think they exhibit or should exhibit. The incongruity or gap between theories-in-use and theories espoused is rooted in the beliefs that people have: they know they should behave in a certain ways to achieve better outcomes, but instead behave in different ways to fit the reality of their existence as they see it.

Competency models follow the same learning and theories-of-action typologies identified by Argyris (1990). The leadership competency model shown in Table I is an example of competencies espoused by top executives. It contains all the right words. However, Tables II and III illustrate the competencies-in-use, which will undermine the competencies espoused for most participants in leadership development workshops and promote only single-loop learning. Therefore, leadership competency models will be ineffective at improving management's behaviors and skills relative to future business needs because it does not address their underlying beliefs (Boyatzis *et al.*, 2002).

In conventional management practice, the beliefs shown in Table III are deeply rooted. Coupled with defensive routines that discourage action and block the flow of information, it is unreasonable to expect that any of the competencies shown in Table I can actually be achieved, except perhaps in isolated cases. Instead, the CEO, for example, will continue to exhibit easily identifiable behaviors and competencies based upon these beliefs. Most managers below the CEO will copy his/her behaviors because it is usually advantageous to do so – to secure advancement or greater financial rewards – and then develop the same competencies. Succession planning is often tacitly based on the ability of other people to model the same or similar behaviors and competencies exhibited by top executives, thus setting the stage for continuity in "skilled incompetence" (Argyris, 1986). The long-term effect on the business (e.g. competitiveness) and its key stakeholders will surely be unfavorable.

In the lean management system, differences between theories-in-use and theories espoused are minimized or eliminated because variation is considered waste. Importantly, people are not seen as waste; rather, it is business processes that contain waste. lean leaders strive to eliminate not only waste, but also unevenness (called "*mura*" in Japanese) and unreasonableness (called "*muri*", in Japanese) – in both leadership behaviors and business processes (Lu, 1989; Emiliani, 1998a, b; Emiliani *et al.*, 2003). The beliefs shown in Table IV are also deeply rooted among managers that practice the lean management system correctly (Emiliani, 2000; Emiliani *et al.*, 2003). The resulting behaviors and competencies reflect a much more positive view of the potential of people and their ability to make valuable contributions to the business and to society. It is a non-zero sum view of business, compared to the zero-sum view possessed by leaders of conventionally managed businesses.

Many brownfield businesses have recently made the initial transition from conventional management practice to lean management practice (Shingo, 2003). To do so requires

Table IV
Lean leaders

Belief[a]	→ Behavior[b]	→ Competency[c]
Companies exist for socio-economic reasons	Reduce or eliminate trade-offs	Strive to achieve stakeholder satisfaction Management recognizes reality
Employees are valuable resources	Treat employees fairly	Hire with great care/achieve stable employment Train employees
Suppliers are valuable resources	Treat suppliers fairly	Partner with great care/achieve stable supply base Train suppliers
Customers are valuable resources	Treat customers fairly	Create value for customers Grow market share
Investors are valuable resources	Treat investors fairly	Seek long-term investors Ensure a fair and consistent return for investors
Business must respect communities	Contribute to the community	Awareness of business impact on community
The amount of waste is large	Seek opportunities to eliminate waste	Business system improvement
All business processes can be improved	Improve all processes	Consistent and correct use of Lean principles and practices
The real money is in non-financial metrics	Focus on time, distance, space, inventory, productivity, etc.	Manage the box score, not the scoreboard Management teaches people methods of improvement
Inventory is not an asset	Use Lean principles and practices tools to reduce inventory and improve response to customer demand	Question traditional views/assumptions
No end to improvement	Focus on eliminating waste	Question traditional views/assumptions
Important to achieve non-balance	Achieve balance by eliminating waste	Question traditional views/assumptions
Spend ideas, not dollars	Seek simple solutions to complex problems	Use root cause analysis to understand problems and implement countermeasures
Problems may never be "solved"	Periodically re-visit the problem	Re-evaluate effectiveness of countermeasures
Forecasts are always wrong	Distrust forecasts Eliminate waste	Respond to rate of customer demand Use market information
Humans are greatly under-utilized	Work with people to develop capabilities	Invest in peope Commitment
Humanity must be respected	Eliminate wasted human effort	Ensure meaningful work by increasing value-added
What I learned in business school may not be correct	Study problems/critical thinking	Question traditional views/assumptions
Variation is waste	Level work loads (volume and mix)	Steady production processes
Stakeholders are interdependent	Cultivate human relationships	Collaborative problem solving
Seeing is believing	Go to see actual place, actual part, actual situation when problems arise	Accurate view of reality
Business processes must be understood	Define processes to ensure repeatability and to establish basis for future improvement	Consistent and correct use of lean principles and practices Discipline
Responsibilities must be clear	Eliminate waste (e.g. ambiguity)	Accurate view of reality
Must have both control and flexibility	Separate conditions requiring control and flexibility	Develop human capabilities and creative potential
Plans change	Avoid unnecessary rigidity Update plans and standards frequently	Develop processes that can adapt to changing circumstances

(continued)

Table IV

Belief[a]	→ Behavior[b]	→ Competency[c]
Need tie-ups to effectively influence business partners	Invest in key suppliers	Discern supplier's unique competencies Train/develop suppliers Disciplined collaborative relationships
Long-term competitiveness more important than short-term focus	Build capabilities	Stable long-term growth Avoid repeat mistakes
Information must flow in order to be competitive	Eliminate delays Efficient processing of information	Transmit accurate, value-laden information Increase information density by eliminating waste
Harmony has more value than conflict	Cultivate human relationships	Cooperation/collaboration Eliminate waste
Lay-offs are the last resort	Grow slowly and carefully Fully utilize internal and external resources	Stable employment

Notes: [a]Something accepted as true; [b]Conduct based upon beliefs; [c]An established skill or capability

changing the fundamental beliefs that people possess about the conduct of business. A key process is *kaizen*, a form of action learning in which most people quickly begin to realize that their existing beliefs do not serve them, the business, or their key stakeholders well. Business beliefs and practices once thought as highly effective are later found to be ineffective and costly. With the aid of *kaizen* consultants and participation in *kaizen* by top executives, beliefs and behaviors begin to change and new competencies emerge. People at all levels become engaged in double-loop learning because senior management has created a new context for doing so.

In lean businesses, lean competencies are highly valued, but competency models – transactional or transformational – are not because they can imply that all people must be exactly alike or exclude important ways of thinking or behaving. Instead, new beliefs, behaviors, and competencies are established by teaching lean principles, processes, and tools at the point where the work is actually performed. This learning process gives people a fundamentally different view of the nature of change: a willingness to accept and seek change. It also gives them a new basis for thinking and taking action, working together, and contributing ideas that eliminate waste and create value for end-customers (Sonoda, 2002). Done correctly, it results in the creation of new organizational routines that lead to capability building and long-term competitive advantage. Applying the two key lean principles, "continuous improvement" and "respect for people" (Toyota, 2001), results in widespread commitment to the new management system. Senior management creates a new reality in which people develop new beliefs and behaviors that lead to better competencies, which are more adaptable to changing business conditions. The typical result is improved outcomes for all key stakeholders (Womack and Jones, 1996; Emiliani *et al.*, 2003).

Table V
Some key differences

Conventional leader competencies	Lean leader competencies
Give direction that is not actionable	Management recognizes reality
Drive stakeholders apart	Create value for customers
Set negative tone/perpetuate fear of failure	System improvement
Lay-offs, plant closing, squeeze suppliers, etc.	Question traditional views/assumptions
Deny the true source of cost	Use root cause analysis to understand problems
Ignore the existence of waste	Respond to customer demand
Perpetuate false paradigms	Invest in people
Perpetuate wasteful stereotypes	Commitment
Game the system	Mutual problem solving
Maintain inward focus	Consistent and correct use of Lean principles and practices
Ignore interdependence of buyers and sellers	Discipline
Make business more complex/local optimization	Avoid repeating mistakes
Under-utilize valuable human resources	Cooperation
Repeat mistakes	Stable employment

Lean businesses do not value competency models for another reason: they have in place well-established business principles and processes that enable people to take action and successfully achieve desired outcomes. Their systematic approach to improvement provides a basis for continuing practice and for developing a deep understanding of business processes. The benefits operate on two levels, the individual and business, without having to create an expensive new competency model process. Defensive routines (non-action), organizational politics, or the absence of recognizable rewards are common features of conventional management practice that will inhibit effective realization of the desired competencies for most people. lean business principles and practices minimize or eliminate these types of negative conditions because they are waste. This, plus a no-blame environment means that people can develop new and better competencies without the need for competency models such as that shown in Table I.

It is also worth briefly noting that lean businesses do not value wilderness or outdoor leadership development experiences. The principal reasons are because this type of development activity does not:

- Develop managers' capability to observe and discern between value-added work, non-value added but necessary work, and waste.
- Teach people to think and understand business processes using simple non-financial measures and root cause analysis.
- Eliminate waste in business processes.
- Create value for end-use customers.
- Change people's belief system.
- Occur at the actual location where the work is performed.

In short, it does not create conditions for double-loop learning in the actual work environment. This further illustrates the importance of *kaizen* in achieving the desired individual and organizational changes in response to changing business conditions.

The change-over problem

Businesses encounter many situations where they must change from one way of doing business to another, often simply as a matter of survival. The types of change-overs encountered span a variety of situations such as:

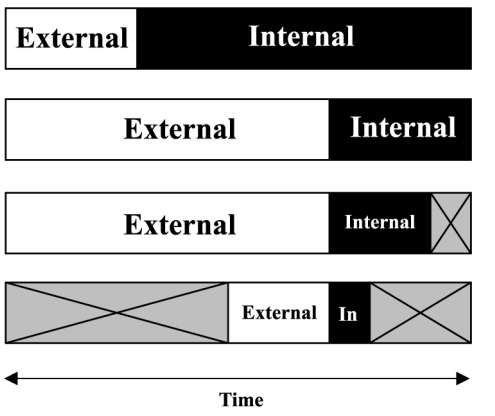
- Organizational change, such as going from conventional management practice to the lean management system.
- Changing from material requirements planning (MRP) to enterprise requirements planning (ERP) software systems.
- Change in leadership from one CEO to another (including associated management paradigms and methods).
- Replacement of old technology with new technology, such as manual machines to computer-controlled machines.

Competency models can also be viewed as a method for changing over from one set or subset of leadership behaviors to another.

In general, the problem of changing over from condition A to condition B is not well understood in conventional management practice, and the key shortcomings of competency models previously noted provide evidence in support of that view. Importantly, the process for doing so, whether it relates to people or equipment, is even less well understood, and so change-overs typically take a long time, encounter severe difficulties, or fail altogether. However, the situation is very different in lean businesses. There, change-over is an extremely important problem and the process for doing so must be well-understood because it has a dramatic impact on cost structure and the ability to respond to changing market conditions – and therefore competitiveness (Shingo, 1985; Ohno, 1988).

Historically, the context is machine or equipment change-over (i.e. "set-up") in a manufacturing environment; that is, changing over from one type of product or process to another (Shingo, 1985). In conventional management practice, machine change-overs take hours or days, while the same equipment in a lean business is changed over in minutes. Figure 1 illustrates the process, which is made up of the following four steps:

Figure 1
Diagram of the process used to perform machine or equipment change-overs



1 identify and separate internal and external set-up;
2 convert internal to external;
3 decrease internal set-up;
4 combine and eliminate tasks to decrease internal and external set-up.

where internal set-up is activities that must be performed when the machine is shut down and external set-up is activities that can be performed when the machine is running.

The same thinking can be applied to the development of new leadership beliefs, behaviors, and competencies, as this is also a change-over problem – but with two important qualifications:

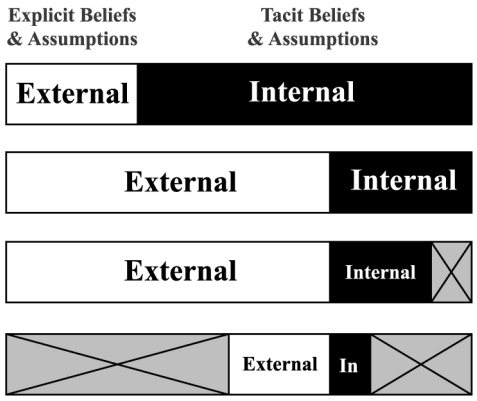
1 No intent is made to characterize people as machines.
2 Change-over in leadership behaviors will take longer than minutes to complete and requires ongoing practice.

Simply think of the change-over process in a general sense. Figure 2 illustrates the change-over process applied to leadership development, which is made up of the same four steps:

1 recognize tacit (internal) conventional management beliefs and assumptions;
2 convert tacit (internal) conventional management beliefs and assumptions to explicit (external);
3 reduce tacit (internal) conventional management beliefs and assumptions; and
4 decrease tacit (internal) and explicit (external) conventional management beliefs and assumptions.

Internal beliefs and assumptions are business beliefs and practices that are thought to yield favorable results. These include: companies exist to maximize shareholder value (short-term sense),

Figure 2
Diagram of the process for achieving change-over in leadership beliefs, behaviors, and competencies



learning curves, economic order quantities, absorption accounting, return on investment calculations, and business metrics such as purchase price variance, standard costs, or earned hours. The first step is for leaders to ask themselves if these common business beliefs, practices, and measures are truly effective, or if they instead result in local optimization, cause uneven business performance, poor process understanding, information blockages, and conflicts in human and business relationships. They then question whether or not their formal education, training programs, and work experience, lead to consistently positive outcomes for key stakeholders.

The second step is to convert these internal beliefs and assumptions to external. In other words, the leader must confront them directly and be willing to abandon prior knowledge and learning experiences without fear or remorse. This is a very difficult step for most managers. Doing so, however, sets the stage for valuable double-loop learning. Most people can arrive at only one conclusion: that there is great opportunity to improve leadership thinking and practice. In step three, the leader decreases his or her internal beliefs and assumptions related to batch-and-queue management practices. The fourth and final step, they decrease internal and external batch-and-queue beliefs and assumptions, which require them to learn more about lean principles and practices.

Importantly, the change-over model shown in Figure 2 can only be achieved by participating in a dramatic new experience. So what would propel leaders to engage in the change-over and create their own personal double-loop learning environment? In lean businesses, *kaizen* – especially shop floor *kaizen* – is the action learning experience that makes leaders critically examine the effectiveness of conventional management thinking and practice. Leaders that participate in *kaizen* quickly begin to realize that most of their beliefs about the conduct of business are incorrect, from which new beliefs, behaviors, and competencies arise. Leaders that engage in the change-over then begin to put into practice the two key principles of the lean management system: "continuous improvement" and "respect for people" (Toyota, 2001).

Unfortunately, most leaders embarking on the lean path do not participate in *kaizen* and thus miss important opportunities to learn and explicitly support the establishment of new beliefs. The challenge is to get out of the corner office and onto the shop or office floor, as their personal participation is *kaizen* is

essential for establishing the competencies they seek in themselves and others.

Summary

Leadership competency model development and deployment processes were discussed in the context of conventional management practice. Leadership competency models in general, and the specific model shown in Table I, are deficient in several ways, including:

- Competencies and behavioral indicators are subject to interpretation and are not usually actionable.
- Discounting the relationship between people's beliefs and behavioral indicators or specified competencies.

The ability of competency models to deliver benefits to individual managers, and, by consequence, to the business at-large, is compromised because conventional management practices, rooted in "batch-and-queue" thinking (e.g. blame, blocked information, defensive routines), sustain the gap between competencies-in-use and competencies espoused and perpetuates single-loop learning. The beliefs associated with conventional management practices are shown to result in behaviors and competencies that do not benefit the business or its stakeholders (Table III), and thus eclipse well-intended efforts to improve leaders' skills through competency models.

The beliefs, behaviors, and competencies of leaders skilled in the lean management system are presented in contrast and shown to be remarkably different from that possessed by managers skilled in conventional management practice (Table IV). In the lean management system, dissonance between competencies-in-use and competencies espoused are minimized or eliminated. A context is established in which people can engage in double-loop learning without defensive routines and practice lean principles and processes to develop the required competencies which are more beneficial to managers, the business, and its stakeholders.

The beliefs, behaviors, and competencies of lean leaders cannot be strictly classified as transactional or transformational. While the competencies are more characteristic of transformational leadership, the path to competency development is rooted in action learning through *kaizen*, which combines elements of both transactional and transformational leadership in a blame-free environment. A more appropriate characterization would be *kaizen* leadership, where capabilities are built through direct observation and participation in continuous improvement activities designed to eliminate waste and create value for end-use customers.

The development of new leadership skills is shown to be a change-over problem that can be modeled after the machine change-over process. Leaders, including the CEO, should personally participate in *kaizen* to simultaneously develop new technical skills and beliefs, and eventually lead *kaizen* activities in both the shop floor and office, to eliminate waste (*muda*), unevenness (*mura*), and unreasonableness (*muri*) and therefore improve competitiveness.

These results point top executives in a different direction. Instead of using ambiguous but well-intentioned leadership competency models, they should understand and implement the lean management system to establish an environment where new beliefs, behaviors, and competencies can be realized through *kaizen* that better support business strategy, operating goals, and outcomes that benefit key stakeholders.

Future research will focus on identifying the implicit beliefs that underpin the explicit beliefs that, in turn, support lean management thinking and practice.

References

Akao, Y. (1990), *Quality Function Deployment: Integrating Customer Requirements into Product Design*, Productivity Press, Portland, OR.

Argyris, C. (1986), "Skilled incompetence", *Harvard Business Review*, September-October, pp. 74-9.

Argyris, C. (1990), *Overcoming Organizational Defenses*, Allyn & Bacon, Boston, MA.

Argyris, C. (1991), "Teaching smart people how to learn", *Harvard Business Review*, May-June, pp. 99-109.

Argyris, C. (2002), "Double-loop learning, teaching, and research", *Academy of Management Learning and Education*, Vol. 1 No. 2, pp. 206-18.

Argyris, C. and Schön, D. (1974), *Theory in Practice*, Jossey-Bass, San Francisco, CA.

Barron, K. (2000), "Hurry up and wait", *Forbes*, 16 October, pp. 158-64.

Barsky, N., Hussein, M. and Jablonsky, S. (1999), "Shareholder and stakeholder value in corporate downsizing – the case of United Technologies Corporation", *Accounting, Auditing, & Accountability Journal*, Vol. 12 No. 5, pp. 583-604.

Basu, S. (1999), *Corporate Purpose: Why it Matters More than Strategy*, Garland Publishing, New York, NY.

Berman, D. and Blumstein, R. (2001), "Behind Lucent's woes: push to meet higher revenue

goal", *The Wall Street Journal Online*, 29 March.
Bianco, A. and Moore, P. (2001), "Downfall: the inside story of the management fiasco at Xerox", *BusinessWeek*, 5 March, pp. 82-92.
Bowen, D. and Youngdahl, W. (1998), "Lean service: in defense of a production line approach", *International Journal of Service Industry Management*, Vol. 9 No. 3, pp. 207-25.
Boyatzis, R., Stubbs, E. and Taylor, S. (2002), "Learning cognitive and emotional intelligence competencies through graduate management education", *Academy of Management Learning and Education*, Vol. 1 No. 2, pp. 150-62.
Brady, D. (2000), "Why service stinks", *BusinessWeek*, 23 October, pp. 118-28.
Byrne, J.A. (1998), "How Al Dunlap self-destructed", *BusinessWeek*, 6 July, pp. 58-65.
Cassidy, J. (2002), "The greed cycle", *The New Yorker*, 23 September.
Charan, R. and Useem, J. (2002), "Why companies fail", *Fortune*, Vol. 145 No. 11, pp. 50-62.
Cooper, K. (2000), *Effective Competency Modeling and Reporting*, AMACOM, New York, NY.
de Geus, A. (1997), "The living company", *Harvard Business Review*, March-April, pp. 51-9.
Eichenwald, K. (2002), "Waste management executives are named in SEC accusation", *The New York Times on the Web*, 27 March.
Emiliani, M. (1998a), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-31.
Emiliani, M. (1998b), "Continuous personal improvement", *Journal of Workplace Learning*, Vol. 10 No. 1, pp. 29-38.
Emiliani, M. (2000), "Cracking the code of business", *Management Decision*, Vol. 38 No. 2, pp. 60-79.
Emiliani, B., Stec, D., Grasso, L. and Stodder, J. (2003), *Better Thinking, Better Results*, The Center for Lean Business Management, Kensington, CT.
Fox, J. (2001), "The amazing stock option sleight of hand", *Fortune*, Vol. 143 No. 6, pp. 86-92.
Fujimoto, T. (1999), *The Evolution of a Manufacturing System at Toyota*, Oxford University Press, New York, NY, pp. 85-222.
Frank, R. and Solomon, D. (2002), "Adelphia-inflated subscriber data, kept two sets of accounting books", *The Wall Street Journal Online*, 7 June.
Gasparino, C. (2002), "Merrill will pay $100 million fine to settle New York's analyst probe", *The Wall Street Journal Online*, 22 May.
Goland, A., Hall, J. and Devereaux, C. (1998), "First National Toyota", *The McKinsey Quarterly*, No. 4, pp. 59-66.
Handy, C. (2002), "What's a business for?", *Harvard Business Review*, Vol. 80 No. 12, December, pp. 49-55.
Harris, G. (2002), "Ex-executives tell how Bristol burnished its financial results", *The Wall Street Journal Online*, 12 December.
Harris, G. (2003), "Bristol-Myers says accounts were flawed, sales inflated", *The Wall Street Journal Online*, 11 March.
Humphreys, J. and Einstein, W. (2003), "Nothing new under the sun: transformational leadership from a historical perspective", *Management Decision*, Vol. 41 No. 1, pp. 85-95.
Imai, M. (1997), *Gemba Kaizen*, McGraw-Hill, New York, NY.
Kaufman, L. (2001), "Questions of style in Warnaco's downfall", *The New York Times on the Web*, 6 May.
Kelly, M. (2001), *The Divine Right of Capital*, Berrett-Koehler, San Francisco, CA.
Kets de Vries, M. (1993), *Leaders, Fools, and Impostors,* Jossey-Bass, San Francisco, CA.
Kets de Vries, M. and Miller, D. (1984), *The Neurotic Organization,* Jossey-Bass, San Francisco, CA.
Kets de Vries, M. and Miller, D. (1986), "Personality, culture, and organization", *Academy of Management Review*, Vol. 11 No. 2, pp. 266-79.
LCM (1999), Leadership competency model used by a US-based *Fortune* 100 company from 1994 to 2003.
Loomis, C. (2001), "This stuff is wrong", *Fortune*, Vol. 143 No. 6, pp. 73-84.
Lu, D. (1989), *Kanban: Just-in-Time at Toyota*, Productivity Press, Portland, OR.
Lucia, A. and Lepsinger, R. (1999), *The Art and Science of Competency Models*, Jossey-Bass/Pfeiffer, San Francisco, CA.
Maremont, M. and Berner, R. (1999), "Rite-Aid's large cash deductions irk suppliers at bill-paying time", *The Wall Street Journal Online*, 31 March.
Mintzberg, H., Simons, R. and Basu, K. (2002), "Beyond selfishness", *Sloan Management Review*, Vol. 44 No. 1, pp. 67-74.
Mitchell, L. (2001), *Corporate Irresponsibility*, Yale University Press, New Haven, CT.
Monden, Y. (1995), *Target Costing and Kaizen Costing*, Productivity Press, Portland, OR.
Monden, Y. (1998), *Toyota Production System*, Engineering and Management Press, Norcross, GA.
Nikkei, (2003), "Toyota Group net profit up 53 percent to new high of ¥944.6 billion", *The Nikkei Weekly*, 9 May.
Norris, F. (2001), "SEC accuses former Sunbeam official of fraud", *The New York Times on the Web*, 16 May.
Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.
Rother, M. and Shook, J. (1999), *Learning to See*, Lean Enterprise Institute, Boston, MA.
Sandberg, J. and Pulliam, S. (2002), "WorldCom finds more errors: restatement will be $7.2 billion", *The Wall Street Journal Online*, 9 August.
Senge, P. (2003), "Taking personal change seriously: the impact of organizational learning on management practice", *The*

Academy of Management Executive, Vol. 17 No. 2, pp. 47-50.
Shingo, S. (1985), *A Revolution in Manufacturing: The SMED System*, Productivity Press, Portland, OR, pp. 5-31.
Shingo, S. (2003), "list of Shingo Prize business recipients", available at: www.shingoprize.org/web/business_prize/recipients.htm (accessed 5 April).
Sonoda, T. (2002), "Honda: global manufacturing and competitiveness", *Competitiveness Review*, Vol. 12 No. 1, pp. 7-13.
Thorn, M. (2002), "Leadership in international organizations: global leadership competencies", available at: www.academy.umd.edu/publications/global_leadership/marlene_thorn.htm (accessed 14 April).
Toyota (2001), "The Toyota way 2001", internal document, Toyota Motor Corporation, April.
Weil, J. (2003), "Prosecutors outline practices behind HealthSouth charges", *The Wall Street Journal Online*, 20 March.
Wolf, M. (2002), "A rescue plan for capitalism", *Financial Times*, 3 July.
Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.
Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY, pp. 139-68.

Application questions

1 Have leadership competency models been effective at helping your business achieve its strategic business objectives? If so, how do you know?
2 Identify several competencies espoused and compare them to competencies-in-use. What can you do to close the gap?
3 Refer to an organization chart, business process flow chart, or value stream map and identify several leadership beliefs, behaviors, and competencies using the format shown in Table III.

Improving business school courses by applying lean principles and practices

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Keywords

Business schools, Customers, Education, Quality improvement, Value added

Abstract

Describes the application of lean principles and practices to the design and delivery of a graduate business course on leadership taken by part-time working professional students in a classroom setting. The principal objectives were to improve consistency between what was taught in the course and how the course was taught, eliminate waste, improve the quality and relevance of course materials, and deliver greater value as perceived by students. Results indicate a higher level of student satisfaction, in part through clearer expectations, less ambiguity regarding lectures and assignments, standard formats for assignments, smoothing individual and team assignments over the semester, and better management of students' time both in and outside class. This joins a growing body of work that demonstrates the applicability of lean principles and practices to service businesses, and the achievement of improved outcomes.

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Introduction

Many manufacturing and some service businesses today are using lean management principles and practices as a means to improve business processes, which in turn improves productivity and competitiveness, and delivers greater value to end-use customers (Bowen and Youngdahl, 1998; Goland *et al.*, 1998; Lean Enterprise Institute, 2003; Swank, 2003; Shingo, 2004; Wysocki, 2004). The lean management system was initially developed by Toyota Motor Corporation (Ohno, 1988; Womack *et al.*, 1990; Monden, 1993; Womack and Jones, 1996; Toyota, 2001; Emiliani, 2004a, b) beginning in the mid-1930s, with elements of the management system dating to the late 1800s (Toyota, 1988; Kimoto, 1991). It borrowed key concepts and practices developed by Henry Ford and Charles Sorenson (Ford, 1988; Sorenson and Williamson, 1956; Ohno, 1988), as well as Frederick Taylor (Taylor, 1967). Importantly, the lean management system as it is known today did not start out that way. It has evolved purposefully over time, driven by practitioners, in alignment with Toyota's corporate purpose (Basu, 1999), anchored in key principles (Ohno, 1988; Toyota, 2001), and by applying the scientific method to the practice of management:

(1) observe a phenomenon;
(2) formulate a hypothesis to explain the phenomenon;
(3) conduct experiments to prove or disprove the hypothesis; and
(4) reach a conclusion that validates or modifies the hypothesis.

Thoughtful application of lean principles and practices results in many benefits, including higher quality products and services, increased market share, margin expansion, revenue growth, stable employment, better customer focus, faster response to changing market conditions, and higher asset efficiency. Importantly, a key focus of lean management is time and how time is used, with the intent of improving responsiveness to customers and ensuring that associates' lives are not being wasted while at work doing unnecessary things (Minoura, 2002). Businesses that practice lean management well are formidable time-based competitors because information (e.g. parts, documents, verbal communication) flows with fewer or even no interruptions (Fujimoto, 1999; Emiliani *et al.*, 2003).

Lean management is distinctly different from conventional, or "batch-and-queue" (B&Q) business practices (Monden, 1993; Womack and Jones, 1996; Emiliani *et al.*, 2003). Batch-and-queue means that materials are processed in large batches, which result in long queue times between

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operations. While the term batch-and-queue originated in manufacturing, the conventional way to deliver services is also batch-and-queue, for example processing information, documents, etc., in large batches, which again results in long queue times. Batch-and-queue processing – whether it is materials or information – has many serious deficiencies, including long lead-times, lower quality, higher cost products or services, customer dissatisfaction, and poor information flow (Womack and Jones, 1996; Bowen and Youngdahl, 1998; Goland *et al.*, 1998; Brady, 2000; Barron, 2000; Emiliani *et al.*, 2003; Swank, 2003; Wysocki, 2004). While *any* "batch-and-queue" process is considered undesirable by lean thinkers, they also recognize that the real world is imperfect, and thus some "batch-and-queue" processes may have to exist until new ideas emerge that eliminate them. Thus, lean thinkers continue to think about how to make processes and related activities consistent with lean principles and practices.

Unfortunately, most managers understand and practise lean as a set of tools – simple add-ons to conventional batch-and-queue business practices – and also view lean as a way to reduce headcount, usually though mass layoffs (Post and Slaughter, 2000; Varnon, 2003). Thus, the term "lean" has for many workers become synonymous with bad outcomes such as layoffs (e.g. *L*ayoff *E*very *A*ssociate *N*ow). Managers using lean principles and practices typically fall prey to an abundance of misconceptions about lean, and usually misapply some or all aspects (Smart *et al.*, 2003; Swank, 2003; Center for Lean Business Management, 2004). It is not surprising that associates, or other key stakeholders such as suppliers or customers, experience negative outcomes. As a result, most businesses fail to realize the full benefits of the lean management system (Womack *et al.*, 1990; Emiliani and Stec, 2004).

The current author had industry experience in implementing lean business practices in manufacturing and service settings, and later, as a result of a career change to become a business school professor, taught the lean management system and wrote numerous papers on lean management principles and practices. Since making the switch to teaching in 1999, the author set out to apply lean principles and practices to the design and delivery of his leadership course for two reasons:

(1) to improve consistency between what was taught in the course and how the course was taught; and
(2) the correct application of lean principles and practices normally results in higher customer (i.e. student) satisfaction.

The student body of the Hartford, Connecticut, department of Rensselaer Polytechnic Institute's Lally School of Management and Technology consists of about 600 working professionals seeking Master of Science (MSc) degrees in management and Master of Business Administration (MBA) degrees part-time. They typically have ten to 15 years of work experience and hold supervisory, mid-level management, or executive positions in mid-size and large corporations. A course on leadership was developed and modified over several semesters, beginning in 2001, to be more consistent with lean principles and practices, and within parameters established by the business school and the accreditation body, AACSB International (Association to Advance Collegiate Schools of Business, 2003).

This paper describes the application of lean principles and practices to the design and delivery of a graduate business school course. The results show a higher level of student satisfaction, in part through clearer expectations, less ambiguity regarding assignments, standard formats for assignments, smoothing individual and team assignments over the semester, and better management of students' time both in and especially outside class. The latter is a very important component of the value proposition for working professionals because they have necessary work and family life issues to attend to in addition to their academic work (Polson, 1993). For them, graduate school is not a full-time job. Additional professional and personal demands on part-time students' time can be due to business travel, job change, added workload and project deadlines (professional reasons) or a new child, child care, care of the elderly or divorce (personal reasons). As a result, most part-time students have difficulty finding four to six hour blocks of time needed to complete an assignment. However, they can more easily find four to six one-hour blocks of time in between professional and personal activities. The students' sensitivity to time, if recognized and accepted by the professor, challenges that professor to think critically about what he or she is trying to teach, course structure, content, and delivery, and the ultimate objective of the material presented for study.

This paper should be of interest to university management and professors because it presents an effective way to focus key concepts, increase the instructor's effectiveness, and achieve greater satisfaction among part-time students. However, applying lean principles and practices to courses alone may not result in significant improvement, as the instructor's speaking ability, course content, methods of analysis, overall impact and related

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student services are also important determinants of part-time student satisfaction. This paper may have less applicability to students enrolled in full-time undergraduate or graduate programs because they have different demands on their time or may perceive the value of traditional modes of education differently. It is likely, however, that there are more similarities than differences in how adult students perceive value, and thus the opportunities for improvement may be much broader than initially apparent. In other words, most professors will find reasons why lean principles and practices do not apply to them, when they may indeed apply. The many misconceptions and negative perceptions of lean management create handy reasons for inaction in other practitioner communities such as service businesses, including higher education.

Lean principles, processes, and tools

Lean is a management system which is designed to be responsive to the needs of humans in business and deliver better outcomes for key stakeholders such as associates, suppliers, customers, investors, and communities. It is rooted in key principles and supported by simple processes and tools that are designed to help people improve productivity and consistently deliver the value that customers seek in the products and services they buy. The overarching lean principles and two key objectives are presented in Table I (Ohno, 1988; Womack and Jones, 1996; Toyota, 2001).

Some of the key processes and tools that are used in the lean management system to help people eliminate waste and create value for end-use customers are presented in Table II (Imai, 1997; Rother and Shook, 1999; Emiliani *et al.*, 2003). The intent of these processes and tools is to simplify work and the workplace, improve quality, reduce lead-times, and focus people on value-creating activities. Importantly, they also help people realize their full potential and actualize their innate desire to make positive contributions to the workplace, which enables a more consistent stream of successful outcomes.

In the lean management system, an important question is: Who is the end-use customer[1]? Normally, it is the person that pays for and uses a product or service. For example, if you buy a computer and use it, then you are the end-use customer. At Rensselaer (Hartford), the person who pays for the teaching service is often different from the person who uses it. While in some cases the teaching service is paid for and used by the student, in most cases the student receives the teaching service but their employer pays for it in whole or part. So the end-use customer, from a practical standpoint, is *both* the student and their employer. It is their perception of value that matters most, and much of that perception is based on price, time commitment, school reputation, and what the student actually learns. The end-use customer could be the person or company that buys the product or service that the student's employer sells. However, since they are likely to be unaware of the link between an employee's education and any improvement in the value proposition that they seek, the end-use customer is best recognized as the student and their employer.

Value as perceived by students and alumni is articulated through direct contact with faculty and administration, inclusive of formal and informal anonymous feedback mechanisms. This can include (Aspen Institute, 2003; Merritt, 2003):

- business school reputation;
- new career opportunities and associated financial rewards;
- stronger international business, entrepreneurship, and information technology courses;

Table I Key lean principles and objectives

		Explanation
Lean principles (Toyota, 2001)	Continuous improvement	Day-to-day activities performed to improve business processes in response to changing market conditions. Called "kaizen" in Japanese, which literally means "change for the better", and is often interpreted as "continuous improvement". Utilizes specific processes and tools to achieve improvements
	Respect for people	People (i.e. stakeholders such as associates, customer, suppliers, investors, and the community) are valuable resources to which a business owes its existence. Disrespecting people creates waste
Objectives	Eliminate waste	Eliminate activities and behaviors that add cost but do not add value as perceived by end-use customers. The original seven wastes are (Ohno, 1988): overproduction, waiting, transportation, processing, inventories, movement, and defects. The eighth waste is behavior (Emiliani, 1998a). Waste is called "muda" in Japanese. Important related concepts are the elimination of unevenness ("mura" in Japanese), and unreasonableness ("muri" in Japanese)
	Create value for end-use customers	Focus on the value-creating activities that end-use customers desire

Table II Lean processes and tools

Lean process or tool	Explanation
Five Ss	Stands for: sort, sweep, straighten, shine, sustain. Important for establishing an organized workplace
Just-in-time	Subsequent operation acquires parts (or information) from the preceding operation when needed, in the quantity needed
Kaizen	Literally means "change for the better", also interpreted as "continuous improvement". Process used to identify and eliminate waste
Lean behaviors	Applying lean principles and tools to improve leadership behaviors and eliminate behavioral waste (Emiliani, 1998a, b)
Load smoothing	Called "heijunka" in Japanese. Used to smoothe fluctuations in customer demand
Percent loading chart	A one-page diagram depicting the cycle time between operations or workers compared to the rate of customer demand. Helps identify workload imbalances
Policy deployment	Called "hoshin kanri" in Japanese. A process used to connect corporate strategy to key objectives and resources, including daily activities across functions
Quality function deployment ("voice of the customer")	A process used to incorporate the wants and desires of intermediate and end-use customers in the design of goods and services
Root cause analysis	Methods used to determine the root cause of a problem and identify countermeasures to avoid repeat occurrences. Key tools are "5 Whys" (asking why five or more times until the root cause of the problem is discovered) and fishbone or cause-and effect diagram
Standard work chart	A one-page diagram showing the sequence in which work is performed
Takt time	The rate of customer demand. Used to establish a direct link between marketplace demand and workplace activities
Total productive maintenance	A program used to ensure that equipment is in good operating condition and available for use when needed
Value stream maps	A one-page visual representation of material and information flows. Used to identify improvement opportunities and eliminate waste
Visual controls	Signs and other forms of visual information used to simplify the workplace and make it easy to recognize abnormalities

- dealing with organizational politics and the challenges associated with mid-management positions;
- gaining a better understanding of tangible issues associated with becoming a top manager;
- managing value conflicts; and
- integrating social responsibility throughout the curriculum.

Employers, however, often do not typically specify the value they expect to receive, or business school personnel may not actively seek an understanding of value from the employer's perspective. Among the most important voices are the managers to whom graduates report directly, not recruiters. Thus, both faculty and administration often have a poor understanding of the value that employers expect to receive. In cases where managers specify value, it can include (Doria *et al.*, 2003):

- stronger writing, public speaking, and team-building skills;
- more courses in leadership and managing human resources;
- differentiation (i.e. allowing students to focus on a particular industry, rather than exposing students to many different industries);
- learning how to apply the scientific method to business and management problems;
- learning how and when to use formal root cause analysis methods; and
- integration of business activities across functions versus silo-based pedagogy (i.e. discrete coursework in finance, marketing, operations, strategy, etc.).

These views indicate that the value proposition for students and employers can be improved. The key question is whether or not faculty and administrators are willing to respond to this feedback and improve the service that they provide. A recent report by the accreditation body for business schools, AACSB International, identified "curricular relevance" as a key issue, and suggested that business education providers must differentiate themselves relative to curricula and programs and better address basic management skills such as communications, interpersonal skills, multi-cultural skills, negotiations, leadership development, and change management; and an outward-facing curriculum designed to enhance relevance of curricula to the particular market niche targeted by the school, through discussions with business and community constituents, to generate boundary-spanning content, alternative pedagogical approaches, and diversity of participants and deliverers, including the integration of clinically experienced executives[2]

into the faculty, in accord with accreditation requirements (Association to Advance Collegiate Schools of Business, 2002). The improvement opportunities identified by AACSB International, as well as other recent calls to improve graduate business school education (Karapetrovic *et al.*, 1999; Donaldson, 2002; Etzioni, 2002; Mintzberg *et al.*, 2002; Pfeffer and Fong, 2002; Aspen Institute, 2003; Ghoshal, 2003), are consistent with the value creation approach used by lean management system practitioners. While the need to improve is clear and seems simple enough, the key question is: how do you do it?

Discussion

Higher education in general, and graduate business courses in particular, have many "batch-and-queue" characteristics (Dahlgaard and Østergaard, 2000; Alp, 2001; Comm and Mathaisel, 2003). Since "batch-and-queue" is considered undesirable by lean thinkers, they will seek opportunities for improvement based upon what they know, i.e. the lean principles (Table I) and processes and tools (Table II) used in day-to-day management practice. Table III summarizes several course elements and illustrates common approaches to each element under the heading "Conventional course", while applying Lean principles to these same course elements are presented under the heading "Improved course". Note that the "Conventional course" element descriptions are generalizations of common characteristics based on the review of literature on higher education. They are not intended to imply that all business school courses are as characterized, or that professors are not interested in improving their courses or teaching abilities. Each course element is discussed below.

Business principles

Professors typically do not explicitly disclose the fundamental basis of inquiry at the start of the course relative to any established system of business principles (Locke, 2002). Thus, students are left to infer the presence of business principles, possibly from courses taken previously, which may or may not serve as appropriate guidelines for management decision-making. Alternatively, the professor may explicitly support a single business principle such as the supremacy of shareholders, which typically manifests itself as: "the prime responsibility of senior management is to maximize shareholder value". This unilateral business principle has serious shortcomings, as the recent financial scandals among major US corporations have shown, including widespread conflicts of interest (Kelly, 2001; Cassidy, 2002; Emiliani, 2004a).

Lean thinkers, on the other hand, view multi-lateral business principles as essential anchors for framing problems and for decision-making among senior managers, as well as people at lower levels, and believe that business has both social (i.e. human) and economic responsibilities (Basu, 1999; Kelly, 2001; Toyota, 2001; Handy, 2002;

Table III Graduate course design and delivery

Course element	Conventional course	Improved course
Business principles	None (or not explicit), or shareholder supremacy (tacit or explicit)	Lean management principles (Table I) and the Caux Round Table's *Principles for Business* (Caux Round Table, 2004)
Syllabus	Five or more pages long Ambiguous student expectations Common errors that lead to lower grades are not identified Sometimes not followed	3-4 pages Student expectations simply defined Identify common errors that lead to lower grades Closely followed and referred back to frequently
Required reading	Voluminous; confusing or complex Routinized or customary learning approach Non-deterministic solutions to business problems (i.e. broad range of possible solutions)	Focused, "less is more", direct and simplified Scientific method, including formal root cause analysis Deterministic solutions to business problems (i.e. single or narrower range of possible solutions)
Assignments	Ambiguous, with poorly defined learning objectives Every few weeks All individual or all team-based Tens of pages in length	Clear, with well defined learning objectives Weekly assignments Balance of individual and team assignments No more than 1-3 pages
Examinations	Mid-term and final examination, or final examination only	Bi-monthly or weekly assignments, each serving as an examination
Student feedback	At end of course Professor may or may not make changes	At mid-term and end of course Professor responds to feedback when received
Course remembrance	Lecture notes, graded tests and assignments, reading materials (if saved by student)	One-page "visual control" summary of course content using diagrams and words One-page table listing common errors made by senior managers

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Caux Round Table, 2004). The business principles used in the "Improved course" espouse a balanced stakeholder perspective, which students soon realize can result in better outcomes for all key stakeholders, including shareholders (Emiliani *et al.*, 2003). Introducing established multilateral business principles at the start of the course provides both a deeper and more focused basis for discussion of material presented throughout the semester. Perhaps not surprisingly, students at Rensselaer, and probably graduate business students in general, are unaware of the existence of multilateral business principles. This sets the stage for real improvement in management thinking and future practice.

Syllabus

Academics, as well as people in general, often equate many pages of text with high quality or thoroughness. As a result, it is common to find course syllabi that are highly detailed and thus several pages in length (Altman and Cahsin, 1992). Alternatively professors may simply be responding to policy set forth by the school (University of Wisconsin-Madison, 1993) or by custom. Either way, attempts to completely detail all aspects of the course can result in confusion among students. As in the case of contracts, more pages create more opportunities for differences in interpretation of requirements, which can lead to disputes (i.e. waiting and behavioral waste; Table I) between students and professors or administrators. Further, unnecessary variation will require the professor to spend a lot of time with students clarifying matters one-on-one, and may inadvertently give inconsistent or contradictory direction to students (i.e. defects; Table I). This can make grading more difficult or less consistent.

Lengthy syllabi may be an indication that the professor is putting too much material in the course, possibly resulting in ambiguous or contradictory themes, which may diminish planned learning outcomes. In other words, the course may lack focus and relevance, despite good intentions. In addition, fancy requirements such as elaborate grading criteria can look impressive, but can in fact be difficult to manage and may result in time-consuming disputes.

Lean thinkers see things differently. Lengthy syllabi represent an opportunity to consolidate, simplify, and clarify requirements – to reduce variation in interpretation (i.e. defects; Table I) and avoid wasteful conflicts that consume time and detract from learning. Simplifying the learning contract and making it less ambiguous, including grading criteria, is welcomed as a challenging improvement opportunity. This helps the professor improve the focus and relevance of course materials and related requirements.

Students, like any worker, are concerned about doing a good job. Among other things, they want to get a good grade for each assignment and for the course. In lean management practice, workers are made aware of common problems that make the job more difficult and lead to poor outcomes, which is consistent with the "respect for people" principle. Lean thinkers would apply a similar logic, i.e. make all students aware of the four or five most common errors (i.e. defects; Table I) that lead to lower grades. Not disclosing this type of basic job-related information would be inconsistent with the "respect for people" principle. Further, the typical assumption is that a poor grade is the student's fault, when in fact the professor may have more to do with this form of variation than meets the eye. A lean thinker establishes an environment that facilitates learning and in which people can improve and succeed, yet without doing the job for them.

Required reading

Conventional courses often require volumes of reading materials – books, cases, and papers. It is often up to the student to sort out the relevance of the information contained in the readings for each assignment (Paul *et al.*, 1996). Since this is probably the basis for learning that most business school professors encountered in graduate school, it seems reasonable to continue the tradition. But is it? It can result in a routinized or customary learning approach, which has been validated through tradition – though that does not necessarily mean it is valuable or effective (Mintzberg *et al.*, 2002; Pfeffer and Fong, 2002), as the recent business scandals have shown (Ghoshal, 2003). In addition, the solutions to business problems are non-deterministic in many courses, especially those that rely extensively on the case method. This outcome seems sensible given the absence of scientific method, formal root cause analysis, and multilateral business principles (Locke, 2002) as the basis for the study of business problems. After all, successful professors raised in this tradition probably see nothing wrong with it.

Lean thinkers see business problems as "abnormalities" that can and must be corrected to ensure consistency with the principles and objectives presented in Table I and achieve better outcomes. They believe in the maxim "less is more", and that it is important to provide people with focus so as not to waste time and effort (i.e. processing, movement, and transportation; Table I). Therefore, required readings will be focused and thematically consistent in order to reduce variation in interpretation and achieve planned

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learning outcomes. In addition, lean thinkers will emphasize the application of the scientific method to *any* business problem. Further, the use of root cause analysis is typically thought to be applicable only to engineering or manufacturing problems, and thus not useful for understanding business problems. Lean thinkers know that the use of formal, yet simple, root cause analysis methods will help students identify the sources of business problems and facilitate the identification of "countermeasures" to prevent their recurrence. Formal root cause analysis is very important because it helps students identify deterministic solutions, or at least a narrower range of potential solutions.

Assignments

Typically, there is no requirement for faculty to present to students, either orally or in writing, the learning objective(s) for each class and each assignment, though there is often such a requirement for the course itself (Pennsylvania State University, 2004). Thus, questions may arise among students, especially part-time students who have strong interests related to application (Polson, 1993; Hoyt and Lee, 2002), including "What is the objective of this reading or assignment?", "What is it supposed to teach us?", "How does it link to previous or future materials?", and "Why are we doing this?". Indeed, the professor may not know the answers to these questions because they may have never given it much thought. If they don't know, then how can students know? It is unreasonable to expect students new to a knowledge area to easily discern the learning objective (Alp, 2001; Association to Advance Collegiate Schools of Business, 2004), and may lead to mistaken impressions or missing the point of an assignment.

Assignments may be due every few weeks, which represents batching or uneven workflow. For whose convenience is the batching done, the student or the professor? Further, assignments may be all individual or all team-based. If they are all individual, students may feel that they were not given opportunities to participate as a team. If assignments are all team-based, then students may feel that they did not have an opportunity to demonstrate their individual talents and capabilities. And how many pages does the professor require students to write? It is common for students to write papers ten to 20 pages or more in length, often several times a semester. What do students think about when faced with this requirement, especially part-time students who are pressed for time? Most will focus their attention on achieving the page count and focus less on learning (which was ambiguous anyway since the learning objective was not defined). Students will import many charts, diagrams, and photos into the paper, tighten page margins a small amount, increase the font size by half a point, or use a larger font such as Arial instead of Times New Roman. These aren't bad people – it's just human nature. Obviously, students are being driven to pursue a different objective.

Lean thinkers believe that they should not waste customers' (i.e. students') time, as that annoys and distracts them, and can result in the loss of future business. They believe that people left to guess about desired outcomes are not using time effectively, and that ambiguity and variation in interpretation obscure expectations. Clarifying expectations, succinctly in writing and emphasized verbally, helps both student and teacher do a much better job. Smaller, more focused assignments are given weekly to smooth the workflow, with a balance between individual and team-based assignments. Careful thought is given to which assignments are better executed individually or by a team. Since most professors dislike reading lengthy papers, why do they ask for them in the first place? Probably it is because that is what they were asked to do in graduate school as *full-time* students. Carrying on this tradition seems sensible if all customers are the same – but they are not.

The questions or subjects of investigation asked for in assignments are carefully constructed to ensure focused learning and to provide the professor with information that he or she can be enthusiastic about reading and can also learn from. Assignments are returned in a standard format, typically a table, which can be evaluated by the professor quickly and easily, and returned to students in time for discussion in the next class. Page count is limited to one to three pages, an amount normally sufficient to determine whether students understand the problem and have responded to it effectively, and eliminate the waste of overproduction (Table I). This approach does not diminish the potential value of extended inquiry as represented by more lengthy written assignments. Rather, it simply recognizes that long papers are not needed for most assignments, but they may be useful for certain assignments.

Examinations

In graduate school, examinations are often given at the mid-term and at the end of the course. In some cases, one examination is given at the end of the course, or the final examination may take the form of a major semester-long project. There may also be a few additional minor grading opportunities during the semester through occasional quizzes, class participation, attendance, or team presentations. However, students typically dislike

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approaches that offer few opportunities to earn grades.

Lean thinkers view having only a few grading opportunities in a semester as queuing and then downloading large batches of information, which introduces opportunities for wasteful variation. They also ask themselves some simple questions. Why are there only a few substantive grading opportunities in the semester? Is it done that way because that's the way it has always been done? Is this done primarily for the benefit of the professor, to reduce their grading workload? If it's done for the professor's benefit, then the perspective is wrong – the focus needs to be on the student. Lean thinkers increase the frequency of examinations, or use each weekly assignment as an examination, thereby giving students a dozen or so opportunities to earn grades and thus eliminate a potential source of dissatisfaction – and eliminate behavioral waste (Table I).

What about the lag time between when a mid-term or final examination is given and when students receive feedback from the professor? In most cases there is a significant delay, driven by the batch nature of examinations, the professor's schedule or interest in grading the examinations (Clio, 2003; Carroll, 2004), and possibly the absence of a school policy for when grading (other than final examinations) should be completed and returned to students. While the grade is important to students, the feedback (e.g. written comments) may no longer be important to them because they have moved on to other matters. This diminishes learning, as well as opportunities for student-teacher interaction – a situation that would not be acceptable to lean thinkers because waiting is one of eight wastes. Instead, feedback must be timely and accurate, both of which are supported by articulating the learning objective, giving weekly assignments, using standard formats for responses, and limiting the page count to one to three pages.

Student feedback

Formal feedback on a course and the professor is generally solicited anonymously from students at the end of the semester by the administration using a survey instrument designed in-house or procured from a supplier. Importantly, the professor may not receive the results of the survey in time for use in the next semester, while formal feedback obtained at the end of a course does not give the professor a chance to make changes *during* the course. Further, professors may ignore the feedback due to arrogance, dislike of criticism from students, or an unwillingness to change (Hilt, 2001; Emery *et al.*, 2003), characteristics that part-time graduate business students will probably find troublesome and maybe also hypocritical because in their workplace, performance evaluations impact their pay and advancement (Ahmadi *et al.*, 2001). In addition to not being timely, conventional routes for obtaining feedback may be poor indicators of teaching effectiveness (Emery *et al.*, 2003; Morgan *et al.*, 2003). In these ways, the voice of the customer may be delayed or diminished.

Lean thinkers also strive to incorporate the voice of the customer in products or services, and view formal and informal customer feedback as a valuable resource for making improvements. Formal feedback is solicited at the end of a transaction (i.e. batch mode), but it typically consists of fewer questions, 10-15 as opposed to 30-50. However, informal feedback is often obtained sooner. While a lean-thinking professor may not be able to change the administration's use of lengthy formal student surveys administered at the end of the course, he or she can ask students for anonymous feedback at the mid-point of the course (Kay, 2004) and incorporate as many suggestions as possible into the remaining classes – and tell students which suggestions were incorporated, where and how. This gives students an opportunity to shape the course in real time, while also supporting attributes commonly taught in business school: empowerment, buy-in, giving timely feedback, and responding to feedback (Ahmadi *et al.*, 2001). It gives the professor an opportunity to show he or she is serious about improvement and that students' suggestions are truly valued. Informal feedback may be given to the professor at any time, and is acted upon by lean thinkers. If a suggestion cannot be acted upon, then the professor tells the students why not, or gives an indication when the suggestion will be incorporated into the course.

Course remembrance

When students successfully complete a course, they leave the course with inventories, such as lecture notes, graded assignments and reading materials. The textbook may be sold back to the bookstore if it is judged to have little future value. The vibrant used textbook market indicates this is a common outcome. Most students will never again return to their instructional materials, partly because it can be difficult to sort out (or process, Table I) the relevant information in relation to future job-related business problems. So it sits on a bookshelf, finds a home in the attic or basement, or ends up in the garbage. Students will move on to the next course and turn their attention to current course requirements. So what will students remember about a course in the years to come? Is it

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what the professor wanted them to remember? Did the professor even indicate specifically what he or she wanted students to remember? Did the students remember it? How can the professor be sure that they did?

Lean thinkers know that most people are very busy and have a lot of things to remember. Therefore, simple "visual controls" are created to convey important information. These are signs, symbols, or one-page diagrams that, after careful thought, distil the essential information so that it can be comprehended at a glance. A lean thinker would take the challenge to summarize the entire course on a single sheet of paper (one- or two-sided) to eliminate the waste of future processing and inventories (Table I), and do so without trivializing the course or its content. It would contain a combination words and graphics, and judiciously use colors to emphasize certain points. The professor can provide the one-page summary, or teams can be challenged to create their own summary as a final assignment. Students then leave the course with a meaningful, information-rich visual control that they can display at work or at home to remind them of key teachings. The professor can also provide a one-page summary of the top ten or 20 errors that senior managers commonly make relative to the course topic. This will help students detect and avoid such errors in the future, and hopefully lead to better management.

Table IV describes how lean principles and practices can be applied to course design and delivery. This approach to improvement will help eliminate waste and create a more valuable educational experience for current and future students, and should result in better outcomes for their employers, as well as professors and the school. The improvement approach described here obviously must be used in a manner consistent with balancing the mostly shared but sometimes competing interests of the primary stakeholders of part-time graduate business programs, i.e. AACSB International, the school, students, employers, and professors.

Outcomes

Figure 1 shows the leadership course ratings, starting with the introduction of the course through to the fifth semester that the course was taught. The course ratings were determined using the Individual Development and Educational Assessment Center (IDEA Center) survey instrument (Individual Development and Educational Assessment Center, 2004a), and administered as instructed by IDEA. Raw scores are presented instead of adjusted scores, which factor in extraneous influences. The intent of the adjustment is to "level the playing fieed for purposes of administrative decisions" (Individual Development and Educational Assessment Center, 2004b), and thus is not relevant to the present work.

The ratings show improvement over time in the IDEA Center survey categories "Overall excellence of teacher" and "Overall excellence of course", resulting in top 10 percent performance in "Teaching effectiveness" for semesters 2-5. The IDEA Center survey national averages for "Overall excellence of teacher" and "Overall excellence of course" are lower, at 4.2 and 3.9, respectively. Over the same period of time, the ratings for all courses at Rensselaer, designed and delivered in the "conventional" manner, were an average of 10.6 percent lower for "Overall excellence of teacher" and 11.8 percent lower for "Overall excellence of course". These results indicate that the application of lean principles and practices to course design and delivery results in higher customer satisfaction, irrespective of the subject matter.

However, since the IDEA Center survey does not evaluate innovation in course design and delivery, the results may be better understood by the written comments received from students in the IDEA survey, which reflects value as they perceive it. Table V summarizes these comments, and also shows the corresponding improvement expressed as a lean process or tool, consistent with the lean principles and objectives shown in Table I.

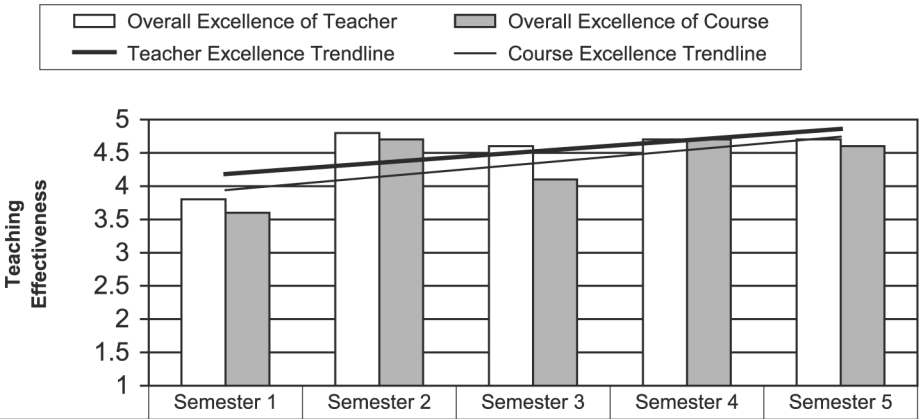
While other approaches to improvement may yield similar results, the application of lean principles and practices to course design and delivery clearly results in outcomes that part-time graduate students value. Understanding and incorporating employers' perceptions of value is important work that remains to be done. The application of lean principles and practices is an opportunity to better understand value from both the students' and employers' perspectives, and offer more substantive and focused educational challenges.

Of course, the voice of the customer – both students and employers – should be incorporated in balance with the knowledge areas that the professor believes must be presented in the course to achieve the desired learning outcomes, and consistent with accreditation and school requirements. In other words, embracing the voice of the customer cannot result in a reduction in content to the point where the material becomes trivial or where the course becomes too easy, nor should it result in an exclusive focus on a particular employer's business problems, although focusing on industry-wide challenges would probably be acceptable.

Table IV Applying lean principles and practices to courses

Lean principle or practice	Application to course design and delivery
Continuous improvement	Apply the scientific method to business problems Use formal root cause analysis in coursework (five whys or cause-and-effect diagram) to understand the source of problems and identify countermeasures Solicit feedback from students at course mid-point to incorporate voice of the customer Solicit feedback from students at end of course Respond to feedback whenever offered
Five Ss	Course content and sequence well organized Eliminate extraneous material
Just-in-time	Return graded papers and projects in time for discussion in next class
Load smoothing	Smoothe workload throughout the semester using smaller weekly assignments Balance of team and individual assignments
Respect for people	Recognize that students' time is very valuable to them Select books, cases, and papers that are relevant, concise, and focused Clearly establish both professor and student expectations Clearly establish grading criteria Solicit mid-term and end-of-term feedback
Standard work	Standard syllabus format and simple one-page schedule Simplify assignments to focus students on the desired learning outcome Standard format for most assignments (e.g. one-page table) State the purpose and learning objective for each class and each assignment
Visual controls	Give examples of common mistakes that students make which reduce grades Use different color paper to indicate updated or corrected course documents Use colored paper to indicate before (e.g. red) and after condition (e.g. green) for assignments At-a-glance grading spreadsheet to quickly determine grades One-page course summary One-page table listing common mistakes made by senior managers

Figure 1 Leadership course ratings



	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5
Overall Excellence of Teacher	3.8	4.8	4.6	4.7	4.7
Overall Excellence of Course	3.6	4.7	4.1	4.7	4.6

Note: Course ratings as reported by part-time graduate students using the IDEA Center survey (IDEA, 2004) administered at the end of the course, starting with the first semester the course was taught through the fifth semester. Significant changes were made to the course after the first semester, based upon student survey results and the professor's dissatisfaction. Semesters 2-5 incorporated improvements consistent with Lean principles and practices (Tables 3 and 4). The IDEA rating system for "Teaching Effectiveness" is: 1 = low to 5 = high. The IDEA national average for "Overall Excellence of Teacher" and "Overall Excellence of Course" are 4.2 and 3.9, respectively

Table V Student feedback

Comment	Improvement
Focused material	Five Ss, eliminate waste and unreasonableness
Good organization of course materials	Five Ss, eliminate waste
Clear learning objectives	Five Ss, eliminate waste
Standard homework format	Standard work, visual control, eliminate waste
Smaller assignments more frequently	Load smoothing
Use of current papers and business press stories	Just-in-time
Incorporates customer wants and desires	Voice of the customer
Consistent and timely feedback	Just-in-time, eliminate waste, unevenness, and unreasonableness
Professor "walks the talk"	Eliminate waste, unevenness, and unreasonableness
Concepts and tools can be applied to the workplace now	Just-in-time
Use of critical thinking	Formal root cause analysis (e.g. five whys)
Like the one-page course summary	Visual control, five Ss, eliminate waste

Summary

This paper examined how lean principles and practices were applied to a graduate course in leadership taken by part-time students seeking MSc in management and MBA degrees. This activity was undertaken to improve consistency between what was taught in the course and how the course was taught, and to determine whether it resulted in higher student satisfaction. Results based on anonymous formal surveys and informal mid-semester feedback indicates that student satisfaction is indeed improved. However, the results achieved are temporary. Course content and materials change every semester, so unwanted variation will probably creep back in. The challenge then is to maintain constancy of purpose with respect to the key lean principles, objectives, processes, and tools shown in Tables I and II.

Applying lean principles and practices to course design and delivery requires professors to challenge their views regarding what they teach and how they teach it. All too often, professors teach in the same ways they were taught, and thus remain bound to convention due to a lack of critical thinking and despite the existence of compelling reasons for change. Importantly, for part-time students, professors should think about how the course consumes time and strive to reduce or eliminate waste, unevenness and unreasonableness such as that due to variation in interpretation, thematic inconsistencies, or lack of focus. This must be done in a manner consistent with balancing the mostly shared but sometimes competing interests or objectives of key stakeholders such as AACSB International, the school, students, business, and professors.

The results point to additional paths for future action. For example, how can other lean principles and practices such as kaizen (Emiliani, 2004b) and value stream maps be used to further improve course design and delivery? In addition, quality function deployment (Akao, 1990; Pitman *et al.*, 1995; Lam and Zhao, 1998; Wiklund and Wiklund, 1999; Hwarng and Teo, 2001) and policy deployment (i.e. "hoshin kanri" in Japanese; Akao, 1991; Roberts and Tennant, 2003) can be used to determine which business courses should be offered to begin with, as school focus or professor capabilities change, accreditation standards change, and the value proposition for part-time students and their employers change over time (Karapetrovic *et al.*, 1999; Dahlgaard and Østergaard, 2000).

Notes

1 Referring to students as "customers" usually causes a lot of controversy among professors and administrators. Many business school and non-business school professors dislike the introduction of "corporate-speak" into academic settings, and related for-profit business practices that some view as corrupt, thus possibly destroying the *raison d'être* of learning institutions. But whatever you call them, "students" or "customers", these people have expectations regarding the value that they (and possibly their employers) expect to receive. After all, part-time students are people who work full-time as independent contributors, supervisors, managers and executives, and usually must confront the reality of the marketplaces that they serve, including understanding who the customer is. So it should not be surprising that this type of student seeks consistency. They come to the university and into the classroom seeking a value proposition, spoken or unspoken, that professors and administrators are expected to deliver on. The essential point is that non-profit institutions are also subject to market forces – witness the growth of online higher education services, both non-profit and for profit – and adjustments may be necessary (Karapetrovic *et al.*, 1999). The challenge is to adjust in ways that are balanced and fully consistent with the institution's *raison d'être*, accreditation standards, and the need to continuously improve with regards to teaching, research, and student services to achieve better outcomes. That, after all, is learning.

2 The phrase "clinically experienced executives" refers to faculty who have significant industrial management experience.

References

Ahmadi, M., Helms, M. and Raiszadeh, F. (2001), "Business students' perceptions of faculty evaluations", *The International Journal of Education Management*, Vol. 15 No. 1, pp. 12-22.

Akao, Y. (1990), *Quality Function Deployment: Integrating Customer Requirements in Product Design*, Productivity Press, Portland, OR.

Akao, Y. (1991), *Hoshin Kanri: Policy Deployment for Successful TQM*, Productivity Press, Portland, OR.

Alp, N. (2001), "The lean transformation model for the education system", paper presented at the 29th Computers and Industrial Engineering Conference, Montréal, 1-3 November, pp. 82-7, available at: www.umoncton.ca/cie/conferences/29thconf/29thICCIE/Papers/paper006.PDF (accessed April 7, 2004).

Altman, H. and Cahsin, W. (1992), "Writing a syllabus", IDEA paper no. 27, Center for Faculty Evaluation and Development, Kansas State University, Manhattan, KS.

Aspen Institute (2003), "Where will they lead? MBA student attitudes about business and society", available at: www.aspeninstitute.org/Programt2.asp?bid = 947

Association to Advance Collegiate Schools of Business (2002), "Management education at risk", available at: www.aacsb.edu/publications/metf/METFReportFinal-August02.pdf

Association to Advance Collegiate Schools of Business (2003), "Eligibility procedures and standards for business accreditation", available at: www.aacsb.edu/accreditation/standards.asp

Association to Advance Collegiate Schools of Business (2004), "Accreditation standards: assurance of learning standards – faculty, responsibility for learning goals", available at: www.aacsb.edu/resource_centers/assessment/std-define-goals-faculty.asp (accessed April 6, 2004).

Barron, K. (2000), "Hurry up and wait", *Forbes Magazine*, October 16, pp. 158-64.

Basu, S. (1999), *Corporate Purpose: Why it Matters More than Strategy*, Garland Publishing, New York, NY.

Bowen, D. and Youngdahl, W. (1998), "Lean service: in defense of a production line approach", *International Journal of Service Industry Management*, Vol. 9 No. 3, pp. 207-25.

Brady, D. (2000), "Why service stinks", *Business Week*, October 23, pp. 118-28.

Carroll, J. (2004), "My dog ate your papers", *The Chronicle of Higher Education*, February 18.

Cassidy, J. (2002), "The greed cycle", *The New Yorker*, September 23, pp. 64-77.

Caux Round Table (2004), "Principles for business", available at: www.cauxroundtable.org/documents/PrinciplesforBusiness.doc (accessed February 3, 2004).

Center for Lean Business Management (2004), "Critique: Jefferson Pilot's lean initiative", available at: www.theclbm.com/jp.html (accessed April 17, 2004).

Clio, M. (2003), "Grading on my nerves", *The Chronicle of Higher Education*, Vol. 50 No. 13, p. C2.

Comm, C. and Mathaisel, M. (2003), "Less is more: a framework for a sustainable university", *International Journal of Sustainability in Higher Education*, Vol. 4 No. 4, pp. 314-23.

Dahlgaard, J. and Østergaard, P. (2000), "TQM and lean thinking in higher education", in Shina, M. (Ed.), *The Best on Quality*, Vol. 11, Quality Press/American Society for Quality, Milwaukee, WI, pp. 203-26.

Donaldson, L. (2002), "Damned by our own theories: contradictions between theories and management education", *Academy of Management Learning and Education*, Vol. 1 No. 1, pp. 96-106.

Doria, J., Rozanski, H. and Cohen, E. (2003), "What business needs from business schools", *Strategy+Business*, No. 32, pp. 38-45.

Emery, C., Kramer, T. and Tian, R. (2003), "Return to academic standards: a critique of studentevaluations of teaching effectiveness", *Quality Assurance in Education*, Vol. 11 No. 1, pp. 37-46.

Emiliani, M.L. (1998a), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-31.

Emiliani, M. (1998b), "Continuous personal improvement", *Journal of Workplace Learning*, Vol. 10 No. 1, pp. 29-38.

Emiliani, M.L. (2004a), "Is management education beneficial to society?", *Management Decision*, Vol. 42 No. 3/4, pp. 481-98.

Emiliani, M.L. (2004b), "Using kaizen to improve graduate business school degree programs", submitted for publication.

Emiliani, M.L. and Stec, D.J. (2004), "Improving your lean transformation", e-mail newsletter from superfactory.com, February, available at: www.superfactory.com/newsletter/newsletter0204.htm (accessed April 9, 2004).

Emiliani, M.L., Stec, D., Grasso, L. and Stodder, J. (2003), *Better Thinking, Better Results*, Center for Lean Business Management, Kensington, CT.

Etzioni, A. (2002), "When it comes to ethics, B-schools get an F", *The Washington Post*, August 4, p. B4.

Ford, H. (1988), *Today and Tomorrow: An Autobiography*, Special Reprint Edition, Productivity Press, Portland, OR.

Fujimoto, T. (1999), *The Evolution of a Manufacturing System at Toyota*, Oxford University Press, New York, NY, pp. 129-72.

Ghoshal, S. (2003), "Business schools share the blame for Enron", *Financial Times*, July 18.

Goland, A., Hall, J. and Devereaux, C. (1998), "First National Toyota", *The McKinsey Quarterly*, Vol. 4, pp. 59-66.

Handy, C. (2002), "What's a business for?", *Harvard Business Review*, Vol. 80 No. 12, pp. 49-55.

Hilt, D. (2001), "What students can teach professors: reading between the lines of evaluations", *The Chronicle of Higher Education*, Vol. 47 No. 27, p. B5.

Hoyt, D. and Lee, E.-J. (2002), *Disciplinary Differences in Student Ratings*, technical report no. 13, IDEA Center, Kansas State University, Manhattan, KS.

Hwarng, H. and Teo, C. (2001), "Translating customer's voices into operations requirements: a QFD application in higher education", *International Journal of Quality & Reliability Management*, Vol. 18 No. 2, pp. 195-225.

Imai, M. (1997), *Gemba Kaizen*, McGraw-Hill, New York, NY.

Individual Development and Educational Assessment Center (2004a), available at: www.idea.ksu.edu (accessed April 9, 2004).

Individual Development and Educational Assessment Center (2004b), "IDEA student ratings of instruction", available at: www.idea.ksu.edu/StudentRatings/index.html (accessed April 9, 2004).

Karapetrovic, S., Rajamani, D. and Willborn, W. (1999), "University, Inc.", *Quality Progress*, Vol. 32 No. 5, pp. 87-95.

Kay, P. (2004), "Being effective as a teacher: letter to the editor", *The Chronicle of Higher Education*, Vol. 50 No. 23, p. B18.

Kelly, M. (2001), *The Divine Right of Capital*, Berrett-Koehler, San Francisco, CA.

Kimoto, S. (1991), *Quest for the Dawn* (originally published in Japanese as *Yoake E No Chosen*), The Dougherty Company, Milwaukee, WI.

Lam, K. and Zhao, X. (1998), "An application of quality function deployment to improve the quality of teaching", *International Journal of Quality & Reliability Management*, Vol. 15 No. 4, pp. 389-413.

Lean Enterprise Institute (2003), "LSG sky chefs cater to new market realities", available at: www.lean.org/Lean/Community/Registered/SuccessStory.cfm?SuccessStoryId = 5

Locke, E. (2002), "The epistemological side of management: teaching through principles", *Academy of Management Learning and Education*, Vol. 1 No. 2, pp. 195-205.

Merritt, J. (2003), "What's an MBA really worth?", *Business Week*, September 22, pp. 90-102.

Minoura, T. (2002), "Address to the World Class Manufacturing Forum", available at: www.electronics-scotland.com/industry_comment/comment_item.cfm?itemID = 18 (accessed September 20, 2003).

Mintzberg, H., Simons, R. and Basu, K. (2002), "Beyond selfishness", *Sloan Management Review*, Vol. 44 No. 1, pp. 67-74.

Monden, Y. (1993), *The Toyota Management System*, Productivity Press, Portland, OR.

Morgan, D., Sneed, J. and Swinney, L. (2003), "Are student evaluations a valid measure of teaching effectiveness: perceptions of accounting faculty members and administrators", *Management Research News*, Vol. 26 No. 7, pp. 17-32.

Ohno, T. (1988), *The Toyota Production System*, Productivity Press, Portland, OR.

Pennsylvania State University (2004), "Tips for an effective syllabus", available at: http://tlt.its.psu.edu/suggestions/syllabus/ (accessed April 6, 2004).

Paul, R., Elder, L. and Bartell, T. (1996), "Study of 38 public universities and 28 private universities to determine faculty emphasis on critical thinking in instruction", available at: www.criticalthinking.org/schoolstudy.htm (accessed March 12, 2004).

Pfeffer, J. and Fong, C. (2002), "The end of business schools? Less success than meets the eye", *Academy of Management Learning and Education*, Vol. 1 No. 1, pp. 78-95.

Pitman, G., Motwani, J., Kumar, A. and Cheng, C. (1995), "QFD application in an educational setting: a pilot field study", *International Journal of Quality & Reliability Management*, Vol. 12 No. 6, pp. 63-72.

Polson, C. (1993), "Teaching adult students", IDEA paper no. 29, Center for Faculty Evaluation and Development, Kansas State University, Manhattan, KS.

Post, C. and Slaughter, J. (2000), "Lean production: why work is worse than ever, and what's the alternative?", Solidarity working paper, available at: www.solidarity.igc.org/LeanProduction.html (accessed September 15, 2003).

Roberts, P. and Tennant, C. (2003), "Application of the hoshin kanri methodology at a higher education establishment in the UK", *TQM Magazine*, Vol. 15 No. 2, pp. 82-7.

Rother, M. and Shook, J. (1999), *Learning to See*, Lean Enterprise Institute, Brookline, MA.

Smart, P., Tranfield, D., Deasley, P., Levene, R., Rowe, A. and Corley, J. (2003), "Integrating 'lean' and 'high reliability' thinking", *Journal of Engineering Manufacture*, Vol. 217 No. 5, pp. 733-9.

Sorenson, C. and Williamson, S. (1956), *My Forty Years With Ford*, W.W. Norton, New York, NY.

Shingo (2004), "Shingo Prize", College of Business, Utah State University, Logan, UT, available at: www.shingoprize.org/BusPrize/recipients/current.htm (accessed March 13, 2004).

Swank, C.K. (2003), "The lean service machine", *Harvard Business Review*, Vol. 81 No. 10, pp. 123-9.

Taylor, F.W. (1967), *The Principles of Scientific Management* (originally published in 1911 by Harper & Brothers, New York, NY), W.W. Norton, New York, NY.

Toyota (1988), *Toyota: A History of the First 50 Years*, Toyota Motor Corporation, Toyota City (Nagoya), pp. 15-77.

Toyota (2001), "The Toyota way", internal document, Toyota Motor Corporation, Toyota City (Nagoya).

University of Wisconsin-Madison (1993), "Uniform syllabus policy and recommended syllabus guidelines", available at: www.uwm.edu/Dept/Acad_Aff/policy/uniformsyllabus.html (accessed April 7, 2004).

Varnon, R. (2003), "Job cuts imminent at Stratford firm", *Connecticut Post*, May 13.

Wiklund, P. and Wiklund, H. (1999), "Student focused design and improvement of university courses", *Managing Service Quality*, Vol. 9 No. 6, pp. 434-43.

Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY.

Wysocki, B. (2004), "To fix health care, hospitals take tips from factory floor", *The Wall Street Journal Online*, 9 April.

Further reading

Emiliani, M.L. (2000), "Cracking the code of business", *Management Decision*, Vol. 38 No. 2, pp. 60-79.

Is management education beneficial to society?

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Abstract *This paper examines whether or not US-style management education is beneficial to society and presents a review of recent events, which suggest that management education must be improved. Two principal approaches to management education and resulting practice are presented and framed differently to better reflect and comprehend societal impacts. They are termed high waste and low waste, where waste is defined as activities and behaviors that do not add value and can be eliminated. High waste management practice, or conventional management, is what the majority business schools teach. Low waste management practice, rooted in the principles and practices of the Toyota Management System, is much less common in business school education. Proposes three improvements to management education that will deliver greater benefits to society while simultaneously promoting the interests of business.*

Introduction

US-style management education has come under much criticism in recent times due to the bursting of the economic bubble in the USA and discovery of misleading, unethical, or illegal business practices and behaviors by senior managers. Financial scandals have engulfed dozens of large US publicly-owned corporations including: Adelphia Communications, Bristol-Myers Squibb, Computer Associates, CitiGroup, Enron, Global Crossing, Merrill Lynch, Qwest Communications, Rite-Aid, Sunbeam, Tyco, Waste Management, WorldCom and Xerox. Many of the senior managers associated with the scandals possess undergraduate or graduate degrees in business (WSJ, 2002). Did management education play a role in creating the financial scandals, or was management education not a factor?

The prevailing wisdom among academics, business writers, and the investment community regarding the recent financial scandals consists of two main points. The first is: scandals were caused by a small number of people – a few "bad apples" – (i.e. senior managers, and related parties such as accountants, lawyers, and investment analysts); the majority senior managers behave ethically and within the bounds of the law.

The basis for this common claim is not substantiated, although the *prima facie* evidence in play appears to be the lack of federal investigations of the thousands of other publicly-owned companies. However, President Bush signed into law the Sarbanes-Oxley Act of 2002 "to protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes" (SOA, 2002). Included in the Act is a provision that requires the Chief executive officers (CEOs) and Chied Finance Offiers (CFOs) of companies publicly listed in the USA with revenues greater than US$1.2 billion – over 900 companies – to certify personally that the reports their companies file with the US

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Securities and Exchange Commission are both accurate and complete (SEC, 2002). The Act is an indication that the problem of inaccurate, incomplete, or misleading corporate financial disclosure and related matters is much more widespread than just the few companies or people under investigation.

Corporate financial scandals have cost employees, investors, and the federal government nearly US$200 billion by one estimate (AFV, 2002), not including the costs borne by suppliers and local governments. Federal intervention for the purpose of accounting reform and investor protection clearly demonstrates the important relationship between business activities and social well-being, and confirms the existence of severe deficiencies in current management practice. It also implies the existence of important deficiencies in management education.

The second point often expressed is: scandals are a "business ethics" problem which many view as correctable to a sufficient degree through better corporate governance processes, new corporate policies and ethics statements, audits and related compliance programs, as well as improved management education (Etzioni, 2002; Ghoshal, 2003; Hindo, 2002; Leavenworth and Fillo, 2002; Mangan, 2002; Merritt, 2003). In other words, Federal intervention is not needed because personal ethics cannot be legislated.

For management education, the classic debate is whether or not business ethics should be a stand alone course or embedded throughout the curriculum. The following viewpoint from a former Wharton MBA student is typical (Schoffer, 2002):

> Ethics courses; what a waste of University resources and student's time. A class or two in ethics will have no effect on someone predisposed to commit illegal acts or behave unethically. If someone cannot distinguish right from wrong by the time he enrolls in Wharton, the school can't do much about it.

It argues against standalone courses in ethics and implies that embedding ethics throughout a curriculum would also be of little value. It assumes that people are either good or bad, and discounts the process by which most people become ethically compromised (i.e. become "bad") – which can occur in many small, seemingly innocuous, steps over time. Distinguishing right from wrong may be simple when the wrong is stunningly obviously – situations that are clearly "black and white". However, in most cases, distinguishing right from wrong for each small step is often ambiguous and may be sustained by corporate politics that suppress dissent (Argyris, 1990) – until the wrong can no longer be contained. Ethics courses, as well as organizational behavior courses, attempt to create awareness of situations, often shades of gray, in which small problems can increase to become much bigger problems with undesirable consequences.

While likely informative and perhaps even useful to some, ethics courses in full-time MBA programs often come into conflict with other courses that either implicitly or explicitly promote business objectives that can create ethical problems for managers. For example, over the last three decades, finance courses have taught future managers to believe that the purpose of business is to "maximize shareholder value" (Jensen, 2000; Kelly, 2001; Mitchell, 2001; Rappaport, 1998). The original focus on long-term shareholder value maximization quickly gave way to short-term shareholder value maximization in management education (Aspen, 2002) and in actual business practice (Cassidy, 2002; Donaldson, 2002; Handy, 2002; Mintzberg *et al.*, 2002) to please ever more demanding institutional shareholders and Wall

Street investment analysts, as well as to enrich one's self through stock options (Fox, 2001; Loomis, 2001; Wolf, 2002).

So how do senior managers convert into practice their desire to maximize shareholder value quickly? The simplest way is to give one's self the unilateral right to make tradeoffs against other key stakeholders such as:

- employees (Ball, 2001; Barsky *et al.*, 1999; Berman, 2001; Girion and Douglass, 2001; Heinzl, 2001; Kaufman, 2001; Lubanko, 2002; McLaughlin, 2002; Okuda, 1999; Orey, 2002; Schultz, 2000; Thomasch, 2001);
- suppliers (Ball, 2001; Bartholomew, 2002; Chappell and Kachadourian, 2001; Hays and Kaufman, 2001; Kaufman, 2002; Kobe, 2001; Maremont and Berner, 1999; McCracken, 2001; Millman, 2002; Richards, 2000; Sherefkin, 2003);
- customers (Bartholomew, 2001; Beckett, 2001; Branch, 2002; Brannigan *et al.*, 2001; Brooks, 2002; Fritsch, 2002; Hafner, 2001; Kranhold, 2001; Mitchener, 2001; Oppel, 2002; Paltrow, 2001; Spencer, 2003; Wong, 2002; Zimmerman and Oster, 2002); and
- communities (Bandler and Maremont, 2001; Blumenthal, 2003; Dixon, 2002; Donnelly, 2002; Haar, 2001; Herrick, 2001; Johnston, 2002; Oppel, 2001; Simpson, 2002; Yardley, 2002);

Senior management simply reduces its costs at the expense of others: i.e. lay off employees (Okuda, 1999), squeeze suppliers' profit margins (Emiliani, 2003a; Emiliani and Stec, 2002), and close plants or offices. They will also try to maximize shareholder value in the short-term using other means such as share buy-backs, acquisitions, mergers, spin-offs, outsourcing, financial engineering, sales incentives (e.g. channel stuffing), offshore re-incorporation, online reverse auctions, etc. (Emiliani, 2000).

Remarkably, management sometimes spares no stakeholder in its quest to maximize shareholder value rapidly, including its own shareholders (Brown, 2002; Byrnes and Henry, 2001; Eichenwald, 2002; Elstrom, 2001; Frank and Sidel, 2002; Frank and Solomon, 2002; Gasparino, 2002; Harris, 2002; Henry, 2001; Kaufman, 2001; Leonhardt, 2002; Loomis, 2001; Maremont and Bandler, 2002; Martin, 2001; Martinez, 2002; Morgenson, 2001, 2003; Norris, 2001a; Romero, 2002; Sandberg and Pulliam, 2002; Spencer, 2003; Weil, 2001).

Using "corporate unilateralism" as a tool to manage a business is common even among companies not embroiled in financial scandals. However, it increases risk as companies that persistently tradeoff other stakeholders' interests to satisfy shareholder's interests typically under-perform (Berman and Blumstein, 2001; Bianco and Moore, 2001; Byrne, 1998; Connelly, 2001; Kaufman, 2001; Norris, 2001b). It should be obvious that management education has not been effective at instilling long-term thinking among senior managers, as well as related parties such as Wall Street investment analysts, large institutional shareholders, and corporate lawyers.

Returning to the view that the recent financial scandals are a "business ethics" problem, if the behaviors of senior managers engaged in are not ethical, then so too must the specific methods used to achieve that outcome. Thus, zero-sum practices that are designed to benefit only shareholders should become recognized as unethical business practices. CEOs who employ zero-sum games to maximize shareholder value

rapidly would thus not qualify as a source of ethical behavior for others to follow. Who, then, is a better model for ethical behavior?

In a speech on 9 July 2002, President Bush noted the role of business school education in promoting corporate responsibility (Bush, 2002):

> Our schools of business must be principled teachers of right and wrong, and not surrender to moral confusion and relativism.

This statement suggests that management education needs to be improved, and the way to do so is for all faculty members to more clearly differentiate between right and wrong. Business school faculty can teach right and wrong, but ultimately graduates have to put into practice what they learned in order for the teaching to have an impact in the "real world". The zero-sum games and other tricks used by senior managers to increase stock price remain commonplace, and so faculty must take a strong and visible position in their pedagogy disapproving of such practices. They should not confuse students, as when one course denounces such practices while other courses remain silent or even promote such practices. In short, faculty must find a common ground and remain consistent throughout the curriculum, and not tacitly or explicitly support zero-sum practices simply because they are commonly used by senior managers.

The ability of students to put what they have learned into practice depends upon the clarity and consistency of the theories, models, principles, and practices presented to them throughout the curriculum. A recent study suggests that business school education overall has not been very effective (Pfeffer and Fong, 2002). The education was not found to correlate with career success, and business school research was found to have little influence on management practice. Another work identified management theories that contradict one another or the key assumptions that form the foundation of management education (Donaldson, 2002). Perhaps because of the apparent ineffectiveness of management education, it is managers who have a larger impact on the practice of management than do its teachers. Importantly, this means that management education is actually taught by two sources: faculty in business or management schools and practicing managers (Skapinker, 2003).

It is against this backdrop that the question of whether or not management education is beneficial to society is examined. The point of view taken is that management education:

- must benefit society;
- is not as beneficial to society as it could be;
- can be significantly improved.

In order for management education to benefit society, it must result in, at minimum, the following outcomes:

- value creation, both financial and non-financial, for customers, employees, suppliers, investors, and communities;
- economic growth and improved competitiveness;
- improvement of the human condition, both individual and group; and
- balance between social and economic interests.

In general, current management education, regardless of the source, does not consistently deliver these results. Further, management education that contributes to undesirable business outcomes, such as financial scandals, surely does not benefit society (SOA, 2002). The aim of this paper is to show how management education can be improved to provide greater benefits to society while simultaneously promoting the interests of business.

Improving management education

In general, management education lacks a coherent framework for decision-making that all management practitioners can use. There is a difference of opinion regarding the purpose of business, which results in two main schools of thought and practice:

(1) pure or near-pure financial, i.e. shareholder value maximization; and

(2) socio-economic, i.e. balance of stakeholder interests.

Proponents of shareholder value maximization argue that this single-valued objective function is more effective at guiding management decision-making towards the ultimate end-objective (Jensen, 2000). While perhaps theoretically correct in an ideal world, recent events in the "real world" show this position has many serious shortcomings that are not beneficial to society (AFV, 2002; Cassidy, 2002; Handy, 2002; Kelly, 2001; Mintzberg *et al.*, 2002; Mitchell, 2001). Business is a human invention, and so business – buying and selling – cannot (yet) exist without humans. Therefore, business must necessarily contain a social or human component. The equation used to estimate shareholder value supports this point (Rappaport, 1998):

$$\text{Shareholder value} = \text{corporate value} - \text{debt}$$

where:

$$\text{Corporate value} = \text{present value of cash flow from operations during the forecast period} + \text{residual value} + \text{marketable securities}$$

and

$$\text{Cash flow} = \text{cash inflow} - \text{cash outflow}.$$

The key stakeholders in a business include: customers, employees, suppliers, investors, and communities. Examining the shareholder value equation reveals the following:

- shareholder value represents the investor;
- corporate value is determined largely by cash flow, the principal source of which is sales to customers; and
- debt, as expressed by current liabilities in the balance sheet, contains money owed to suppliers (accounts payable), employees (accrued expenses), and communities (income taxes payable).

Not surprisingly, all five key stakeholders are represented in the shareholder value equation, which proves their existence and thus recognizes business as a

socio-economic activity. As a result, shareholder value maximization (Friedman, 1970), or any other single-valued objective function that strongly favors one group's interest over all others, is not considered to be an appropriate vehicle for delivering management education that benefits society.

In contrast, proponents of business as a socio-economic entity argue that it is impossible to reduce business to a single market principle such as shareholder value maximization (Senge, 2000). In their view, the single objective function requires several unlikely attributes to be operative simultaneously in an ideal world. The business world cannot effectively sustain unrealistic or purely theoretical constructs based on ideal conditions. Therefore, the purpose of business is obviously socio-economic, which better reflects the reality that business is a human-centered activity, inclusive of the strengths and weaknesses of human thinking and behaviors. Consequently, this dual-valued objective function is considered to be a better vehicle for delivering management education that benefits society.

It would be wonderful if all that needed to be done in management education were to convince people that business is a human-centered activity and espouse the importance of balancing social and economic interests. However, this is clearly insufficient. Instead, there must be a foundation from which management theories, models, principles, and practices can be built upon and that reflect the true nature of business.

Three critical improvements can be incorporated into management education to achieve greater benefits to society while simultaneously improving the practice and performance of business, both financial and non-financial. They are:

(1) business principles;

(2) the concept of waste; and

(3) root cause analysis.

First improvement: business principles

The first improvement in management education would be to incorporate guiding principles that provide students and faculty with a clear representation of the fundamental nature of business. For this we can use the Caux Round Table *Principles for Business* (Caux, 2003). The *Principles* describe the role of the global business community in improving economic and social conditions through seven general principles (Table I) and six stakeholder principles (Table II).

Using the *Principles* as the foundation for *every* course would allow both faculty and students to discuss the merits of business theories, models, principles, and practices in relation to business goals, activities, and relationship between key stakeholders. This results in several benefits:

- a richer dialogue framed against a back-drop of management's responsibility to balance social and economic interests;
- the ability to distinguish between generative vs degenerate business theories and practices;
- recognize the important role that key stakeholders play in the functionality and also improving the overall effectiveness of business; and
- create ideas on how to leverage, rather than divide (i.e. tradeoff), the interests of key stakeholders.

Principle 1. The responsibilities of businesses: beyond shareholders toward stakeholders	The value of a business to society is the wealth and employment it creates and the marketable products and services it provides to consumers at a reasonable price commensurate with quality. To create such value, a business must maintain its own economic health and viability, but survival is not a sufficient goal. Businesses have a role to play in improving the lives of all their customers, employees, and shareholders by sharing with them the wealth they have created. Suppliers and competitors also should expect businesses to honor their obligations in a spirit of honesty and fairness. As responsible citizens of the local, national, regional and global communities in which they operate, businesses share a part in shaping the future of those communities
Principle 2. The economic and social impact of business: toward innovation, justice and world community	Businesses established in foreign countries to develop, produce or sell should also contribute to the social advancement of those countries by creating productive employment and helping to raise the purchasing power of their citizens. Businesses also should contribute to human rights, education, welfare, and vitalization of the countries in which they operate. Businesses should contribute to economic and social development not only in the countries in which they operate, but also in the world community at large, through effective and prudent use of resources, free and fair competition, and emphasis upon innovation in technology, production methods, marketing and communications
Principle 3. Business behavior: beyond the letter of law toward a spirit of trust	While accepting the legitimacy of trade secrets, businesses should recognize that sincerity, candor, truthfulness, the keeping of promises, and transparency contribute not only to their own credibility and stability but also to the smoothness and efficiency of business transactions, particularly on the international level
Principle 4. Respect for rules	To avoid trade frictions and to promote free trade, equal conditions for competition, and fair and equitable treatment for all participants, businesses should respect international and domestic rules. In addition, they should recognize that some behavior, although legal, may still have adverse consequences
Principle 5. Support for multilateral trade	Businesses should support the multilateral trade systems of the GATT/World Trade Organization and similar international agreements. They should cooperate in efforts to promote the progressive and judicious liberalization of trade and to relax those domestic measures that unreasonably hinder global commerce, while giving due respect to national policy objectives
Principle 6. Respect for the environment	A business should protect and, where possible, improve the environment, promote sustainable development, and prevent the wasteful use of natural resources
Principle 7. Avoidance of illicit operations	A business should not participate in or condone bribery, money laundering, or other corrupt practices: indeed, it should seek cooperation with others to eliminate them. It should not trade in arms or other materials used for terrorist activities, drug traffic or other organized crime

Table I.
Caux Round Table *Principles for Business*: general principles

Customers. We believe in treating all customers with dignity, irrespective of whether they purchase our products and services directly from us or otherwise acquire them in the market. We therefore have a responsibility to:

- provide our customers with the highest quality products and services consistent with their requirements;
- treat our customers fairly in all aspects of our business transactions, including a high level of service and remedies for their dissatisfaction;
- make every effort to ensure that the health and safety of our customers, as well as the quality of their environment, will be sustained or enhanced by our products and services;
- assure respect for human dignity in products offered, marketing, and advertising; and respect the integrity of the culture of our customers.

Employees. We believe in the dignity of every employee and in taking employee interests seriously. We therefore have a responsibility to:

- provide jobs and compensation that improve workers' living conditions;
- provide working conditions that respect each employee's health and dignity;
- be honest in communications with employees and open in sharing information, limited only by legal and competitive constraints;
- listen to and, where possible, act on employee suggestions, ideas, requests and complaints;
- engage in good faith negotiations when conflict arises;
- avoid discriminatory practices and guarantee equal treatment and opportunity in areas such as gender, age, race, and religion;
- promote in the business itself the employment of differently abled people in places of work where they can be genuinely useful;
- protect employees from avoidable injury and illness in the workplace;
- encourage and assist employees in developing relevant and transferable skills and knowledge; and
- be sensitive to the serious unemployment problems frequently associated with business decisions, and work with governments, employee groups, other agencies and each other in addressing these dislocations

Owners/investors. We believe in honoring the trust our investors place in us. We therefore have a responsibility to:

- apply professional and diligent management to secure a fair and competitive return on our owners' investment;
- disclose relevant information to owners/investors subject to legal requirements and competitive constraints;
- conserve, protect, and increase the owners/investors' assets; and
- respect owners/investors' requests, suggestions, complaints, and formal resolutions

Suppliers. Our relationship with suppliers and subcontractors must be based on mutual respect. We therefore have a responsibility to:

- seek fairness and truthfulness in all our activities, including pricing, licensing, and rights to sell;
- ensure that our business activities are free from coercion and unnecessary litigation;
- foster long-term stability in the supplier relationship in return for value, quality, competitiveness and reliability;
- share information with suppliers and integrate them into our planning processes;
- pay suppliers on time and in accordance with agreed terms of trade; and
- seek, encourage and prefer suppliers and subcontractors whose employment practices respect human dignity

Competitors. We believe that fair economic competition is one of the basic requirements for increasing the wealth of nations and ultimately for making possible the just distribution of goods and services. We therefore have a responsibility to:

(*continued*)

Table II.
Caux Round Table *Principles for Business*: stakeholder principles

- foster open markets for trade and investment;
- promote competitive behavior that is socially and environmentally beneficial and demonstrates mutual respect among competitors;
- refrain from either seeking or participating in questionable payments or favors to secure competitive advantages;
- respect both tangible and intellectual property rights; and
- refuse to acquire commercial information by dishonest or unethical means, such as industrial espionage

Communities. We believe that as global corporate citizens we can contribute to such forces of reform and human rights as are at work in the communities in which we operate. We therefore have a responsibility in those communities to:

- respect human rights and democratic institutions, and promote them wherever practicable;
- recognize government's legitimate obligation to the society at large and support public policies and practices that promote human development through harmonious relations between business and other segments of society;
- collaborate with those forces in the community dedicated to raising standards of health, education, workplace safety and economic well-being;
- promote and stimulate sustainable development and play a leading role in preserving and enhancing the physical environment and conserving the earth's resources;
- support peace, security, diversity and social integration;
- respect the integrity of local cultures; and
- be a good corporate citizen through charitable donations, educational and cultural contributions, and employee participation in community and civic affairs

Table II.

Second improvement: the concept of waste

Some companies practice a profoundly different type of management system rooted in the principles and practices created or developed by Toyota Motor Corporation (Basu, 1999; Dyer and Nobeoka, 2000; Emiliani, 1998a, b; Emiliani *et al.*, 2003; Fujimoto, 1999; Imai, 1997; Monden, 1993; Ohno, 1988; Toyota, 2001; Womack and Jones, 1996; Womack *et al.*, 1990). At its core, the "Thinking" (or "Lean") management system is focused on eliminating waste – activities and behaviors that do not add value and can be eliminated – and creating value for end-use customers. This is a profound difference in management philosophy and practice compared to companies that seek to literally "maximize shareholder value" or otherwise optimize their own position in the value stream at the expense of others (Emiliani, 2003b; Womack and Jones, 1996).

Figure 1 shows a key concept that operates in the minds of people who practice the "Thinking" management system (Emiliani, 2003b). The diagram on the left shows that there are two types of work: value-added and non-value added but necessary. The remainder is waste (Emiliani, 1998a; Ohno, 1988). Identify and remove the waste, and the response time for any process is dramatically reduced. This results in lower costs and improved customer satisfaction. However, most work activities, whether in the office or factory, are designed without this understanding in mind and therefore typically contain only 5-10 per cent value-added (Emiliani *et al.*, 2003). Remarkably, this is one of the outputs of conventional management education.

Figure 2 shows another key concept that mirrors Figure 1. Namely, there are human behaviors that add value and behaviors that are non-value added but

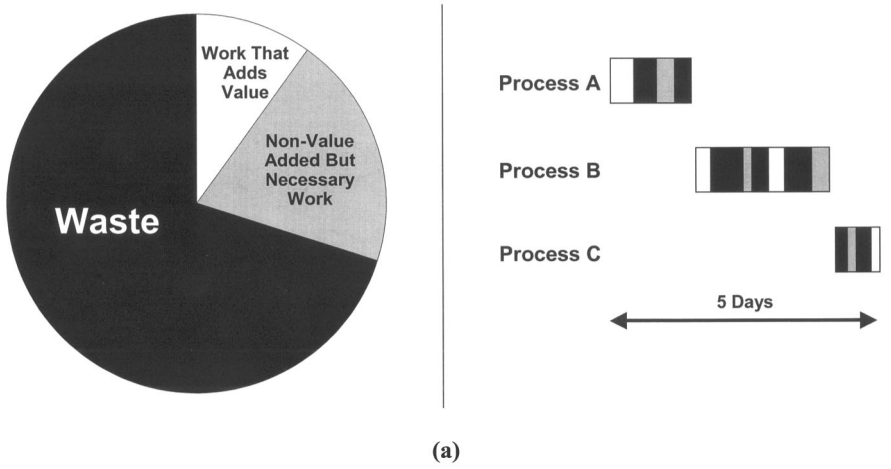

Figure 1.
Classical model representing the two types of work, value-added and non-value added but necessary, and waste

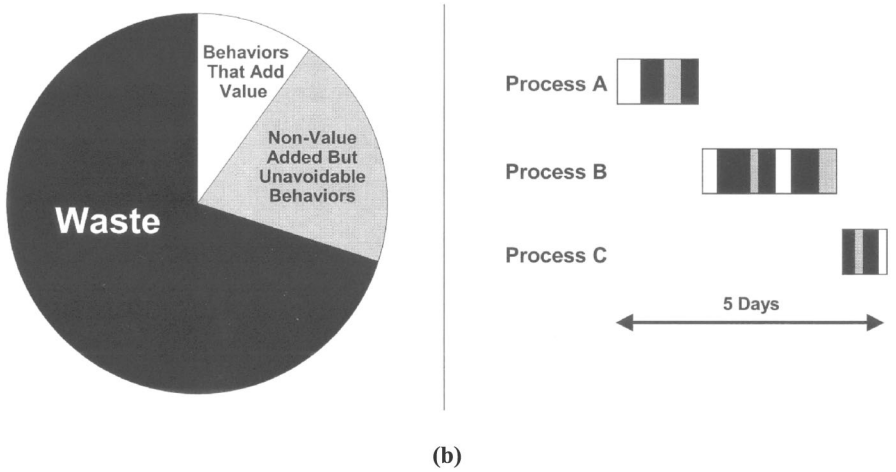

Figure 2.
Model extended to include human behaviors that add value, behaviors that do not add value but are unavoidable, and waste

unavoidable and perhaps even necessary in some cases (Emiliani, 1998a, b, 2000). The remainder is waste. Behaviors are part of any process to perform an activity. Wasteful behaviors lead to delays and rework, which result in higher costs and lower customer satisfaction. Conventional management education has had little or no impact in reducing wasteful office politics, turf wars, fear, and defensive routines (Argyris, 1990).

Instead, balance, mutual co-existence, co-prosperity, and harmony between social and economic interests are important principles that guide management decision-making, without losing sight of the importance of generating profits. "Corporate unilateralism" is not seen as an effective solution because it divides key stakeholders and forces people to act in their own self-interests. It is the last resort,

rather than first resort, to business problems. A central point is that "Thinking" businesses are managed in ways that reduce or eliminate conflict between people because it is viewed as waste (Emiliani, 1998a, 2003b; Emiliani *et al.*, 2003).

Management education that includes the concept of waste, as well as related processes such as *kaizen* (Japanese word meaning "continuous improvement") and its associated tools (Imai, 1997), would result in greater social and economic benefits if put into practice. Specific benefits associated with identifying and eliminating waste in both work activities and behaviors include (Emiliani, 2003b; Emiliani *et al.*, 2003):

- more valuable management competencies;
- minimizing or eliminating tradeoffs between key stakeholders;
- lower costs, higher quality, and speed to market;
- products and services that meet end-use customer needs;
- stable employment;
- improved financial and non-financial performance; and
- higher levels of satisfaction among key stakeholders.

Third improvement: root cause analysis

A fact of business is that people make mistakes. To reduce mistakes, some senior managers skilled in conventional management practice call for "flawless execution" or state "failure is not an option". While well intentioned, these statements usually result in people hiding mistakes for fear of being blamed. Requiring "flawless execution" in an environment that blames people and in the absence of processes to identify root causes – and concomitant rewards for doing so – will not result in any substantial reduction in errors.

In the "Thinking" management system, people are not blamed for mistakes, instead, the process is closely examined with the help of various tools to determine the root cause, and countermeasures are applied to avoid repeated mistakes. A "no blame" environment is essential for gaining employee participation and to obtain information to flow. Genuine improvement cannot be achieved if people are viewed as waste, when in fact it is business processes that contain waste.

Management educators, however, rarely use root cause analysis methods in class (Doria *et al.*, 2003). Instead, they often use case studies whose solution is indeterminate in the absence of root cause analysis. Should not they teach students how to avoid common management errors in addition to the theories, models, principles, and practices? There is a common bias among business educators, which suggests that root cause analysis should be used to solve only technical engineering or manufacturing problems. It is shortsighted and unrealistic to think that problems outside of engineering or manufacturing have no root cause. Those who do must believe that it is of no consequence to repeat mistakes over and over again. This position is clearly indefensible, as repeat problems can cause great distress to a business (Berman and Blumstein, 2001; Bianco and Moore, 2001; Byrne, 1998; Cassidy, 2002; Frank and Sidel, 2002; Harris, 2002; Kaufman, 2001; Maremont and Berner, 1999; Stecklow *et al.*, 2003).

Table III shows some of the common mistakes made by senior managers sorted by key stakeholder group, plus a general category that affects all stakeholders. For many of the mistakes listed, root cause analysis would reveal the cause to be related to shareholder value maximization or other local optimization routine, or dysfunctional individual and organizational behavior (i.e. office politics, defensive routines, fear, etc.) rooted in wasteful business practices and related business measurement systems (Emiliani, 2003b; Emiliani *et al.*, 2003).

Summary

Recent financial scandals indicate the need for improving US-style management education. As an important stakeholder in the practice of management, management educators must do much more than re-emphasize the business ethics component of

Stakeholder	Practice or behavior
Employees	Unfair pay
	Layoffs (elective)
	Cutting benefits
	Discrimination/harassment
	Unsafe workplace (physical or mental)
	Ignoring employee suggestions
Suppliers	Avoiding or cutting payments/debiting suppliers' accounts
	Squeezing suppliers margins
	Ignoring supplier suggestions
Customers	Channel stuffing
	Incomplete disclosure of terms of service
	Ignoring customers/customer complaints
	Profile-based pricing, non-uniform pricing, overcharging, extra fees
Investors	Money games: expense and revenue recognition, hiding debt, self-dealing
	Failure to respond to the competition
	Lack of new products or services
	Incomplete disclosure
Community	Plant closings
	Tax evasion/reincorporating offshore
	Damaging the environment
Competitors	Predatory pricing
	Antitrust violation
	False/misleading advertising
	Acquiring competitor's proprietary information
All	Power-based bargaining (win-lose)
	Not understanding the problem
	Blaming people
	Politicizing the workplace
	Conflicts of interest

Table III.
Common mistakes made by senior managers

Note: These are presented as mistakes because they are used as solutions in the absence of root cause analysis. They also divide key stakeholders and are often used to support management's efforts to achieve single-valued objective functions such as "maximize shareholder value" in the short term

management education. They must question the sensibility of delivering a learning experience that results in:

- ignorance of the existence of waste and a poor understanding of business process;
- the repetition of common errors that often threaten the existence of the business; and
- strongly favoring shareholder's interests above all other stakeholders' interests.

These outcomes require managers to behave unilaterally and force others to act in their own self-interest, which ultimately results in undesirable outcomes for all key stakeholders. Management practices that destroy financial and non-financial value are well known and should be de-emphasized or eliminated – yet recognize their potential usefulness for comparative purposes – while those that create value for end-use customers should become centerpieces of management education.

An important difference between conventional management practice that results from management education and the "Thinking" management system is awareness of the concept of waste. In the former, senior management is unaware of the existence of waste, and so the amount of waste in business processes is high. This leads to high variation in financial and non-financial performance. In the latter, senior managers and non-managers alike are acutely aware of the existence of waste, and therefore seek to eliminate waste using simple processes and tools (Emiliani *et al.*, 2003; Imai, 1997). This reduces variation in financial and non-financial performance and also reduces the amount of resources demanded by the corporation. Managers often say: "resources are scare". The truth is that waste is abundant.

Three improvements to management education are proposed that will deliver greater benefits to society while simultaneously promoting the interests of business. They are shown in Figure 3.

Achieving such a change will take time, as management educators must themselves first learn the features and benefits of the "Thinking" (i.e. lean) management system (Basu, 1999; Dyer and Nobeoka, 2000; Emiliani, 1998a, 2000, 2003b; Emiliani *et al.*, 2003; Monden, 1993; Ohno, 1988; Womack and Jones, 1996; Womack *et al.*, 1990) and not become trapped by misconceptions or other false impressions. Doing so will deliver a more valuable classroom experience that students will hopefully translate into future management practices that result in greater social and economic benefits.

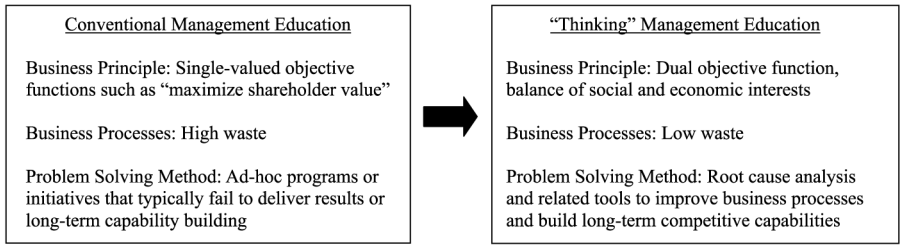

Figure 3.

References

AFV (2002), "The cost of corporate recklessness", American Family Voices, available at: www.americanfamilyvoices.org/pdf/costofcorporaterecklessnessreportfinal.pdf

Argyris, C. (1990), *Overcoming Organizational Defenses*, Allyn & Bacon, Boston, MA.

Aspen (2002), "Where will they lead? 2002 MBA student attitudes about business and society", in, The Aspen Institute, available at: http://www.aspeninstitute.org/Programt2.asp?bid = 947

Ball, J. (2001), "New Chrysler boss plans to cut jobs, squeeze suppliers in overhaul mission", *The Wall Street Journal Online*, 22 January.

Bandler, J. and Maremont, M. (2001), "How Xerox's plan to reduce taxes while boosting earnings backfired", *The Wall Street Journal Online*, 17 April.

Barsky, N., Hussein, M. and Jablonsky, S. (1999), "Shareholder and stakeholder value in corporate downsizing – the case of United Technologies Corporation", *Accounting, Auditing, and Accountability Journal*, Vol. 12 No. 5, pp. 583-604.

Bartholomew, D. (2001), "Co$t vs. quality", *IndustryWeek*, 29 August.

Bartholomew, D. (2002), "The big squeeze", *IndustryWeek*, 1 April.

Basu, S. (1999), *Corporate Purpose: Why it Matters More than Strategy*, Garland Publishing, New York, NY.

Beckett, P. (2001), "Citigroup agrees to a settlement in probe of associates first capital", *The Wall Street Journal Online*, 7 September.

Berman, D. (2001), "Corning announces $1 billion charge as it cuts 4,000 more jobs, idles plants", *The Wall Street Journal Online*, 4 October.

Berman, D. and Blumstein, R. (2001), "Behind Lucent's woes: push to meet higher revenue goal", *The Wall Street Journal Online*, 29 March.

Bianco, A. and Moore, P. (2001), "Downfall: the inside story of the management Fiasco at Xerox", *BusinessWeek*, pp. 82-92, 5 March.

Blumenthal, R. (2003), "As Levi's work is exported, stress stays home", *The New York Times on the Web*, 19 October.

Branch, S. (2002), "Waiters reveal tricks of the trade to raise the bottled-water pressure", *The Wall Street Journal Online*, 8 March.

Brannigan, M., Carey, S. and McCartney, S. (2001), "High fares, mediocre service cause business travelers to mount rebellion", *The Wall Street Journal Online*, 28 August.

Brooks, R. (2002), "Data reveal 'priority mail' is slower than first class", *The Wall Street Journal Online*, 29 May.

Brown, K. (2002), "Creative accounting: four areas to buff up a company's picture", *The Wall Street Journal Online*, 21 February.

Bush, G. (2002), "Remarks by the President on corporate responsibility", 9 July, available at: http://www.whitehouse.gov/news/releases/2002/07/20020709-4.html

Byrne, J.A. (1998), "How Al Dunlap self-destructed", *BusinessWeek*, 6 July, pp. 58-65.

Byrnes, N. and Henry, D. (2001), "Confused about earnings?", *BusinessWeek*, 26 November, pp. 77-84.

Cassidy, J. (2002), "The greed cycle", *The New Yorker*, 23 September, pp. 64-77.

Caux (2003), "Caux Round Table: *Principles for Business*", available at: www.cauxroundtable.org/documents/PrinciplesforBusiness.doc

Chappell, L. and Kachadourian, G. (2001), "DCX drags suppliers down rocky road", *Automotive News*, 13 August.

Connelly, M. (2001), "Ford's job 1: mending fences", *Automotive News*, 5 November.

Dixon, J. (2002), "Plant closings, slowdowns will wound entire cities", *Detroit Free Press*, 12 January.

Donaldson, L. (2002), "Damned by our own theories: contradictions between theories and management education", *Academy of Management Learning and Education*, Vol. 1 No. 1, pp. 96-106.

Donnelly, F. (2002), "GM's Desertion decimates flint", *The Detroit News*, 24 July.

Doria, J., Rozanski, H. and Cohen, E. (2003), "What business needs from business schools", *Strategy + Business*, No. 32, pp. 38-45.

Dyer, J. and Nobeoka, K. (2000), "Creating and managing a high performance knowledge-sharing network: the Toyota case", *Strategic Management Journal*, Vol. 21 No. 3, pp. 345-67.

Eichenwald, K. (2002), "Waste management executives are named in SEC accusation", *The New York Times on the Web*, 27 March.

Elstrom, P. (2001), "The great internet money game", *BusinessWeek e.biz*, 16 April, pp. EB16-EB24.

Emiliani, M.L. (1998a), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-31.

Emiliani, M.L. (1998b), "Continuous personal improvement", *Journal of Workplace Learning*, Vol. 10 No. 1, pp. 29-38.

Emiliani, M.L. (2000), "Cracking the code of business", *Management Decision*, Vol. 38 No. 2, pp. 60-79.

Emiliani, M.L. (2003a), "The inevitability of conflict between buyers and sellers", *Supply Chain Management: An International Journal*, Vol. 8 No. 2, pp. 107-15.

Emiliani, M.L. (2003b), "Linking leader's beliefs to their behaviors and competencies", *Management Decision*, Vol. 41 No. 9.

Emiliani, M. and Stec, D. (2002), "Squaring online reverse auctions with the Caux Round Table Principles for Business", *Supply Chain Management*, Vol. 7 No. 2, pp. 92-100.

Emiliani, M.L., Stec, D., Grasso, L. and Stodder, J. (2003), *Better Thinking, Better Results*, The CLBM, Kensington, CT.

Etzioni, A. (2002), "When it comes to ethics, B-schools get an F", *The Washington Post*, 4 August, p. B4.

Fox, J. (2001), "The amazing stock option sleight of hand", *Fortune*, Vol. 143 No. 6, pp. 86-92.

Frank, R. and Sidel, R. (2002), "Firms that lived by the deal are now sinking by the dozens", *The Wall Street Journal Online*, 6 June.

Frank, R. and Solomon, D. (2002), "Adelphia inflated subscriber data, kept two sets of accounting books", *The Wall Street Journal Online*, 7 June.

Friedman, M. (1970), "The social responsibility of business is to increase its profits", *The New York Times Magazine*, 13 September.

Fritsch, P. (2002), "Cemex thrives by selling cement to Mexico's poor a bag at a time", *The Wall Street Journal Online*, 22 April.

Fujimoto, T. (1999), *The Evolution of a Manufacturing System at Toyota*, Oxford University Press, New York, NY, pp. 85-222.

Gasparino, C. (2002), "Merrill will pay $100 million fine to settle New York's analyst probe", *The Wall Street Journal Online*, 22 May.

Ghoshal, S. (2003), "Business schools share the blame for Enron", *Financial Times*, 18 July.

Girion, L. and Douglass, E. (2001), "Layoffs go beyond fat, experts fear", *Los Angeles Times*, 8 August.

Haar, D. (2001), "Dear John: please take a civic role", *The Hartford Courant*, 7 September.

Hafner, K. (2001), "Bell companies blamed for D.S.L.' s woes", *The New York Times on the Web*, 6 August.

Handy, C. (2002), "What's a business For?", *Harvard Business Review*, Vol. 80 No. 12, pp. 49-55.

Harris, G. (2002), "Ex-executives tell how Bristol burnished its financial results", *The Wall Street Journal Online*, 12 December.

Hays, C. and Kaufman, L. (2001), "Some suppliers say Kmart has pressed for deals", *The New York Times on the Web*, 25 October.

Heinzl, M. (2001), "Nortel expects $3.6B loss for quarter, plans to cut about 20,000 more positions", *The Wall Street Journal Online*, 4 October.

Henry, D. (2001), "The numbers game", *BusinessWeek*, 14 May, pp. 100-10.

Herrick, T. (2001), "Exxon CEO Lee Raymond's stance on global warming causes a stir", *The Wall Street Journal Online*, 29 August.

Hindo, B. (2002), "Where can execs learn ethics?", *BusinessWeek*, 13 June.

Imai, M. (1997), *Gemba Kaizen*, McGraw-Hill, New York, NY.

Jensen, M. (2000), "Value maximization and the corporate objective function", in Beer, M. and Nohira, N. (Eds), *Breaking the Code of Change*, Harvard Business School Press, Boston, MA, pp. 37-57.

Johnston, D. (2002), "Senators assail corporate use of bermuda as tax shelter", *The New York Times on the Web*, 22 March.

Kaufman, L. (2001), "Questions of style in Warnaco's downfall", *The New York Times on the Web*, 6 May.

Kaufman, L. (2002), "For clothing makers, it's cut or be cut", *The New York Times on the Web*, 6 January.

Kelly, M. (2001), *The Divine Right of Capital*, Berrett-Koehler Publishers, San Francisco, CA.

Kobe, G. (2001), "Supplier squeeze", *Automotive Industries*, March.

Kranhold, K. (2001), "Former Sotheby's Chairman is found guilty of conspiring to fix client fees", *The Wall Street Journal Online*, 6 December.

Leavenworth, J. and Fillo, M. (2002), "Business classes taking care of ethics", *The Hartford Courant*, 12 July.

Leonhardt, D. (2002), "Tell the good news. Then cash in", *The New York Times on the Web*, 7 April.

Loomis, C. (2001), "This stuff is wrong", *Fortune*, Vol. 143 No. 6, pp. 73-84.

Lubanko, M. (2002), "Employees paying for CIGNA's mistakes", *The Hartford Courant*, 29 October.

McCracken, J. (2001), "Ford at bottom of suppliers' ranking", *Detroit Free Press*, 21 November.

McLaughlin, T. (2002), "No nickname, but Tyco CEO still swings a sharp axe", 21 February, Reuters.

Mangan, K. (2002), "The ethics of business schools", *The Chronicle of Higher Education*, Vol. 40 No. 9, p. A14.

Maremont, M. and Bandler, J. (2002), "Improperly booked revenue at Xerox exceeds SEC estimate", *The Wall Street Journal Online*, 28 June.

Maremont, M. and Berner, R. (1999), "Rite-Aid's large cash deductions irk suppliers at bill-paying time", *The Wall Street Journal Online*, 31 March.

Martin, P. (2001), "Shareholders start to pay for the past", *Financial Times*, 17 November.

Martinez, B. (2002), "Merck recorded $12.4 billion in revenue it never collected", *The Wall Street Journal Online*, 8 July.

Merritt, J. (2003), "Why ethics is also B-school business", *BusinessWeek*, pp. 105, 27 January.

Millman, J. (2002), "Lower labor costs in Mexico attract U.S. aerospace industry", *The Wall Street Journal Online*, 23 January.

Mintzberg, H., Simons, R. and Basu, K. (2002), "Beyond selfishness", *Sloan Management Review*, Vol. 44 No. 1, pp. 67-74.

Mitchell, L. (2001), *Corporate Irresponsibility*, Yale University Press, New Haven, CT.

Mitchener, B. (2001), "EU levies $755.1 million fine in vitamin price fixing case", *The Wall Street Journal Online*, 22 November.

Monden, Y. (1993), *The Toyota Management System*, Productivity Press, Portland, OR.

Morgenson, G. (2001), "Dispelling the myth that options help shareholders", *The New York Times on the Web*, 29 July.

Morgenson, G. (2003), "Shareholders will pick up the bill this time, too", *The New York Times on the Web*, 8 June.

Norris, F. (2001a), "S.E.C. accuses former sunbeam official of fraud", *The New York Times on the Web*, 16 May.

Norris, F. (2001b), "Did Ken Lay understand what was happening at Enron?", *The New York Times on the Web*, 16 November.

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Okuda, H. (1999), "Slashing payrolls shows executive incompetence", *Japan ECHO*, Vol. 26 No. 6, pp. 14-17.

Oppel, R. (2001), "Dallas Bleeds as job cuts hit is Tech Sector", *The New York Times on the Web*, 5 August.

Oppel, R. (2002), "How Enron got California to buy power it didn't need", *The New York Times on the Web*, 8 May.

Orey, M. (2002), "Lawsuits mount from workers looking to get overtime pay", *The Wall Street Journal Online*, 30 May.

Paltrow, S. (2001), "Old memos show in black and white MetLife's use of race to screen clients", *The Wall Street Journal Online*, 24 July.

Pfeffer, J. and Fong, C. (2002), "The end of business schools? Less success than meets the eye", *Academy of Management Learning and Education*, Vol. 1 No. 1, pp. 78-95.

Rappaport, A. (1998), *Creating Shareholder Value*, The Free Press, New York, NY.

Richards, B. (2000), "Dear supplier: this is going to hurt you more than it hurts me. . .", *Ecompany Now*, Vol. 1 No. 1, pp. 136-42.

Romero, S. (2002), "Qwest finds problem with $1.1 billion in transactions", *The New York Times on the Web*, 29 July.

Sandberg, J. and Pulliam, S. (2002), "WorldCom finds more errors: restatement will be $7.2 billion", *The Wall Street Journal Online*, 9 August.

Schoffer, D. (2002), "Online feedback on the story perspective: the ethics of business", *The Daily Pennsylvanian*, 22 October, available at: http://www.dailypennsylvanian.com/vnews/display.v/ART/2002/10/22/3db50a806b526

Schultz, E. (2000), "Companies quietly use mergers, spin-offs to cut worker benefits", *The Wall Street Journal Online*, 27 December.

SEC (2002), "File No. 4-460: order requiring the filing of sworn statements pursuant to Section 21(a)(1) of the securities exchange Act of 1934", Securities and Exchange Commission, 27 June, available at: www.sec.gov/rules/other/4-460.htm and http://www.sec.gov/rules/other/4-460a.htm

Senge, P. (2000), "The puzzles and paradoxes of how living companies create wealth", in Beer, M. and Nohira, N. (Eds), *Breaking the Code of Change*, Harvard Business School Press, Boston, MA, pp. 59-81.

Sherefkin, R. (2003), "GM: be the cheapest or be gone", *Automotive News*, 3 November.

Simpson, G. (2002), "A tax maneuver in delaware puts squeeze on other states", *The Wall Street Journal Online*, 9 August.

Skapinker, M. (2003), "Hotshots leave managers cold", *Financial Times*, 4 November.

SOA (2002), "Sarbanes-Oxley Act of 2002", 107th Congress of the United States of America, available at: http://news.findlaw.com/hdocs/docs/gwbush/sarbanesoxley072302.pdf

Spencer, J. (2003), "What part of 'cancel' don't you understand?", *The Wall Street Journal Online*, 12 November.

Stecklow, S., Ragharan, A. and Ball, D. (2003), "How a quest for rebates sent ahold on an odd buying spree", *The Wall Street Journal Online*, 6 March.

Thomasch, P. (2001), "CEOs slash jobs but not their pay", Reuters, 22 September.

Toyota (2001), "The Toyota way 2001", internal document, Toyota Motor Corporation, Toyota City, April.

Weil, J. (2001), "Enron's accounting violated accepted financial practices", *The Wall Street Journal Online*, 9 November.

Wolf, M. (2002), "A rescue plan for capitalism", *Financial Times*, 3 July.

Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon and Schuster, New York, NY.

Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY, pp. 139-68.

Wong, E. (2002), "Big airlines cut service and add fees", *The New York Times on the Web*, 29 August.

WSJ (2002), "High profiles in hot water", *The Wall Street Journal Online*, 28 June, available at: http://online.wsj.com/documents/profile-2002-06-28.htm

Yardley, J. (2002), "Corporate giant's fall takes toll on Houston", *The New York Times on the Web*, 14 January.

Zimmerman, R. and Oster, C. (2002), "Insurers' price wars contributed to doctors facing soaring costs", *The Wall Street Journal Online*, 24 June.

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Using value-stream maps to improve leadership

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Keywords *Leadership, Competences, Value chain*

Abstract *Presents for the first time how value-stream maps can be used to determine leadership beliefs, behaviors, and competencies. Current-state value-stream maps represent "conventional" management thinking and practices – what most business schools teach – while future-state maps represent progressive "lean" management thinking and practices rooted in the Toyota management system. Current- and future-state value-stream maps for manufacturing and service business processes are used to illustrate the progression from belief to behavior to competency. The beliefs, behaviors, and competencies of leaders skilled in these two modes of management thinking and practice are shown to be remarkably different, and constitute an alternative and simpler route for identifying leadership problems and improving leadership effectiveness.*

Introduction

Value-stream maps, originally called "material and information flow maps," are one-page diagrams depicting the process used to make a product (Womack and Jones, 1996; Rother and Shook, 1999). They were first developed by the Operations Management Consulting Division of Toyota Motor Corporation, Toyota City, Japan, in the late 1980s (Shook, 2003). Value-stream maps identify ways to get material and information to flow without interruption (Womack and Jones, 1996), improve productivity and competitiveness, and help people implement system rather than isolated process improvements. For over ten years, value-stream maps were applied principally to manufacturing activities.

More recently, however, value-stream maps have been used to understand the flow of material and information in office activities (Tapping and Shuker, 2003; Swank, 2003) such as order entry, new product development, and financial reporting. Indeed, they can be used to map any service business process, including business-to-business sales, retail sales, e-business, auditing, healthcare, education, and government services.

Value-stream maps help people see waste that exists in business processes, where waste is defined as an activity (Ohno, 1988) or behavior (Emiliani, 1998) that adds cost but does not add value. Eliminating waste focuses people's efforts on the value creating activities that customers desire and are willing to pay for, and results in improved business processes -, e.g. shorter lead-times, fewer defects and errors, and lower costs (Emiliani *et al.*, 2003; Swank, 2003). The classic seven wastes (Ohno, 1988), and an eighth waste more recently identified (Emiliani, 1998), are:

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(1) Overproduction: making more products than can be sold.
(2) Waiting: operators or machines waiting.
(3) Transportation: transporting parts.
(4) Processing: processing itself.
(5) Inventories: raw material, work-in-process, and finished goods.
(6) Moving: operator and machine movement.
(7) Defects: making defective products.
(8) Behaviors: behaviors that do not add value.

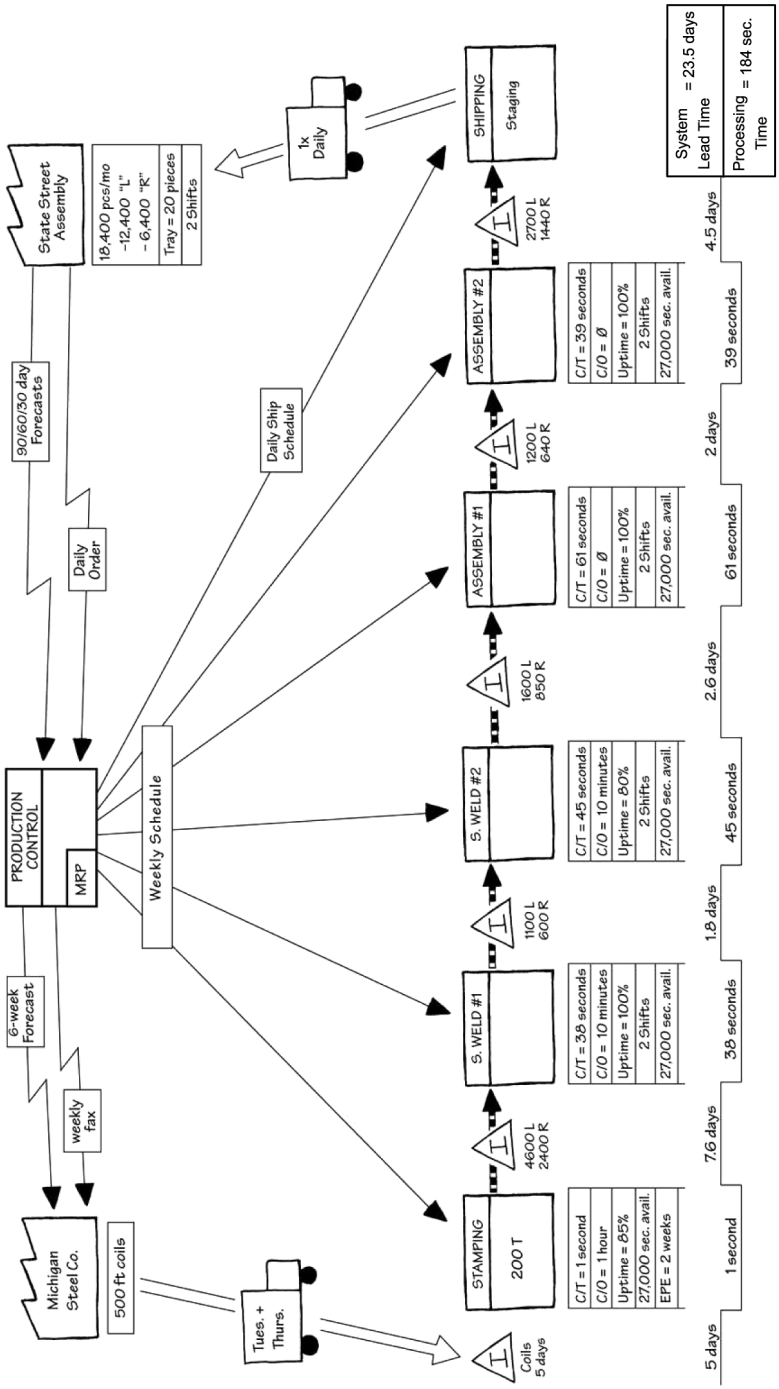
The same eight wastes exist in service businesses:

(1) Overproduction: doing work not requested by customers.
(2) Waiting: reviews and approvals.
(3) Transportation: transporting documents.
(4) Processing: processing itself.
(5) Inventories: data, work-in-process, and completed services.
(6) Moving: searching for information.
(7) Defects: errors in data or documents.
(8) Behaviors: behaviors that do not add value.

Value-stream maps are created by cross-functional teams of people who are directly involved in the process under consideration. There are two types of value-stream maps: "current state," shown in Figures 1 and 2, and "future state," shown in Figures 3 and 4. Figures 5 and 6 show some of the icons used to create value-stream maps. As the name implies, "current-state" value-stream maps depict the current way in which material and information are processed. Importantly, until a current-state map is drawn, people – including senior managers – are unaware of the large amount of waste that exists in a process as well as the existence of confusing information signals.

Senior managers often say or think, "We are not globally competitive," and usually attribute this to high labor costs (McDermott, 2002). Current-state value-stream maps show senior managers, in vivid detail, that the reasons for poor competitiveness are instead due to an abundance of the first seven types of waste listed above. While the current state was created by well-intentioned people at all levels of the organization trying to get work done the best way they know how, given the circumstances, it ultimately reflects a situation that maximizes the consumption of resources – human, financial, time, space, equipment, etc. It is therefore not surprising that many senior managers say, "We are not globally competitive."

Future-state value-stream maps depict a future condition that incorporates yet-to-be-made improvements. Team members, usually with the help of an experienced facilitator, identify the improvements by questioning current paradigms and thinking creatively about how to improve the process. Sometimes an "ideal state" value-stream map will be drawn to guide additional future continuous improvement activities. The team then presents the value-stream maps to senior management for review and approval.



Note: C/T = cycle time; C/O = change-over time; EPE = every part every ____

Source: Womack (2003)

Figure 1.
Current-state value-stream map showing the process for producing stamped and welded metal brackets

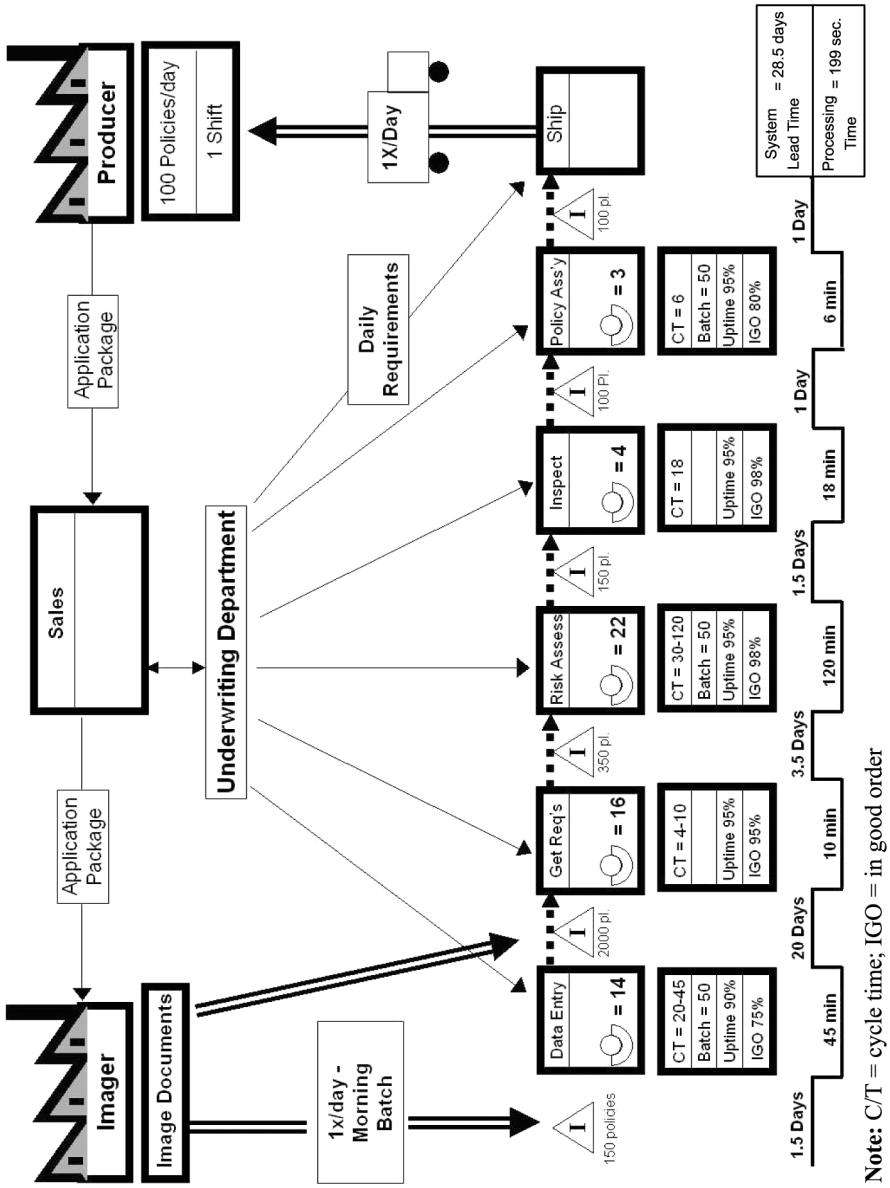
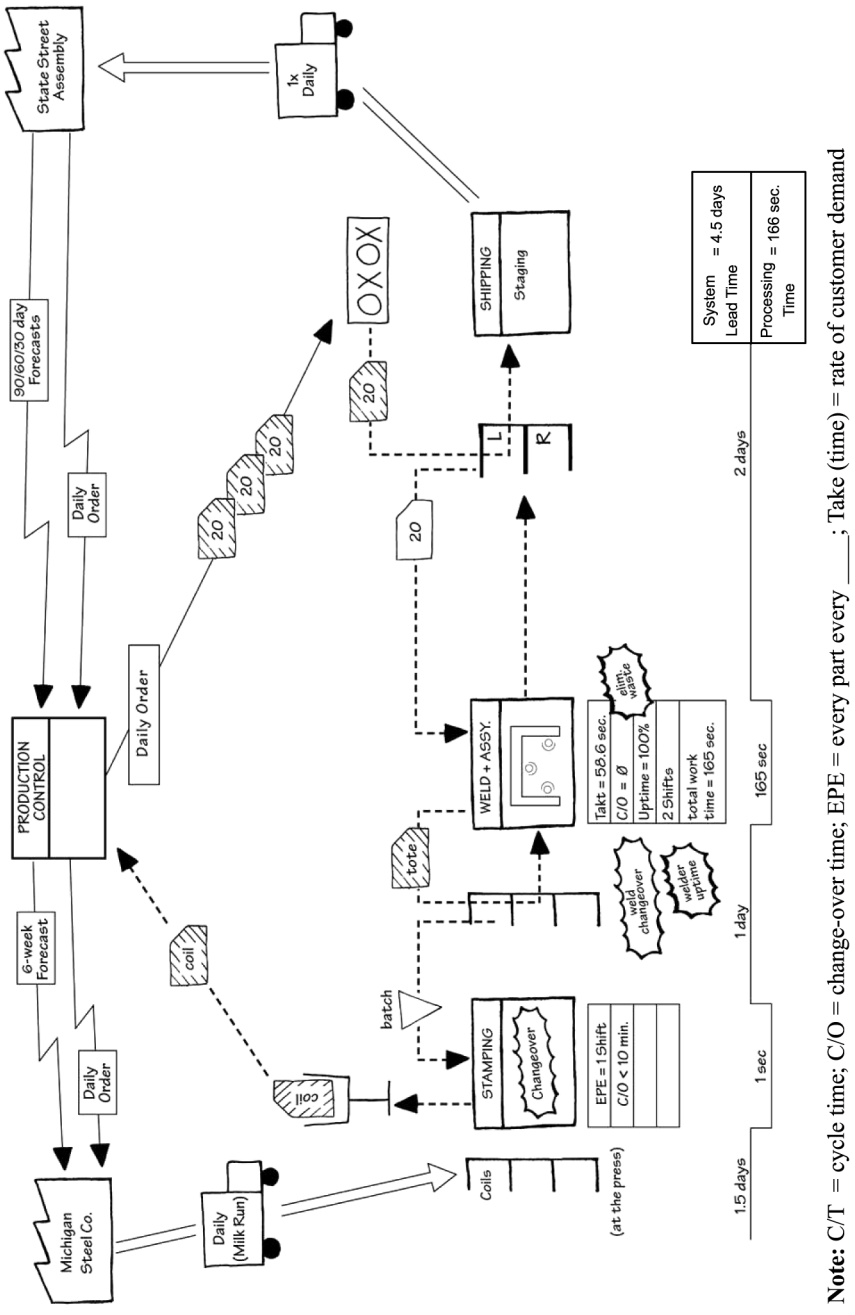


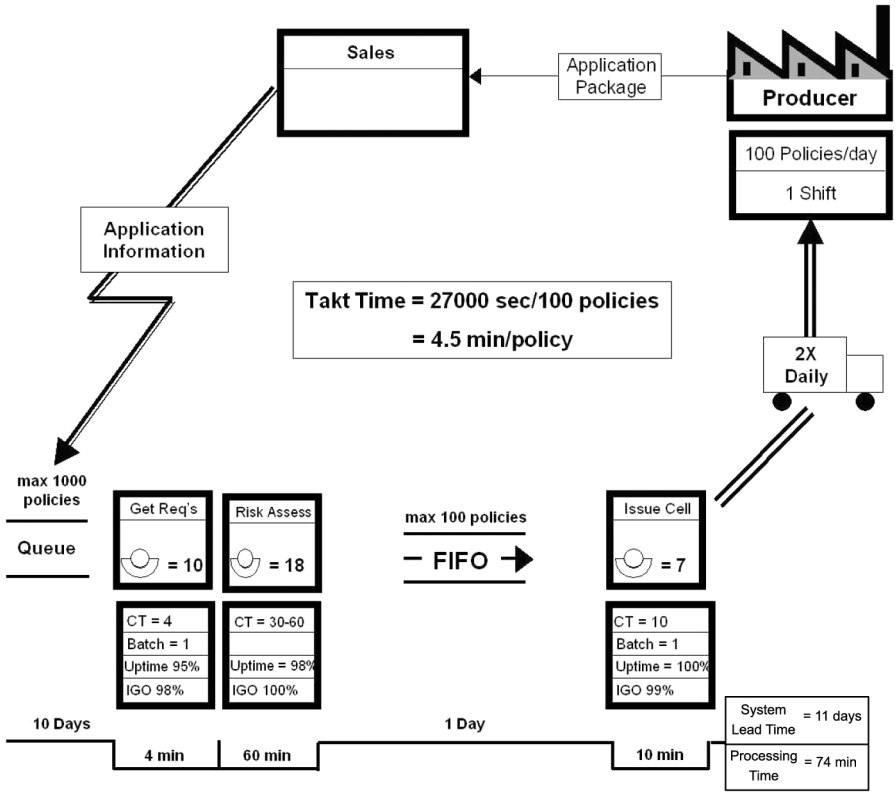
Figure 2.
Current-state value-stream map showing the process for producing an insurance policy



Note: C/T = cycle time; C/O = change-over time; EPE = every part every ____; Take (time) = rate of customer demand

Source: Womack (2003)

Figure 3.
Future-state value-stream map showing the process for producing stamped and welded metal brackets



Note: C/T = cycle time; IGO = in good order

Figure 4.
Future-state value-stream map showing the process for producing an insurance policy

In some cases, however, the team is not allowed to implement the future state because it requires simultaneous changes in several functional areas – changes that some members of the senior management team may be unwilling to make. This can be due to several factors, such as unwillingness to change, unfamiliarity with this improvement methodology, or incorrect perceptions that the proposed improvements will cost too much money or take too much time to implement. Thus, some senior managers will prefer traditional methods for meeting financial and non-financial objectives (Emiliani, 2000). Despite this occasional negative outcome, the use of value-stream maps has become very popular in the last six years. Many companies, both large and small, see them as a useful tool for guiding efforts to improve national or international competitiveness.

The use of value-stream maps has been extended to the field of accounting to determine the process costs of a value stream. The information contained in value-stream maps can be used to calculate current- and future-state process costs and create value-stream profit-and-loss statements (Maskell, 2001; LEI, 2003a; Maskell and Baggaley, 2003). This is a significant break from traditional cost accounting methods, and one that more accurately reflects the costs associated with production and non-production activities. Value-stream maps have also been used to determine the

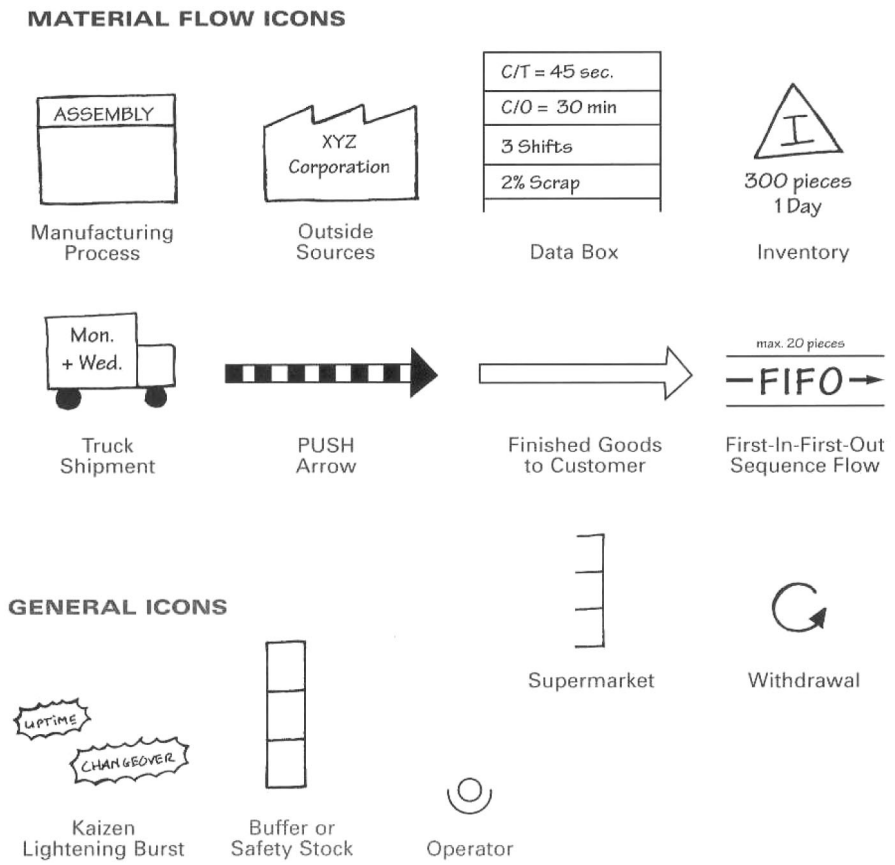


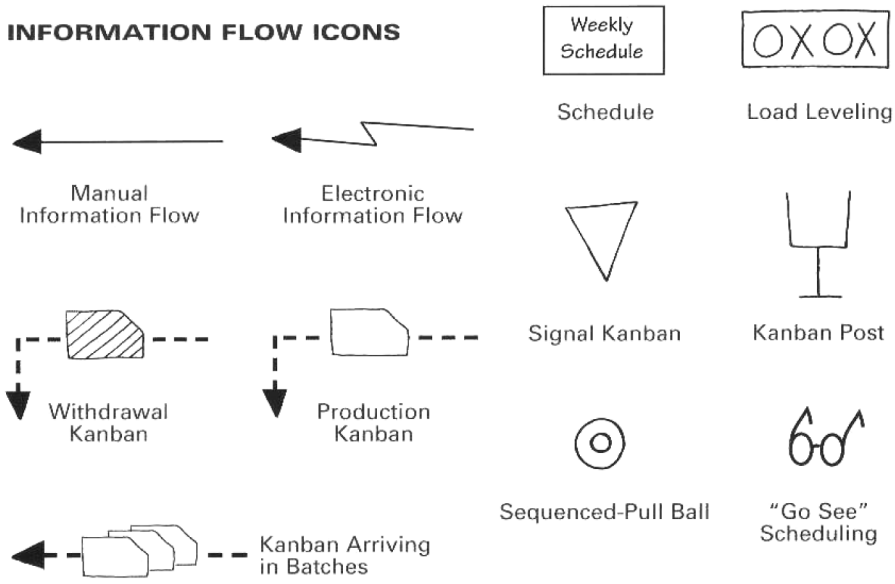
Figure 5.
Value-stream map: material-flow icons

Source: Rother and Shook (1999)

amount of CO_2 greenhouse gas generated by processing and transportation (Simons and Mason, 2003).

This paper further extends the use of value-stream maps to the field of leadership and organizational improvement. It uses value-stream maps to determine the beliefs, behaviors, and competencies of senior managers that support the current state, and compares them to senior managers that implement the future state. Importantly, value-stream maps can also be used to elucidate and characterize the existence of the eighth waste, behavioral waste, which is powerful in its ability to block the flow of information between key stakeholders such as employees, suppliers, customers, investors, and communities (Emiliani, 1998, 2000, 2003; Emiliani *et al.*, 2003).

This work contributes to the literature by presenting a novel route for identifying leadership problems and improving leadership effectiveness, as well as day-to-day management – independent of traditional leadership competency models (Lucia and Lepsinger, 1999; Cooper, 2000; Emiliani, 2003) or training programs rooted in complex industrial psychology or organizational behavior theories (Argyris, 1990; Goleman,



Source: Rother and Shook (1999)

Figure 6.
Value-stream map: information-flow icons

1998, Boyatzis *et al.*, 2002) – and is a useful method for recognizing and understanding the progression from leadership beliefs to behaviors to competencies.

Batch-and-queue compared to lean

Complete descriptions of conventional and lean management principles and practices have been presented in detail elsewhere (Monden, 1993, 1998; Womack and Jones, 1996; Fujimoto, 1999; Emiliani, 2000, 2003; Emiliani *et al.*, 2003). In a nutshell, most businesses, whether service or manufacturing, public or private, profit or non-profit, process materials and information according to conventional or "batch-and-queue" (B&Q) practices, i.e. processing large batches, which result in long queue times between operations. This has many serious deficiencies including (Womack and Jones, 1996; Bowen and Youngdahl, 1998; Goland *et al.*, 1998; Brady, 2000; Barron, 2000; Emiliani, 2000, 2004):

- long lead-times;
- low quality;
- high costs;
- low productivity;
- customer dissatisfaction; and
- conflict between stakeholders.

In addition, businesses that operate using conventional management practices typically focus on results, with little or no attention given to the processes that were

used to achieve the results. This means that good results are unlikely to be repeated, while poor results are likely to be encountered periodically. There is also an intense focus on local optimization, including the use of business metrics that may drive improvement in one area at the expense of other departments or metrics, which results in conflict between people as well as business objectives (Emiliani *et al.*, 2003).

Leaders support batch-and-queue material and information processing, despite many serious shortcomings, because they believe it is efficient or have been trained that way on-the-job or in school. In addition, there are usually financial and other long-established systems or practices in place that support batch-and-queue material and information processing.

A small but growing number of companies practice a different type of management, one rooted in the principles and practices of Toyota Motor Corporation's management system (Ohno, 1988; Womack *et al.*, 1990; Monden, 1993; Womack and Jones, 1996; Imai, 1997; Monden, 1998; Basu, 1999; Fujimoto, 1999; Emiliani *et al.*, 2003). At its core, the lean management system is focused on eliminating waste (called *muda* in Japanese), creating value for end-use customers, and getting material and information to flow without interruption. In other words, they view batch-and-queue processing, related metrics, and organizational routines as defective because they result in high costs, low quality, long lead-times, and slow response to changing customer needs.

Lean businesses have characteristics that are mostly the opposite of that found in conventionally managed businesses (Emiliani *et al.*, 2003). Material and information that flows has many benefits including (Nishiguchi, 1994; Womack and Jones, 1996; Fujimoto, 1999; Dyer and Nobeoka, 2000; Emiliani *et al.*, 2003):

- short lead-times;
- high quality;
- low cost;
- high productivity;
- superior financial and non-financial performance;
- improved time-based competitiveness;
- customer satisfaction;
- balance of stakeholders' interests; and
- conflict reduced or eliminated.

Lean businesses focus on the processes used by people to perform an activity, and separate value-added work from non-value added but necessary work and waste (Ohno, 1988). This helps ensure that favorable results can be easily repeated. If unfavorable results are encountered, then teams work to quickly discover the root cause of problems and apply countermeasures. The lean management system also focuses on improving the entire business system, rather than optimizing individual parts of the business. If an improvement is good only for one functional area but not good for the entire company or its customers, then the improvement is not undertaken (Toyota, 2001).

These and other factors result in favorable intra- and inter-organizational capability building – features largely absent in batch-and-queue businesses (Nishiguchi, 1994; Fujimoto, 1999; Dyer and Nobeoka, 2000; Emiliani *et al.*, 2003). Companies that practice

lean management well are formidable competitors in good economic times and usually outperform peer group companies in difficult economic times (Emiliani *et al.*, 2003).

Both batch-and-queue and lean management practices require leaders to believe in certain things. These beliefs drive behaviors that, over time, result in leadership competencies (Emiliani, 2003), i.e. specific skills, knowledge, or characteristics needed to perform a role effectively and to help a business meet its strategic objectives (Lucia and Lepsinger, 1999). However, while the context is normally positive, competencies may also be negative in nature and have been characterized as resulting in "skilled incompetence" (Argyris, 1986). Thus, a leader can possess "good" competencies or "bad" competencies – i.e. being good at doing things that result in bad outcomes (Emiliani, 2003).

Value-stream maps

Figure 1 shows the current-state value-stream map for a company producing stamped and welded metal brackets in left-hand and right-hand configurations. It includes the following information:

- customer requirements communicated electronically as 90/60/30 day forecasts and daily orders;
- production control calculates weekly requirements using material requirements planning (MRP) software system and delivers a print-out of schedule to each process;
- steel coil requirements communicated to supplier via weekly fax;
- steel coils delivered twice per week by supplier to meet five-day supply requirement;
- five discrete processing steps (stamping + 2weld + 2 assembly) are used to produce brackets;
- stamping machine change-over time = 1 hour;
- each operation produces uncontrolled quantities of work-in-process independent of one another due to multi-point scheduling;
- average machine uptime = 93 percent;
- completed brackets are shipped to the customer once per day;
- system lead-time = 23.5 days; and
- processing time = 184 seconds.

Among the most telling pieces of data is the long lead-time and short processing time. If every company in the metal bracket business has similar lead-times, and customers are indifferent to lead-time, then there is no reason to improve this measure despite the existence of waste. However, if competitive pressure exists to reduce lead-times, then the company depicted in the current-state value-stream map will have difficulty competing on that basis, and invariably suffer from high costs and poor quality as well.

Figure 3 shows the future-state value-stream map. It includes the following information:

- customer requirements communicated electronically as 90/60/30 day forecasts and daily orders;
- production control issues daily orders to shipping department using inexpensive *kanban* (i.e. work instruction) card system (Lu, 1989);
- steel coil requirements communicated to supplier daily via computer;
- steel coil delivered daily by supplier to a "supermarket" (i.e. controlled inventory used to schedule work at an upstream process (LEI, 2003b));
- two discrete processing steps: one stamping operation with machine change-over
- time < 10 minutes (Shingo, 1985), and combined welding and assembly operations;
- quantity of brackets produced limited to the size of the supermarkets;
- average machine uptime = 100 percent;
- completed brackets are shipped to the customer once per day;
- system lead-time = 4.5 days; and
- processing time = 166 seconds.

In this case, there is a large reduction in stamping machine change-over time and also the elimination of several queues by combining operations, which enables a much shorter system lead-time of 4.5 days (80 percent reduction). Operations have been combined resulting in 10 percent reduction in processing time, production is coordinated through the use of controlled inventories, and information is conveyed using simple *kanban* cards. The future state obviously represents a much more competitive position that the business and its customers will enjoy if leaders support implementation of the future state. In addition, it offers valuable new learning opportunities to both leaders and associates.

Figure 2 shows the current-state value-stream map for a company producing an insurance policy. It contains the following information:

- application documents pass from producer (i.e. insurance agent) to the insurer's sales department and then to an imaging company that scans the documents;
- imaged documents are electronically delivered once per day in the morning as a batch;
- five discrete steps (four processing and one inspection) are used to produce insurance policies;
- each process produces work independent of one another, dictated by multiple schedules communicated to each process by the underwriting department;
- uncontrolled amounts of work-in-process exist throughout the system, contributing to long and unstable queue times; processes are performed in batches of 50 units;
- 59 workers are needed to produce policies in this system;
- first pass yield = 55 percent (FPY is the product of each process' "in good order" (IGO) percent; i.e. FPY = 75 percent $\times$ 95 percent $\times$ 98 percent $\times$ 98 percent $\times$ 80 percent);
- average uptime of information systems = 94 percent;

- completed policies are shipped to producers once per day;
- system lead-time = 28.5 days; and
- maximum processing time = 199 minutes.

There are many similarities between the current-state value-stream map for producing an insurance policy and that shown in Figure 1 for producing a bracket. Long lead-times versus actual processing times, uncontrolled work-in-process, multiple scheduling points, and "push" processing are among the similarities. The current-state system design does not support a business strategy that competes on the basis of time, nor would it be a low cost design as costs would be higher due to the inherent complexity of the system.

Figure 3 shows the future-state value-stream map. It includes the following information:

- Application documents pass from producer to sales who then electronically inputs data directly into the queue for first process.
- Three discrete processing steps are used to process the application and generate an insurance policy. Previous discrete operations have been combined into work cells where work units are continuously flowed through the process area.
- Each process produces work in a first-in-first-out (FIFO) sequence once application packages are ready for processing. Single-unit flow processing (batch = 1) is employed.
- Controlled amounts of work-in-process exist in two locations in the system yielding a stable maximum system lead-time.
- 35 workers are needed to produce policies[1].
- First pass yield = 97 percent.
- Average uptime of information systems = 97.6 percent.
- Completed policies are shipped to producers twice per day.
- The demand rate (takt time) for policies is 4.5 minutes per policy.
- System lead-time = 11 days.
- Maximum processing time = 74 minutes.

Once again, there are many similarities between the future-state value-stream map for producing an insurance policy and that shown in Figure 3 for producing a bracket. Shorter lead-times and processing times, controlled work-in-process, a single scheduling point, and "pull" processing are among the similarities. The future-state system design now supports a business strategy that can compete on the basis of time, and will be a lower cost design higher due to simplification of the production system.

Beliefs, behaviors, and competencies

The beliefs, behaviors, and competencies exhibited by leaders ultimately manifest themselves in the ways that people at all levels in a business go about doing tasks and interacting with each other (Emiliani, 2003). Current-state value-stream maps reflect what people have been allowed to do, or not do, over time, and represent leadership's – and by extension, an organizations' – collective current best practice for satisfying customer requirements.

The current-state value-stream maps shown in Figures 1 and 2 depict a situation in which leaders believe that certain aspects of business either can not be changed or are too difficult to change, and thus not worth any effort – physical or mental – to challenge. They also typically believe that their business is complex, and thus complex systems are needed to support their products. However, there is a great deal of inefficiency and waste in the current system that left unrecognized and unchanged will inhibit overall system improvement.

Repetitive errors that people encounter are considered to be a normal part of everyday business, and the root causes of systemic problems go undetected. While people learn how to respond and improve within the context and constraints of the current state, there is no change in the underlying beliefs that would help drive people to change how they go about doing their day-to-day activities (Argyris, 2002). So when competitiveness wanes, leaders often quickly turn to outsourcing work as the solution – despite the fact they have not recognized the existence of waste or understand that the value-added portion of work is small.

Tables I and II show several beliefs that are immediately apparent from looking at the current-state value-stream maps shown in Figures 1 and 2, respectively, as well as related behaviors and competencies. These are not intended to be a comprehensive account of all operative beliefs, behaviors, and competencies among leaders responsible for the current state. Rather, they simply illustrate some of the obvious beliefs that are in play, which in turn lead to behaviors and competencies that form the basis of important future management decisions such as layoffs, plant closings, squeezing suppliers' profit margins, or outsourcing work. Additional beliefs, behaviors, and competencies exhibited by leaders skilled in conventional and lean management practice have been previously described (Emiliani, 2003).

The beliefs shown in Tables I and II result in three consistent leadership behaviors:

(1) don't question the process;

(2) ignore improvement opportunities; and

(3) encourage local process efficiencies.

If the leader does not question the process and ignores improvement opportunities, then followers are not likely to do so either. Instead they will, in most cases, prefer to avoid taking unnecessary personal or business risk. Hence the adage: "we park our brains at the door" when coming to work. Competencies such as "maintain the status quo" and "increase costs" erode competitiveness over time, causing leaders to seek unimaginative unilateral solutions to regain competitiveness such as layoffs, plant closings, squeezing suppliers' profit margins, or outsourcing work (Emiliani, 2000; Mintzberg *et al.*, 2002).

The competencies that result from these beliefs and behaviors are the opposite of that which sound business judgment or articulated business objectives would support. Senior managers must recognize that fundamental beliefs and practices drive dysfunctional behaviors and competencies. Without a change at this level, leadership behaviors and business practices are unlikely to result in favorable outcomes.

Further, current-state beliefs disable communication and the development of intra- and inter-organizational learning routines that could help improve competitiveness. Importantly, the beliefs exhibited result in wasteful leadership behaviors (Emiliani, 1998) and competencies that impede the flow of information between people (Emiliani,

Belief: something accepted as true	→	Behavior: conduct based upon beliefs	→	Competency: an established skill or capability
Many processing steps are needed Add additional steps if needed		Don't question the process Ignore improvement opportunities		Maintain the status quo Increase costs (current labor, material, space, and equipment expenses and future liabilities, e.g. pensions and healthcare) Increase lead-times
Two welding and two assembly operations are needed		Don't question the process Ignore improvement opportunities		Maintain the status quo Employ more people than are actually needed (i.e. over-hire) Increase costs (current labor, space, and equipment expenses and future liabilities, e.g. pensions and healthcare)
Need two shifts to meet customer demand		Don't question the process Ignore improvement opportunities		Maintain the status quo Over-hire Increase costs (current labor, space, and equipment expenses and future liabilities, e.g. pensions and healthcare)
Production control determines what to make, how much to make, when to make it		Don't question the process Communicate requirements to people at every operation		Cause confusion over what do make, how much to make, when to make it Increase costs (e.g. use of MRP software to calculate requirements) Create the need for constant "firefighting" Reward people who are good at responding to problems (i.e. firefighting)
Long lead-time is necessary and can't be reduced		Don't question cause of long lead-time Ignore improvement opportunities Ignore queues		Maintain the status quo Unresponsive to changing customer needs Manage work-in-process and finished goods inventories
Large amounts of work-in-process are needed to meet customer requirements Inventories are an asset		Don't question the process Ignore improvement opportunities		Overproduction Manage work-in-process and finished goods inventories Increase costs (space and equipment needed to manage inventories)
Stamping machine change-over time can not be reduced Unit cost reduced by increasing volume		Accept large batch production method Ignore improvement opportunities Reduce number of set-ups		Maintain the status quo Overproduction Increase costs Slow response to changes in customer demand (volume and mix)
Raw material unit cost reduced by increasing purchase volume Can't change steel coil supplier's delivery terms		Don't question the process Ignore improvement opportunities Maintain five-day supply of steel coil		Increase costs (raw material and overhead) Manage raw material inventories

(*continued*)

Table I.
Current-state leadership beliefs, behaviors, and competencies

Belief: something accepted as true	→	Behavior: conduct based upon beliefs	→	Competency: an established skill or capability
Processes do not need to be connected to each other; each produces at own pace		No effort made to connect individual processes		Manage raw material, work-in-process, and finished goods inventories Slow response to changes in customer demand
I don't have to worry about what's going on in the factory; other people will take care of that		Stay in office Spend the day in meetings Blame people when things go wrong		No understanding of value-added and waste Poor observation skills Focus on the people, not the process

Table I.

2003). This, coupled with complex and confusing business metrics, results in a distorted view of reality, organizational politics, and blaming people when errors occur (Emiliani *et al.*, 2003; Emiliani, 2003) – none of which benefit customers.

The future-state value-stream maps shown in Figures 3 and 4 depict a situation in which leaders believe that certain aspects of business can be changed and is not difficult to do so. People are now learning how to respond and improve outside of the context and constraints of the current state. The underlying leadership beliefs have changed, which helps drive people to change how they go about doing their day-to-day activities (Argyris, 2002).

Tables III and IV show the beliefs that are immediately apparent from looking at the future-state value-stream maps shown in Figures 3 and 4, respectively, as well as related behaviors and competencies. Again, these are not intended to be a comprehensive account of all operative beliefs, behaviors, and competencies among leaders responsible for the current state. Rather, they simply illustrate some of the obvious beliefs that are now in play, which in turn lead to behaviors and competencies that form the basis of important management decisions such as stabilizing employment, keeping offices open, improving supplier relationships through collaborative problem solving, or insourcing work (Womack and Jones, 1996; Emiliani *et al.*, 2003).

The beliefs shown in Tables III and IV are remarkably different than those shown in Tables I and II. They result in four consistent leadership behaviors:

(1) question the process;

(2) support improvement opportunities;

(3) encourage system improvement; and

(4) identifying and eliminating waste.

If the leader questions the process and supports improvement opportunities, then followers are likely to do so as well. People will accept risk and enjoy work more because they are able to use their brains in the workplace. Competencies such as "challenge the status quo" and "cost reduction" improve competitiveness over time, and cause leaders to seek imaginative multi-lateral solutions to further improve competitiveness (Womack *et al.*, 1990; Nishiguchi, 1994; Fujimoto, 1999; Emiliani, 2000, 2003; Toyota, 2001; Sonoda, 2002; Emiliani *et al.*, 2003; Swank, 2003).

Belief: something accepted as true	→	Behavior: conduct based upon beliefs	→	Competency: an established skill or capability
Many processing steps are needed Add additional steps if needed		Don't question the process Ignore improvement opportunities		Maintain the status quo Increase costs (current labor, material, space, and equipment expenses and future liabilities, e.g. pensions and healthcare) Increase lead-times
59 workers are needed Add more workers if needed		Don't question the process Ignore improvement opportunities		Maintain the status quo Employ more people than are actually needed (i.e. over-hire) Increase costs (current labor, space, and equipment expenses and future liabilities, e.g. pensions and healthcare)
Existing individual process quality levels are good enough – especially if IGO is > 90 percent		Don't seek to improve overall system Set individual process performance measures Ignore improvement opportunities		Maintain the status quo Encourage and reward local optimization
Underwriting department dictates schedule and priority to each individual process		Don't question the process Communicate requirements to people at every operation		Cause confusion over what do make, how much to make, when to make it Create the need for constant expediting Reward people who are good at responding to problems (i.e. firefighting)
Long lead-time is necessary and can't be reduced No value lost in waiting		Don't question cause of long lead-time Ignore improvement opportunities Ignore queues		Maintain the status quo Unresponsive to changing customer needs
Automation is more efficient		Spend capital without questioning process Add complexity to process		Overproduction Increase costs & complexity
Producing in batches is more efficient – achieve economies of scale		Focus on local efficiency of associate rather than on product flow Ignore queues as source of cost System designed for batches		Overproduction Increase costs (raw material and overhead) Buy and produce in large quantities
Product "push" generates more throughput		Release more units into system Ignore downstream process status		Overproduction Increase costs (raw material and overhead)

(*continued*)

Table II.
Current-state leadership beliefs, behaviors, and competencies

Belief: something accepted as true	→	Behavior: conduct based upon beliefs	→	Competency: an established skill or capability
Sum of individual process efficiencies yield overall system efficiency		Set dysfunctional individual process or department performance measures		Reward dysfunctional behavior Encourage local optimization
Processes do not need to be connected to each other; each produces at own pace		Set disconnected production rates Ignore actual customer demand rates		Overproduction Increase costs and complexity
Inspect quality into the product		Add inspection or quality control operations into the process Ignore root cause analysis		Increase costs and complexity Reward people who are good at responding to recurring problems
Single-skilled workers are more efficient		Group similar functions together Ignore cross-training		Local optimization Reward specialists

Table II.

The competencies that result from these beliefs and behaviors are aligned with the desired competencies that sound business judgment would support (Basu, 1999; Emiliani, 2003). Further, the beliefs enable communication and development of intra- and inter-organizational learning routines that help improve competitiveness. Importantly, the beliefs exhibited result in value-added leadership behaviors (Emiliani, 1998) and competencies that permit the flow of information between people (Emiliani, 2003). This, coupled with simpler business metrics, result in a more accurate view of reality, less organizational politics, and a focus on the process instead of blaming people when errors occur (Emiliani, 2003; Emiliani *et al.*, 2003) – all of which benefit end-use customers.

Improving leadership effectiveness

Current-state value-stream maps vividly illustrate serious shortcomings in conventional management thinking and practice. The efficacy of the business system, and its implications for current and future competitiveness are enormous, as the current state maximizes the consumption of resources and is not responsive to changes in customer demand. In contrast, the future state consumes much less resources and is more responsive to changes in customer demand.

However, while senior managers may recognize the opportunity and approve implementation of future states, their basic beliefs about business may remain unchanged. In other words, showing senior managers current- and future-state value-stream maps will not by its self change their beliefs and lead to improved leadership effectiveness. So the question is, how do you change leaders' fundamental business beliefs? First, let's examine how most senior managers respond to improvement opportunities.

In most cases, the CEO or president delegates the improvements specified by the future-state value-stream maps to one or more vice presidents, who in-turn delegate

Belief: something accepted as true	→	Behavior: conduct based upon beliefs	→	Competency: an established skill or capability
Can make brackets with fewer processing steps		Question the process Support improvement opportunities Identify value added work, non-value added but necessary work, and waste		Challenge the status quo Cost reduction (current labor, material, space, and equipment expenses and future liabilities, e.g. pensions and healthcare) Reduce lead-times
Welding and assembly operations can be combined		Question the process Support improvement opportunities Separate work from waste		Challenge the status quo Employ no more people than actually needed Cost reduction (current labor, space, and equipment expenses and future liabilities, e.g. pensions and healthcare)
Need two shifts at the current time; maybe can get to one shift using new ideas		Question the process Support improvement opportunities		Challenge the status quo Carefully hire people/re-deploy people to other value-adding activities Cost reduction (current labor, space, and equipment expenses and future liabilities, e.g. pensions and healthcare)
Customer determines what to make, how much to make, when to make it – and transmit the information using simple *kanban* cards		Question the process Listen to customers Communicate requirements to people at last operation		Clarify what do make, how much to make, when to make it Reduce costs (e.g. eliminate MRP software for daily execution) Reduce or eliminate expediting Reward people who are good at improving processes
Lead-time can be reduced Waste exists in every process		Question cause of long lead-time Support improvement opportunities Identify value added work, non-value added but necessary work, and waste		Challenge the status quo Responsive to changing customer needs Waste identification and elimination Time-based competitiveness
Don't need large amounts of work-in-process to meet customer requirements Inventories are waste		Question the process Support improvement opportunities		Cost reduction (less inventory; less space and equipment needed to manage inventories) Understands customer needs
Stamping machine change-over time can be reduced Short change-over times reduce unit cost		Accept small batch production method Support improvement opportunities Increase number of quick set-ups		Challenge the status quo Produce to customer demand Reduce costs Fast response to changes in customer demand (volume and mix)

(*continued*)

Table III.
Future-state leadership beliefs, behaviors, and competencies

Belief: something accepted as true	→	Behavior: conduct based upon beliefs	→	Competency: an established skill or capability
Steel coil supplier is a valuable resource that can better serve our needs		Question the process Support improvement opportunities		Cost reduction (raw material and overhead) Develop supplier relationships
Buy only what is needed when needed				
Processes need to be connected to each other; produce what is requested by downstream process		Support efforts to connect individual processes		Synchronize material and information flows Fast response to changes in customer demand
I have to understand what's going on in the factory to help ensure customer satisfaction		Visit the shop floor frequently Work with people to improve processes Blame the process when things go wrong		Understands value-added and waste Strong observation skills Focus on the process, not the people

Table III.

implementation to lower-level managers and associates. Doing this indicates that senior managers view themselves as having different roles to play. They may view "leadership" as different from "improvement," or feel that their role in improvement, as they understand it, is better achieved by other means (Emiliani, 2000). This will create conflicts between people at different levels of the organization due to the simultaneous deployment of competing approaches to "improvement."

For example, if the president approves implementation of the future state, yet eliminates excess workers as a result of process improvements, then he or she views both actions as favorable improvements. Outcomes that are good for the company matter most, while those that are bad for affected workers matter much less. Most presidents would view the layoffs as an appropriate action, but perhaps unfortunate. This negative, mixed-signal outcome is a common occurrence. While the president will take credit for creating value from a short-term financial perspective, these actions actually destroy both financial value and value as perceived by end-use customers over the long run because the people that helped create the future state are gone. The affected workers were using their brains at work, but now senior management has cast aside some of the people that helped create the improvement. Not only are those people unavailable for future improvements, this action undercuts the desire of the remaining people to participate in future improvement activities. As a result, the value stream will soon revert to the current state. Favorable results cannot be sustained because the president's beliefs did not change – in particular, his or her beliefs about people and the purpose of business (Basu, 1999; Mintzberg *et al.*, 2002; Handy, 2002).

Senior managers that practice lean correctly know that eliminating excess workers as a result of process improvements is inconsistent with lean principles and practices. As might be expected, a key lean principle is continuous improvement. But there is a second key principle: respect for people. "People" includes not just associates, but also customers, suppliers, investors, and the community (Toyota, 2001). Improvements

Belief: something accepted as true	→	Behavior: conduct based upon beliefs	→	Competency: an established skill or capability
Can produce policies with fewer processing steps and/or processes can be combined		Question the process Support improvement opportunities Identify value added work, non-value added but necessary work, and waste		Challenge the status quo Cost reduction (current labor, material, space, and equipment expenses and future liabilities, e.g. pensions and healthcare) Reduce lead-times
Work content dictates staffing requirements		Separate work from waste Question the process Support improvement opportunities		Challenge the status quo Employ no more people than actually needed Cost reduction (current labor, space, and equipment expenses and future liabilities, e.g. pensions and healthcare)
Multi-skilled workers are an asset Maximize worker utilization		Promote cross-training of workers Maximize worker utilization		Challenge the status quo Carefully hire people/re-deploy people to other value-adding activities Cost reduction (current labor, space, and equipment expenses and future liabilities, e.g. pensions and healthcare)
Customer determines production rate Process scheduled in FIFO sequence at one point		Listen to customers Schedule single point in system		Clarify what do make, how much to make, when to make it Reduce costs (e.g. eliminate multiple scheduling points and expediting) Reward people who are good at improving processes
Lead-time can be reduced Waste exists in every process		Question cause of long lead-time Support improvement opportunities Identify value added work, non-value added but necessary work, and waste		Challenge the status quo Responsive to changing customer needs Time-based competitiveness Waste identification and elimination
Continuous flow production is efficient Ideal lot size = 1		Accept small batch production method Support improvement opportunities Identify and eliminate sources of queueing		Challenge the status quo Produce and respond to customer demand (volume and mix) Develop eyes for flow
Quality is the priority Build quality into processes		Identify and reduce sources of variability Improve system first pass yield Mistake proof processes		Root cause analysis Reduce costs (e.g. variability reduction) Mistake-proofing

(*continued*)

Table IV.
Future-state leadership beliefs, behaviors, and competencies

Belief: something accepted as true	→	Behavior: conduct based upon beliefs	→	Competency: an established skill or capability
Simplicity is the key to low cost		Identify and remove waste Question the process Simplify material and information flow paths		Challenge the status quo Cost reduction (current labor, material, space, and equipment expenses) Reduce overhead
Sum of local optima does not equal system optimum		Align and set system-wide performance measures Connect and align processes		Organizational alignment System thinking
Controlled inventory yields stable lead-times		Cap work-in-process inventory (i.e. pull/FIFO)		Cost reduction (inventory and materials management) Lead-time reduction and stabilization
Processes need to be connected; produce only when requested by downstream process		Support efforts to connect processes Establish unambiguous connections		Synchronize material and information flows Clear (i.e. low distortion) information flow

Table IV.

must benefit each of these key stakeholders, which helps gain their involvement and thus improves long-term competitiveness. Senior managers view associates as valuable resources with vast amounts of creative potential, and not as disposable assets.

In addition, lean managers understand that a key component of corporate purpose must be to balance both social (i.e. human) and economic objectives (Basu, 1999; Toyota, 2001). Not achieving balance increases costs and creates unwanted conflicts. Paradoxically, balancing social and economic results in better outcomes for investors if it is done correctly (Emiliani *et al.*, 2003), compared to the common financial-results-at-all-costs approach to management (Kelly, 2001; Mitchell, 2001; Handy, 2002; Mintzberg *et al.*, 2002) – which typically leads to poor long-term financial results. This is not surprising given that most conventionally managed businesses are run in the absence of well-defined principles and balanced corporate purpose.

So how do senior managers gain the beliefs shown in Tables III and IV? They do it simply through direct participation in, and later leading, improvement activities (Toyota, 2001; Emiliani *et al.*, 2003). They understand that improvement is part of leadership – not separate from it, and that that improvement activities cannot be completely delegated to others. It is these first-hand experiences that teach senior managers to see waste and understand value as perceived by end-use customers. On-the-job training – action learning – quickly helps them understand the two key principles, continuous improvement and respect for people, and how these interact with each other, and demonstrates the sensibility of balancing social and economic objectives. Facilitated correctly, continuous improvement activities are fun and memorable life-altering experiences that quickly change people's beliefs about business, people, and processes. From this springs new behaviors and competencies that lead to better outcomes.

The lean management system has clear advantages over conventional management practice with regards to financial and non-financial performance, resource allocation and utilization, human resource development, competitiveness, and customer satisfaction (Emiliani *et al.*, 2003). Decision making in conventional management practice is typically ad-hoc, and thus improvements are difficult to implement and sustain. The reason is because important features are missing from conventional business practice, e.g. the concept of value-added work, non-value added but necessary work, waste, and end-use customers; two key principles, continuous improvement and respect for people; and corporate purpose that balances social and economic objectives. Lean managers use these as guides for decision-making, and doing so requires them to think[2].

Improving leadership effectiveness starts with the creation of new beliefs. In conventional management practice, no mechanism is available to do this consistently across an organization. While leadership training programs based on organizational behavior theories or competency models may be helpful to some (Argyris, 1990; Goleman, 1998; Lucia and Lepsinger, 1999; Cooper, 2000; Boyatzis *et al.*, 2002), they do not address the fundamental beliefs that senior managers possess about business, people, and processes (Emiliani, 2003). Lean practitioners know the only way to do that is through direct participation in fast-cycle continuous improvement activities. In other words, seeing is believing.

Summary

This paper described the use of value-stream maps for determining the beliefs, behaviors, and competencies possessed by business leaders. Examples of current- and future-state value-stream maps were provided for both manufacturing and service business processes. The current-state value-stream maps depict customer fulfillment processes that consume large amounts of resources, while the future-state value-stream maps depict customer fulfillment processes that consume much less resources. The difference between current and future states highlights the ineffectiveness of most senior managers as well as traditional leadership development programs.

Value-stream maps reveal the fundamental beliefs possessed by senior managers, which in turn lead to behaviors and competencies that directly impact financial and non-financial performance, resource allocation and utilization, human resource development, competitiveness, and customer satisfaction. They can be used as diagnostic tools to identify leadership problems and pathways for improving leadership effectiveness. Current- and future-state value-stream maps are simple, high-impact, one-page illustrations whose significance relative to business performance can be easily grasped by senior managers. This stands in contrast to abstract leadership development models and training programs based upon organizational behavior theories or competency models that do not directly relate to actual business processes.

However, the maps alone are not usually sufficient to get senior managers to change their fundamental beliefs about business, people, and processes. Too often, the missing ingredients are senior management participation in the improvements specified by the value-stream maps and the absence of guiding business concepts, principles, and corporate purpose rooted in balancing social and economic objectives. Further, it is not customary for senior managers skilled in conventional management practice to

directly participate in continuous improvement activities. As a result, they do not obtain the first-hand experiences that are needed to form new beliefs and thus improve leadership effectiveness. Conversely, the lean management system, practiced correctly, requires periodic direct participation by senior managers. This results in the formation of new beliefs, which drive the development of new behaviors and competencies over time that are much better aligned with desired business outcomes, both stated and inferred.

Notes

1. The correct practice of lean requires senior management to re-deploy the people made available through process improvement to other parts of the business. It is a gross violation of lean principles to lay people off as a result of improvement activities. True lean managers recognize that employees should not suffer due to management's prior inability to see waste. To better understand human resource policy and practice in a lean business, see Emiliani *et al.* (2003).
2. A better name for the "lean management system" would be the "thinking management system," because it more accurately describes the basic requirement for all leaders, managers, and associates. But even that name does not capture the full scope of what people actually do, which can be expressed as the cycle: think-do-evaluate-improve.

References

Argyris, C. (1986), "Skilled incompetence", *Harvard Business Review*, September/October, pp. 74-9.

Argyris, C. (1990), *Overcoming Organizational Defenses*, Allyn and Bacon, Boston, MA.

Argyris, C. (2002), "Double-loop learning, teaching, and research", *Academy of Management Learning and Education*, Vol. 1 No. 2, pp. 206-18.

Barron, K. (2000), "Hurry up and wait", *Forbes*, 16 October, pp. 158-64.

Basu, S. (1999), *Corporate Purpose: Why It Matters More than Strategy*, Garland Publishing, New York, NY.

Bowen, D. and Youngdahl, W. (1998), "Lean service: in defense of a production line approach", *International Journal of Service Industry Management*, Vol. 9 No. 3, pp. 207-25.

Boyatzis, R., Stubbs, E. and Taylor, S. (2002), "Learning cognitive and emotional and emotional intelligence competencies through graduate management education", *Academy of Management Learning and Education*, Vol. 1 No. 2, pp. 150-62.

Brady, D. (2000), "Why service stinks", *BusinessWeek*, 23 October, pp. 118-28.

Cooper, K. (2000), *Effective Competency Modeling and Reporting*, AMACOM, New York, NY.

Dyer, J. and Nobeoka, K. (2000), "Creating and managing a high-performance knowledge sharing network: the Toyota case", *Strategic Management Journal*, Vol. 21, pp. 345-67.

Emiliani, B., Stec, D., Grasso, L. and Stodder, J. (2003), *Better Thinking, Better Results*, The Center for Lean Business Management, Kensington, CT.

Emiliani, M.L. (1998), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-31.

Emiliani, M.L. (2000), "Cracking the code of business", *Management Decision*, Vol. 38 No. 2, pp. 60-79.

Emiliani, M.L. (2003), "Linking leaders' beliefs to their behaviors and competencies", *Management Decision*, Vol. 41 No. 9, pp. 893-910.

Emiliani, M.L. (2004), "Improving business school courses by applying lean principles and practices", submitted for publication.

Fujimoto, T. (1999), *The Evolution of a Manufacturing System at Toyota*, Oxford University Press, New York, NY, pp. 85-222.

Goland, A., Hall, J. and Devereaux, C. (1998), "First national Toyota", *The McKinsey Quarterly*, No. 4, pp. 59-66.

Goleman, D. (1998), *Working with Emotional Intelligence*, Bantam Books, New York, NY.

Handy, C. (2002), "What's a business for?", *Harvard Business Review*, Vol. 80 No. 12, pp. 49-55.

Imai, M. (1997), *Gemba Kaizen*, McGraw-Hill, New York, NY.

Kelly, M. (2001), *The Divine Right of Capital*, Berrett-Koehler Publishers, San Francisco, CA.

LEI (2003a), "Creating the course and tools for a lean accounting system", Lean Enterprise Institute, Brookline, MA, 25 June, available at: www.lean.org/Lean/Community/Resources/SuccessStories.cfm

LEI (2003b), *Lean Lexicon*, Lean Enterprise Institute, Brookline, MA.

Lu, D. (1989), *Kanban: Just-In-Time at Toyota*, Productivity Press, Portland, OR.

Lucia, A. and Lepsinger, R. (1999), *The Art and Science of Competency Models*, Jossey-Bass/Pfeiffer, San Francisco, CA.

McDermott, M. (2002), "Outsourcing: the path to achieving business transformation goals (CEO survey report)", *Chief Executive*, November, available at: www.chiefexecutive.net/pdfs/spherion.pdf

Maskell, B. (2001), "Costing the value stream", Lean Enterprise Institute Value Stream Management Summit, Orlando, FL, 19 March.

Maskell, B. and Baggaley, B. (2003), *Practical Lean Accounting*, Productivity Press, New York, NY.

Mintzberg, H., Simons, R. and Basu, K. (2002), "Beyond selfishness", *Sloan Management Review*, Vol. 44 No. 1, pp. 67-74.

Mitchell, L. (2001), *Corporate Irresponsibility*, Yale University Press, New Haven, CT.

Monden, Y. (1993), *Toyota Management System*, Productivity Press, Portland, OR.

Monden, Y. (1998), *Toyota Production System*, Engineering and Management Press, Norcross, GA.

Nishiguchi, T. (1994), *Strategic Industrial Sourcing*, Oxford University Press, New York, NY.

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Rother, M. and Shook, J. (1999), *Learning to See*, Lean Enterprise Institute, Boston, MA.

Shingo, S. (1985), *A Revolution in Manufacturing: The SMED System*, Productivity Press, Portland, OR, pp. 5-31.

Shook, J. (2003), personal communication, July.

Simons, D. and Mason, R. (2003), "Lean and green: doing more with less", *ECR Journal*, Vol. 3 No. 1, pp. 84-91.

Sonoda, T. (2002), "Honda: global manufacturing and competitiveness", *Competitiveness Review*, Vol. 12 No. 1, pp. 7-13.

Swank, C. (2003), "The lean service machine", *Harvard Business Review*, Vol. 81 No. 10, pp. 123-9.

Tapping, D. and Shuker, T. (2003), *Value Stream Management for the Lean Office*, Productivity Press, New York, NY.

Toyota (2001), "The Toyota way 2001", internal document, Toyota Motor Corporation, Toyota City, April.

Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY, pp. 139-68.

Using *kaizen* to improve graduate business school degree programs

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Abstract

Purpose – To illustrate the applicability of *kaizen* in higher education.

Design/methodology/approach – *Kaizen* process was used for ten courses contained in a part-time executive MS degree program in management.

Findings – *Kaizen* was found to be an effective process for improving graduate business school courses and the value proposition for students.

Research limitations/implications – Further opportunity to quantitatively correlate *kaizen* results with student satisfaction.

Practical implications – *Kaizen* can help higher education institutions compete more effectively against both traditional non-profit and newer for-profit sources of higher education.

Originality/value – Presents insights, lessons learned, and critical reflections from the first known application of *kaizen* in higher education for this purpose.

Keywords Business schools, Continuous improvement

Paper type Research paper

Introduction

Competitive marketplaces require people at all levels in an organization to think of ways to continuously improve the products or services that they deliver to customers. Organizations that succeed in improving the value proposition for customers usually become the supplier of choice, in preference to other suppliers that, for whatever reasons, are not able to improve. While most managers and employees support the general notion of continuous improvement, the specific approaches to continuous improvement tend to be *ad hoc* or complex. While these approaches to continuous improvement may be successful on occasion, they are not usually responsive to ongoing changes in customer's wants and needs.

Continuous improvement in traditional classroom-style business school education is of increasing importance given the many recent calls to improve graduate business school education (Zimmerman, 1991; Karapetrovic *et al.*, 1999; AACSB, 2002; Donaldson, 2002; Etzioni, 2002; Mintzberg *et al.*, 2002; Pfeffer and Fong, 2002; The Aspen Institute, 2003; Doria *et al.*, 2003; Ghoshal, 2003; Handy, 2002; Emiliani, 2004a; Grey, 2004), and the advent of alternative sources such as online degree programs. The rapid rise of online degree programs (*Fortune*, 2003; Symonds, 2003a) indicates a shift in customer perception of the value of traditional classroom-style higher education – especially among part-time working professionals. In addition, students that work full-time for a living face pressure in the workplace to deliver greater value to customers in the products and services that they supply. Not surprisingly, these students come to the classroom with similar expectations of the university. For example, should students have to wait in line in the school bookstore to purchase

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course materials in a separate transaction, or should the university include these materials in the price of the course and deliver them directly to the classroom?

Accreditation of degree programs in business or management by AACSB International (The Association to Advance Collegiate Schools of Business; see the Appendix for a glossary of acronyms) is intended to: "... assure quality and promote excellence and continuous improvement undergraduate and graduate education ..." (AACSB, 2004a), and "... challenge educators to pursue continuous improvement ..." (AACSB 2004b). Importantly, AACSB's principal focus is the school's mission, curriculum, and faculty qualifications, and less upon other activities that are also important contributors to students' perception of value (Merritt, 2003; Hazelwood, 2003). While many policies are examined, AACSB does not evaluate processes such as course registration, adding or dropping courses, plan of study, waiver and transfer credit, change of status, issuing final grades, dispute resolution, student feedback, etc. (AACSB, 2004b), to understand which activities create value (Zimmerman, 1991; Womack and Jones, 1996; Rother and Shook, 1999). This could be an improvement opportunity for AACSB's accreditation and re-accreditation processes.

Importantly, AASCB International does not define exactly what it means by "continuous improvement," nor does the National Consortium for Continuous Improvement whose focus is "advancing administrative and academic excellence in higher education" (Ruben and Sandmeyer, 2001; National Consortium for Continuous Improvement, 2004). Thus, the methods used to achieve continuous improvement may be *ad hoc*, or subject to interpretation by the school or by members of the peer review team. In other words, "continuous improvement" can embody any means that leads to improvement as judged by one or more stakeholders: AACSB International, administrators, faculty and staff, students, and the organizations that hire graduates. However, given the open-ended nature of how the words "continuous improvement" can be interpreted and applied (Zimmerman, 1991; Roffe, 1998; Drennan, 1999; Marshall, 1998; Rice and Taylor, 2003), it is likely that some things that appear to be improvements may not actually be improvements – especially as viewed by customers (Zimmerman, 1991; Falk *et al.*, 1993).

AACSB, like most organizations, subscribes to quality, excellence, and continuous improvement. However, doing so in the absence of well-defined improvement processes usually leads to confusion over meanings and thus yields uneven results (Zimmerman, 1991; Banta, 1993; Woehrle *et al.*, 1997; Marshall, 1998; Roffe, 1998; Drennan, 1999). The question is: Are there processes than can be used to achieve this on a consistent basis, day-to-day? The leaders of some businesses understand continuous improvement more formally as (Womack and Jones, 1996; Toyota, 2001; Emiliani *et al.*, 2003) "Continuous, incremental improvement of an activity to eliminate waste, unevenness, and unreasonableness (called *muda*, *mura*, and *muri* in Japanese) and create more value", where waste is defined as (Ohno, 1988; Womack and Jones, 1996) "Any activity that adds cost but does not add value as perceived by customers – typically end-use customers."

Importantly, the leaders of institutions of higher education, like most leaders, do not operate with this understanding of waste in mind, and thus are not effective at cost reduction, for example – particularly when compared to some non-educational organizations (Bowen and Youngdahl, 1998; Womack and Jones, 1996; Toyota, 2001; Emiliani *et al.*, 2003; Lean Enterprise Institute, 2003; Panchak, 2003; Swank, 2003).

Simply put, they have a poor understanding of business processes and the specific activities contained therein that consume resources but do not create value. Thus, the common solution to cost problems is to increase tuition and fees, or cut programs, reduce academic or support resources, and sometimes lay people off (Rensselaer at Hartford, 2001, 2004a; Hebel, 2002; Arnone *et al.*, 2003; Hebel, 2003; Fogg, 2003; Farrell, 2003) – actions that few would characterize as improvements. It is common to hear senior managers say "we looked at the numbers" to justify the cuts (or the need to raise funds) (June, 2002), but almost never do they say "we looked at the process" to understand and eliminate costs that customers do not value.

So how do you eliminate waste? The principal process used is called *kaizen* (Imai, 1986), a Japanese word that means: "change for the better," and is typically interpreted as "continuous improvement." *Kaizen* is often incorrectly associated solely with quality improvement, such as fewer defects or conformance to requirements, and is often poorly defined (Zimmerman, 1991). The phrase "change for the better" implies any change that results in improvement, which could be related to quality or other factors that customers judge to be of value, such as innovation, ease of use, on-time delivery, durability, low cost, etc. (Zimmerman, 1991). Negative actions such as increasing tuition and fees, cutting programs, reducing academic or support resources, or layoff are inconsistent with *kaizen*'s meaning: "change for the better."

The *kaizen* process utilizes various tools and methods to make the problem visible, and then uses formal root cause analysis and other means to identify and correct the problem at the source (Zimmerman, 1991; Imai, 1997; Roffe, 1998). The result is rapid improvement: lower costs, higher quality, and better products or service – attributes that customer recognize. While *kaizen* has historically been applied in manufacturing settings (Imai, 1986; Womack *et al.*, 1990; Womack and Jones, 1996; Imai, 1997; Fujimoto, 1999; Emiliani *et al.*, 2003), it is increasingly common to find *kaizen* applied to service business processes (Bowen and Youngdahl, 1998; Goland *et al.*, 1998; Ledgard, 2002; Carney, 2003; Lean Enterprise Institute, 2003; Panchak, 2003; Swank, 2003; Emiliani, 2004b; Wysocki, 2004), due to the recognition that waste also exists in service businesses.

Various other general and systematic approaches to improvement have been proposed or employed by educators (Banta, 1993; Marshall, 1998; Karapetrovic *et al.*, 1999; Alp, 2001; Grey, 2004), including *kaizen* (Zimmerman, 1991), total quality management (TQM) (Woehrle *et al.*, 1997; Koch, 2003); quality function deployment (Akao, 1990; Pitman *et al.*, 1995; Lam and Zhao, 1998; Wiklund and Wiklund, 1999; Hwarng and Teo, 2001) and policy deployment (i.e. "policy management," called "hoshin kanri" in Japanese) (Akao, 1991; Roberts and Tennant, 2003) to determine what courses should be offered. It should be noted that TQM is a philosophical approach to management of an organization, and *kaizen* is a process that is not typically used by managers who subscribe to TQM (Falk *et al.*, 1993; Drennan, 1999).

This paper describes the systematic approach taken by the faculty, staff, and administration of Rensselaer at Hartford (Connecticut)[1], a unit of Rensselaer Polytechnic Institute (Troy, NY) to improve a part-time, 30-credit, graduate master's of science in management program for executives, called the Executive Master's Program (EMP). The *kaizen* process, similar to that used in industrial settings, was used to improve the courses and their content. It is the first known application of *kaizen* for this

purpose, and thus contributes to the literature and practice of continuous improvement in higher education.

The EMP

The EMP is a part-time, 12-month, program leading to a master of science degree in management (Rensselaer at Hartford, 2004b). Students are high potential full-time employees and represent a broad spectrum of manufacturing and service industries, as well as state or local government within a fifty-mile radius of the Hartford campus. Students typically have 10-20 years of business experience, often in two or more functions, and must have at least six years of management experience as well as company sponsorship to gain admission to the program. Class size ranges from 20-30 students for each cohort group.

The program is designed to prepare experienced managers for more senior leadership positions in their organizations, while the curriculum concentrates on new product and service development, management decision-making, and implementation. The curriculum is made up of the following ten courses (Rensselaer at Hartford, 2004b):

(1) organizational behavior, design, and change;
(2) finance for decision analysis;
(3) quantitative methods for managerial decision making;
(4) marketing and product management;
(5) investment analysis;
(6) strategic information systems management;
(7) global strategic management of technological innovation;
(8) ethical, political, and legal context of business;
(9) leadership and organizational improvement; and
(10) technological change and international competitiveness.

Classes meet on alternating Fridays and Saturdays from late August through June, beginning with a four-day residence week. The program also includes an international trip, with visits to global *Fortune* 500 businesses.

The author became familiar with *kaizen* while working in industry in the mid-1990s, and has participated in many *kaizen*s to improve both manufacturing and service business processes. In September of 2002, he proposed to Rensselaer senior management that *kaizen* be used to improve each of the courses in the EMP. TQM, re-engineering, or other large-scale approaches to improvement were not considered for the following reasons (Woehrle *et al.*, 1997; Roffe, 1998; Drennan, 1999):

- they generally take a long time to implement;
- implementation can be complex, *ad hoc*, and confusing;
- they often create resistance or organizational discord;
- lack of senior management interest; and
- they were beyond the scope of the immediate need.

In other words, the primary objective was rapid improvement of a specific degree program, and not protracted improvement of the entire organization's value-creating

activities. The latter, of course, is ultimately more desirable, but only if senior management recognizes it and is willing to lead the organization, top-down, in large-scale improvement processes. The *kaizen* proposal was a bottom-up opportunity. As is often the case, the plan was to start small, achieve some successes, and expand to other improvement opportunities if senior management's approval could be obtained.

The EMP program was selected because the students and their employers were especially demanding customers, and past implementation of improvement suggestions was both irregular and inconsistent – principally due to the lack of a structured process for achieving improvement. Based upon student feedback from formal and informal student surveys, four major categories were identified for improvement. Table I shows these items, as well as the reasons for their selection and possible pathways for improvement.

The proposal to initiate *kaizen* also defined management's roles and responsibilities, which included:

- senior management commitment and participation in *kaizen* and *kaizen* close-out meetings;
- communicating to every employee the benefits of participating in *kaizen* (talking points were provided);
- *kaizen* would be independent of the formal administrative performance evaluation process for professors;
- the need to obtain other data to further improve the value proposition for students and their employers, in recognition of that fact that the classroom experience is just one of many shapers of student satisfaction; and
- a small amount of funding is needed to pay for team member lunches, *kaizen* team shirts, etc.

Senior management, upon review of the proposal, enthusiastically agreed to this approach.

Kaizen process

In industry, *kaizen* is normally four to five days in duration, though it can be as short as a few hours. During this time, a cross-functional team of eight to 12 people, with the aid of a skilled *kaizen* facilitator, identify, measure, and correct the problems associated with a process. *Kaizen*s are not business meetings in the usual sense, which rarely focus on eliminating waste and thus creating more value for end-use customers. Rather, *kaizen* is a specific form of action or on-the-job learning where people examine and critically question all activities that are performed in order to meet the needs of internal or external customers. Observation, data gathering, analysis, and critical thinking required components of the *kaizen* process.

Kaizen may address one problem, or a cluster of related problems that consume resources but do not add value. *Kaizen* is valuable because it is a method for quickly achieving improvement. Thus, most improvements are made during the *kaizen* activity. In addition, the facilitator challenges the team to identify solutions that are both low cost and highly effective at eliminating waste, unevenness, and unreasonableness. Finally, it engages people at all levels of an organization and promotes teamwork[2].

Table I.
Categories of improvement opportunities

Improvement opportunity	Why	How
1. Purpose and learning objectives	Eliminate the questions: "Why are we doing this?" or "What's the point?"	Written description of purpose and learning objective for each class and every assignment
2a. Content – current course materials and discussion	Students demand greater insight into today's problems and solutions	Current text, cases, etc., plus current articles from business press
2b. Content – root cause analysis	Increase technical rigor and show students how to avoid repeat errors in business	Use five whys and fishbone diagrams to better understand the source of management problems and identify corrective actions
2c. Content – increased comparative analysis	Students want to know what managers in other companies and countries are doing	Compare ideas and methods: US to EU, Asia, Latin America, Africa, etc.
2d. Content – utility	Improve students' perception of the value of material used	Demonstrate applicability of ideas and methods to the students' workplace
2e. Content – technology	Students want to understand when and where technological solutions are appropriate	Make linkages between technology and subject-matter, where appropriate
3. Organization and sequence	Eliminate the criticisms: "Course content is not focused" or "Course seems disconnected."	Organize course material to achieve more logical flow
4. Classroom experience	Eliminate the criticisms: "Too many lectures" or "Too many slides."	Incorporate other adult learning methods such as simulations and break-out activities

The application of *kaizen* to improve each of the EMP courses was modified to suit the circumstances. For example, the initial *kaizen*s were two days in duration because it was thought that the objectives could be achieved in this timeframe. However, objectives were achieved sooner, so subsequent *kaizen*s were reduced to one day, with a second day held in reserve if needed. The same data forms used for *kaizen* in industrial settings were used in this activity, but with minor modifications. These forms included (Emiliani *et al.*, 2003):

- *pre-kaizen self-assessments*, to define the current state;
- *kaizen activity sheet*, to define the future state;
- *kaizen target sheet*, to measure improvement;
- *daily record*, to summarize accomplishments; and
- *kaizen 30-day follow-up chart*, to document follow-up activities.

Kaizen teams were smaller than that normally found in industrial settings, typically five to six people from the following areas:

- faculty member whose course was the subject of *kaizen*;
- other faculty members, both subject matter and non-subject matter experts from the school of management, engineering or computer science;
- senior manager or staff member;
- alumni of the EMP (i.e. voice of the customer); and
- facilitator.

Team members were solicited through presentations and via e-mail, with follow-up visits if necessary to further explain the *kaizen* process, the role of team members, etc. The solicitations were received favorably, and volunteers were assigned to upcoming *kaizen*s.

The facilitators consisted of one faculty member with *kaizen* experience (Emiliani), and three volunteers – two management and one computer science faculty – who had expressed a strong interest in learning the *kaizen* process. A 25-page "*Kaizen* facilitators guideline" was prepared and distributed to both facilitators and team members. The document summarized, in two pages, the scope of the project, its purpose, duration, desired outcomes, and expectations of team members, as well as the responsibilities of the facilitator, team members, and the professor whose course was the subject of *kaizen*. The remaining pages contained examples of how the various forms are used in the *kaizen* process.

One *kaizen* was conducted for each of the ten EMP courses between late October 2002 and March 2003. Team members received a package of information about the course, including syllabus and key instructional materials, several days before the *kaizen*. They were asked to review these materials in preparation for their upcoming *kaizen*, and formulate questions or identify improvement opportunities. Giving a copy of the "*Kaizen* facilitators guideline" to all team members proved to be beneficial, as it helped them understand the purpose of *kaizen*, expectations, roles, responsibilities, and the schedule of activities.

The first *kaizen* was the authors' course, "Leadership and organizational improvement" (Emiliani, 2004b). Part of the reason for starting with this course was

to identify problems related the process and data forms used, and make corrections for upcoming *kaizen*s. At the end of each *kaizen*, improvement suggestions were solicited from team members and incorporated into future *kaizen*s. Rensselaer at Hartford senior managers, faculty, and staff were invited to attend a 20-30 minute meeting at the conclusion of each *kaizen* to learn about the results and also suggest additional improvement opportunities.

Results

To the extent possible, improvements were made during the *kaizen*. Inevitably, some action items had to be completed at a later date, typically within 30 days, because they involved gathering additional information, finding different cases or journal articles to use in the course, or making changes to lecture notes or assignments. Facilitators were given responsibility for following up on action items. Table II summarizes the results of the *kaizen*s with respect to the improvement opportunities identified.

In addition to that shown in Table II, other improvement were made including:

- eliminated ambiguity in syllabi related to grading criteria (i.e. class participation) and assignments;
- eliminated variation in the syllabi such as format, course description, course objectives, or the "academic integrity" statement;
- eliminated duplicate teaching materials, such as case studies or journal articles used in two courses;

Improvement opportunity	Improvement made
1. Purpose and learning objectives	For each class or each assignment, state in writing the purpose or learning objectives, and also review this orally in class
2a. Content – current course materials and discussion	Course materials were updated. Current articles from the business press and other sources incorporated into classroom for discussion
2b. Content – root cause analysis	Simple, formal root cause analysis methods (i.e. five whys and fishbone diagram) incorporated into courses where appropriate
2c. Content – increased comparative analysis	Use some cases that feature non-US businesses. Incorporate current articles from the business press and other sources that feature non-US businesses
2d. Content – utility	Show students, orally and in diagrams or narrative, how the concept is applied in real business settings. Or, have students determine how the concept is applied in real business settings through research, etc.
2e. Content – technology	Describe how technology is being used in relation to the subject-matter, either orally or through actual business examples
3. Organization and sequence	Re-order class sequence or topics to improve flow and timing. Ensure that logic path is sensible to students unfamiliar with subject-matter
4. Classroom experience	Increase diversity of adult learning methods to expand learning opportunities and student participation

Table II.
Kaizen results

- ensured students had enough opportunities to earn grades for the work performed (for example, change from final exam only, or mid-term and final exam, to 4-12 graded assignments); and
- identified connections between courses to deliver a more thematically consistent EMP program focused on strategic thinking and leadership.

Upon conclusion of the ten *kaizen*s, the participants were invited to a debriefing where they were asked to share their thoughts on the process and outcomes. The benefits of *kaizen* that were cited include:

- having the professor review their self-assessment, syllabus, and key course materials with team members conveyed much more information than if a faculty or staff member independently reviewed the syllabus alone;
- professors gain a better understanding of what they are trying to accomplish in their course;
- the changes made were better aligned with student expectations;
- team members gained a much better understanding of professors' course, content, instructional methods, etc.;
- it gave faculty, staff, and alumni and opportunity to interact together in ways that that they had not done before;
- *kaizen* generated a tremendous number of new ideas for current and future use;
- professors who participated in the *kaizen*s as team members were energized to incorporate improvements in their course, even if it was not the subject of a future *kaizen*; and
- faculty and staff viewed *kaizen* as a very positive experience.

Most *kaizen*s went smoothly, but there were some difficulties. These, of course, represent improvement opportunities for future *kaizen*s. For example, the different data forms used in the *kaizen*s were not quite right at the start. They underwent multiple rounds of improvement based upon suggestions from team members and the facilitators.

Measures of improvement in industrial settings are usually tangible: e.g. change-over time, part travel distance, units per day, inventory, etc. However, The pre-*kaizen* self-assessments were subjective. As might be expected, some professors rated themselves much higher or much lower than they should have for certain items. However, the *kaizen* process generally corrected this deficiency.

Likewise, the *kaizen* target sheet used to measure improvement was also subjective. While teams were able to assign a number to indicate the level of improvement achieved in the *kaizen* using 1-5 scale[3], there was some discomfort in doing so because people did not know if the score was truly the right one. However, rather then dwell on the specific score, team members invariably agreed that improvement was indeed achieved. In the end, the subjective nature of scoring was not a major problem.

In a couple of *kaizen*s, the professor whose course was under study for improvement appeared to have felt threatened, particularly in cases where senior managers were present as team members. This is not unusual, though feeling threatened is not the intent of *kaizen*, nor how facilitators want people to feel. This outcome can be improved by: better communicating to faculty, in writing and one-on-one, the objectives of *kaizen*;

and communicating to senior managers that their presence could be intimidating, and that they may need to make adjustments in how they interact in order to be viewed as a team member, and not as the boss.

Another opportunity for improvement pertains to the *kaizen* close-out meetings. The basic intent of the close-out meeting is to brief people – any employee in the building – on the improvements that were made. But it is more than that. It is a way to broaden participation, obtain additional suggestions for improvement, and demonstrate management commitment to the process. In some cases, participation in *kaizen* close-out meetings was low, which was perceived by *kaizen* team members as a lack of interest. The normal human reaction is: If people are not interested in what we did, then why do again it in the future? As noted previously, continuous improvement in traditional, classroom-style business school education is of increasing importance. Done correctly, improvement using the *kaizen* process is a lot of fun, and people feel like they are making valuable contributions to the school and the services it delivers.

While many improvements were made to the EMP courses during the *kaizen*s, some had to be made afterwards. Facilitator follow-up on items contained in the *kaizen* 30-day follow-up chart can be improved. While responsibility for this was among the facilitators, senior managers should also take an interest in ensuring that action items are completed.

The strength of people's desire to continuously improve affects the results achieved. Professors must be willing to improve, and the facilitator and team members – faculty, staff, management, and alumni – must willing to challenge each other in non-threatening ways towards the goal of improvement. To that end, it would also be useful to compare courses to those offered by other institutions, and engage the participation of subject matter experts from industry.

Confronting barriers

Academic organizations are like any other organization in that it can be difficult to obtain broad-based participation in formal process improvement activities – especially when the tools or methods are unfamiliar, and faculty are not certain if administrators truly support the activity. Indeed, faculty generally have low regard for administrators, so their ideas are routinely viewed with skepticism. Faculty also tend to have low regard for improvement tools and methods imported from industry, which some view as corrupt, and may believe that their use will conflict with the mission of the institute or the traditions of academia (Zimmerman, 1991; Falk *et al.*, 1993; Roffe, 1998; Drennan, 1999; Emiliani, 2004b). This initial negative reaction is very common, and most people will quickly say or think, "It won't work here because we're different." Predictably, maintaining the status-quo is often viewed by faculty as more desirable, and thus the consequences of not meeting customers' changing needs are insignificant.

In addition, administrators often explain the need for improvement and benefits of participation poorly (Falk *et al.*, 1993; Drennan, 1999), and data revealing shortcomings in the services offered may not be collected, could be incomplete, or have not been widely disseminated among those who are in a position to make the improvements. In other words, the need to improve may not be apparent to others, and could even be contradicted by what faculty simultaneously witness first-hand, e.g. "Enrollments are up, we're constructing new buildings, and we're hiring faculty. What's the problem?" As a result, the method identified for improvement will not garner much attention.

This, however, view reveals an inconsistency: faculty are supposed to be experts at applying structured qualitative, quantitative, or mixed methods of inquiry when confronted with a problem. But they often dismiss improvement approaches proposed by administrators, for example, without thoroughly understanding its purpose, the process, their roles and responsibilities, or its potential benefits. It is likely well worth investigating the problem and improvement tool or method because it could yield superior results compared to alternative approaches that faculty unquestionably dislike such as budget cuts, program cuts, pay freezes, layoffs, etc.

Acceptance of *kaizen* among the EMP program faculty was due to several factors:

- they were a collegial group (perhaps somewhat unusual in academics), and not bounded by functional departments in the school;
- most faculty had industry experience, and thus were not ideologically opposed to industry practices;
- the improvement proposal came from a colleague, not administrators;
- faculty uniformly saw the need for improvement, as various data indicated the need for improvement;
- most faculty wanted to improve their courses; and
- they were willing to try new things, even though the personal benefits or rewards were uncertain at the start.

So while *kaizen* was not previously a part of day-to-day activities, and there was no formal mandate to participate, the EMP faculty were willing to give it a try – and with a positive attitude. While these circumstances might seem unusual to some, the fact is that most people do not come to work to purposefully make matters worse. Instead, people want to improve if they can be shown a way to do it that does not place excessive demands on them or their time, and is also consistent with their personal and department or school goals. A criticism of TQM when applied in academia has been the large amount of time taken away from teaching and research (Roffe, 1998; Drennan, 1999) – activities for which there are clear rewards. In general, faculty do not yet consider participation in structured process improvement activities to constitute meaningful service contributions to the university. This is partly driven by long-established organizational routines, including the tenure process, which typically emphasize research accomplishments over teaching and service.

Kaizen, explained and applied correctly, is appropriate for academic settings because it encourages thoughtful dialog, introduces faculty to new structured process for inquiry, promotes cross-functional teamwork, and identifies specific actions that faculty can take to quickly improve their courses. In other words, the *kaizen* process yields useful results without being a burden. Given that outcome, faculty might then be willing to participate in *kaizen* to improve other elements of the student experience, such as administrative processes, where they surely have some good ideas to share.

Other approaches to improvement in academic settings may also be appropriate, depending upon the specific circumstances. In all cases, the tool or method alone will not sustain itself. Continuous improvement requires resource inputs: sometimes money, but always labor (i.e. faculty and staff) and support from administrators (Falk *et al.*, 1993; Roffe, 1998; Drennan, 1999). Their support is best demonstrated through direct participation in improvement activities, and not by delegating improvement to

lower-level employees. Ultimately, people at all levels have to understand the need for continuous improvement in competitive environments, overcome barriers that inhibit cross-functional teamwork, and should seek simple processes that have a track record of yielding favorable results – with meaningful ties to the reward system. If they don't do this, then their customers may some day go elsewhere.

Summary

The challenges posed by part-time students demanding greater value in graduate business education, rising accreditation or re-accreditation standards, and competition between traditional non-profit and newer for-profit sources of graduate business education means that some of the traditional approaches taken to continuously improve must change. In particular, the processes used must evolve from *ad hoc* or confusing approaches, which frequently include lengthy delays or rework, to systematic approaches that are more responsive to ongoing changes in the marketplace.

While the traditional committee-based approach commonly used to review and approve changes in graduate program structure, curriculum, etc., may have served stakeholders well in the past, there is a growing need to replace this with processes that produce better results faster – consistent with the school's mission, AACSB accreditation standards, balancing the interests of key stakeholders, etc.

This paper described how *kaizen*, similar to found in industrial settings, was used to improve a part-time, 30-credit, graduate master's of science degree program in management. The *kaizen* process resulted in rapid improvement, without creating undesirable trade-offs that might negatively impact other stakeholders, such as academic freedom or students' perception of value. In addition, team members identified many benefits associated with *kaizen* that are not typically found in traditional approaches used to identify, implement, and evaluate improvement opportunities.

Because students' perception of value changes over time, the job of continuous improvement is never done. *Kaizen* must be repeated at regular intervals, using data from relevant sources to guide improvement activities. Doing so will ensure that the school and its programs remain competitive, and also reflect deeper individual and institutional commitment to quality, excellence, and continuous improvement.

Finally, given the financial and other significant challenges that most institutions of higher education face on an ongoing basis, it would be useful if senior managers learned about and participated in *kaizen* and related systematic approaches to process improvement.

Notes

1. Rensselaer at Hartford (formerly known as known as the "Hartford Graduate Center") is Rensselaer Polytechnic Institute's core enterprise for "Education for working professionals." It offers on-site and distance Master's degree programs in management, engineering, and computer science. Rensselaer at Hartford has been a leader in educating working professionals, granting more than 13,000 Master's degrees in Connecticut since 1955 (Weaver and Swift, 2003). The Hartford department of the Lally School of Management and Technology is AACSB accredited.
2. For *kaizen* to function effectively, senior management must establish a no-blame environment and make a commitment that there will be no loss of employment due to

process improvement. Without this commitment, people are usually unwilling to participate in *kaizen*, or participate half-heartedly (Zimmerman, 1991; Emiliani *et al.*, 2003).

3. The scale used was based on the frequency that the items listed in Table I appeared in the course: 1 = not at all; 3 = sometimes; 5 = always (in half-point increments). Not every line item shown in Table I was scored a "5," either in self-assessments made by professors or as judged by *kaizen* team members. The scoring for each line item should instead be appropriate in relation to the subject matter and the overall goals of the course and EMP program, as well as in recognition that other ideas for improvement may come at a later date. Thus, a combination of scores ranging from 3 to 5 can, for example, reflect significant improvement and the creation of a course judged by students to be excellent.

References

AACSB (2002), *Management Education at Risk*, AACSB International, St Louis, MO, August, available at: www.aacsb.edu/publications/metf/METFReportFinal-August02.pdf (accessed 17 January 2004).

AACSB (2004a), *Accreditation Standards*, AACSB International, St Louis, MO, available at: www.aacsb.edu/accreditation/standards.asp (accessed 18 January).

AACSB (2004b), *Eligibility Procedures and Standards for Business Accreditation*, AACSB International, St Louis, MO, available at: www.aacsb.edu/accreditation/standards.asp (accessed 18 January).

Akao, Y. (1990), *Quality Function Deployment: Integrating Customer Requirements in Product Design*, Productivity Press, Portland, OR.

Akao, Y. (1991), Hoshin Kanri*: Policy Deployment for Successful TQM*, Productivity Press, Portland, OR.

Alp, N. (2001), "The lean transformation model for the education system", *Proceedings of the 29th Computers and Industrial Engineering Conference*, November, pp. 82-7, available at: www.umoncton.ca/cie/conferences/29thconf/29thICCIE/Papers/paper006.PDF (accessed 22 January 2004).

Arnone, M., Hebel, S. and Schmidt, P. (2003), "Another bleak budget year", *The Chronicle of Higher Education*, Vol. 49 No. 17, p. A21.

(The) Aspen Institute (2003), *Where Will They Lead? 2003 MBA Student Attitudes about Business and Society*, The Aspen Institute, Washington, DC, May, available at: www.aspeninstitute.org/Programt2.asp?bid = 947 (accessed 19 January 2004).

Banta, T. (1993), "Toward a plan for using national assessment to ensure continuous improvement of higher education", *Journal of General Education*, Vol. 42 No. 1, pp. 33-58.

Bowen, D. and Youngdahl, W. (1998), "Lean service: in defense of a production line approach", *International Journal of Service Industry Management*, Vol. 9 No. 3, pp. 207-25.

Carney, J. (2003), "We're listening", *Fidelity Outlook*, August, p. 28.

Donaldson, L. (2002), "Damned by our own theories: contradictions between theories and management education", *Academy of Management Learning and Education*, Vol. 1 No. 1, pp. 96-106.

Doria, J., Rozanski, H. and Cohen, E. (2003), "What business needs from business schools", *Strategy + Business*, No. 32, Fall, pp. 38-45.

Drennan, L. (1999), "Total quality management in the Scottish universities", *International Journal: Continuous Improvement Monitor*, Vol. 1 No. 4, available at: www.llanes.panam.edu/journal/library/Vol1No4/drennan.html (accessed 17 July 2004).

Emiliani, M.L. (2004a), "Is management education beneficial to society?", *Management Decision*, Vol. 42 No. 3/4, pp. 481-98.

Emiliani, M.L. (2004b), "Improving business school courses by applying lean principles and practices", *Quality Assurance in Education*, Vol. 12 No. 4.

Emiliani, M.L., Stec, D., Grasso, L. and Stodder, J. (2003), *Better Thinking, Better Results*, The Center for Lean Business Management, Kensington, CT.

Etzioni, A. (2002), "When it comes to ethics, B-schools get an F", *The Washington Post*, 4 August, p. B4.

Falk, C., Brewer, P. and Brewer, V. (1993), "Total quality management in a college of business: operations and administration", *Mid-American Journal of Business*, Vol. 8 No. 2, pp. 3-12.

Farrell, E. (2003), "Public-college tuition rise largest in three decades", *The Chronicle of Higher Education*, Vol. 50 No. 10, p. A1.

Fogg, P. (2003), "U. of Nebraska seeks to lay off 15 tenured faculty members", *The Chronicle of Higher Education*, Vol. 49 No. 43, p. A12.

Fortune (2003), "100 fastest-growing companies", *Fortune*, 1 September.

Fujimoto, T. (1999), *The Evolution of a Manufacturing System at Toyota*, Oxford University Press, Inc., New York, NY, pp. 129-72.

Ghoshal, S. (2003), "Business schools share the blame for Enron", *Financial Times*, 18 July.

Goland, A., Hall, J. and Devereaux, C. (1998), "First National Toyota", *The McKinsey Quarterly*, No. 4, pp. 59-66.

Grey, C. (2004), "Reinventing business schools: the contribution of critical management education", *Academy of Management Learning and Education*, Vol. 3 No. 2, pp. 178-86.

Handy, C. (2002), "What's a business for?", *Harvard Business Review*, December, pp. 49-55.

Hazelwood, K. (2003), "Turbocharging your career", *BusinessWeek*, 20 October, pp. 94-8.

Hebel, S. (2002), "Virginia Tech will drop 200 jobs to deal with state budget cuts", *The Chronicle of Higher Education*, 17 May, p. A32.

Hebel, S. (2003), "California public universities increase tuition for first time in eight years", *The Chronicle of Higher Education*, Vol. 49 No. 19, p. A22.

Hwarng, H. and Teo, C. (2001), "Translating customers' voices into operations requirements: a QFD application in higher education", *International Journal of Quality & Reliability Management*, Vol. 18 No. 2, pp. 195-225.

Imai, M. (1986), *Kaizen*, Random House, New York, NY.

Imai, M. (1997), *Gemba* Kaizen, McGraw-Hill, New York, NY.

June, A. (2002), "Six creative ways colleges are cutting costs", *The Chronicle of Higher Education*, Vol. 49 No. 15, p. A27.

Karapetrovic, S., Rajamani, D. and Willborn, W. (1999), "University, Inc.", *Quality Progress*, Vol. 32 No. 5, pp. 87-95.

Koch, J. (2003), "TQM: why is its impact in higher education so small?", *The TQM Magazine*, Vol. 15 No. 5, pp. 325-33.

Lam, K. and Zhao, X. (1998), "An application of quality function deployment to improve the quality of teaching", *International Journal of Quality & Reliability Management*, Vol. 15 No. 4, pp. 389-413.

Lean Enterprise Institute (2003), *LSG Sky Chefs Caters to New Market Realities*, Lean Enterprise Institute, Brookline, MA, 29 April, available at: www.lean.org/Lean/Community/Registered/SuccessStory.cfm?SuccessStoryId = 5 (accessed 20 January 2004).

Ledgard, L. (2002), "City hospital takes some new management medicine", *Hartford Business Journal*, Vol. 10 No. 52.

Marshall, S. (1998), "Professional development and quality in higher education institutions of the 21st century", *Australian Journal of Education*, Vol. 42 No. 3, pp. 321-34.

Merritt, J. (2003), "The education edge", *BusinessWeek*, 20 October, pp. 86-92.

Mintzberg, H., Simons, R. and Basu, K. (2002), "Beyond selfishness", *Sloan Management Review*, Vol. 44 No. 1, pp. 67-74.

National Consortium for Continuous Improvement (2004), NCCI, Washington, DC, available at: www.ncci-cu.org/ (accessed 17 July).

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Panchak, P. (2003), "Lean health care? It works", *IndustryWeek*, 1 November, available at: www.industryweek.com/CurrentArticles/asp/articles.asp?ArticleId = 1503 (accessed 22 January 2004).

Pfeffer, J. and Fong, C. (2002), "The end of business schools? Less success than meets the eye", *Academy of Management Learning and Education*, Vol. 1 No. 1, pp. 78-95.

Pitman, G., Motwani, J., Kumar, A. and Cheng, C. (1995), "QFD application in an educational setting: a pilot field study", *International Journal of Quality & Reliability Management*, Vol. 12 No. 6, pp. 63-72.

Rensselaer at Hartford (2001), *Fall 2001 Course Schedule: Tuition and Fees*, Rensselaer at Hartford, Hartford, CT, available at: www.rh.edu/publications/course_sched/current/ (accessed 18 July 2004).

Rensselaer at Hartford (2004a), *Fall 2004 Course Schedule: New Tuition Policy*, Rensselaer at Hartford, Hartford, CT, available at: www.rh.edu/publications/course_sched/current/ (accessed 18 July).

Rensselaer at Hartford (2004b), *Executive Master's Program Overview*, Rensselaer at Hartford, Hartford, CT, available at: www.rh.edu/lsmt/emp/overview.html (accessed 19 January).

Rice, G. and Taylor, D. (2003), "Continuous-improvement strategies in higher education: a progress report", *Research Bulletin*, Vol. 2003 No. 20, EDUCASE Center for Applied Research, Boulder, CO, 30 September.

Roberts, P. and Tennant, C. (2003), "Application of the *Hoshin Kanri* methodology at a higher education establishment in the UK", *The TQM Magazine*, Vol. 15 No. 2, pp. 82-7.

Roffe, I. (1998), "Conceptual problems of continuous quality improvement and innovation in higher education", *Quality Assurance in Education*, Vol. 6 No. 2, pp. 74-82.

Rother, M. and Shook, J. (1999), *Learning to See*, Lean Enterprise Institute, Inc., Brookline, MA.

Ruben, B. and Sandmeyer, L. (2001), "Matchmaker, matchmaker: NCCI's role in higher education", *NACUBO Business Officer*, Vol. 35 No. 2, pp. 35-8.

Swank, C.K. (2003), "The lean service machine", *Harvard Business Review*, Vol. 81 No. 10, pp. 123-9.

Symonds, W. (2003a), "University of Phoenix online: swift rise", *BusinessWeek*, 23 June.

Symonds, W. (2003b), "Cash cow universities", *BusinessWeek*, 17 November.

Toyota (2001), "The Toyota way 2001", internal document, Toyota Motor Corporation, Toyota City, April.

Weaver, G. and Swift, M. (2003), *Hartford Connecticut's Capital: An Illustrated History*, American Historical Press, Sun Valley, CA, pp. 198-201.

Wiklund, P. and Wiklund, H. (1999), "Student focused design and improvement of university courses", *Managing Service Quality*, Vol. 9 No. 6, pp. 434-43.

Woehrle, A., Gitlow, H. and Kerr, J. (1997), "Reengineering in the context of quality management theory: a cautionary note to educators", *International Journal: Continuous Improvement Monitor*, Vol. 1 No. 2, available at: http://llanes.panam.edu/journal/library/vol1no2/gitlow_article3.html (accessed 18 July 2004).

Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY.

Wysocki, B. (2004), "To fix health care, hospitals take tips from factory floor", *The Wall Street Journal Online*, 9 April.

Zimmerman, W.J. (1991), "*Kaizen*: the search for quality", *The Journal of Continuing Higher Education*, Vol. 39 No. 3, pp. 7-10.

Appendix. Acronym glossary

AACSB	Formerly an abbreviation for The Association to Advance Collegiate Schools of Business, and now known as AACSB International.
EMP	Executive Master's Program.
TQM	Total quality management.

Leaders lost in transformation

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Abstract

Purpose – To examine why most Lean transformations achieve only modest favorable results, despite years of effort.

Design/methodology/approach – Comparative/evaluative discussion of efforts made by senior managers to implement the Lean management system, with commentary on a published example.

Findings – Presents common obstacles and identifies common implementation errors that must be avoided in order to realize the full benefits of the Lean management system.

Research limitations/implications – Illustrates the ease by which Lean transformation efforts can lead to less desirable outcomes when senior managers fail to fully grasp the implicit and explicit aspects of both task and behavioral elements of a new management system.

Practical implications – Provides specific suggestions that will enable senior managers and organizations to achieve improved outcomes.

Originality/value – Identifies numerous common errors made by senior managers, the rationale for why the errors have occurred, and suggests improvements for implementing the Lean management system.

Keywords Continuous improvement, Leadership, Transformational leadership

Paper type General review

Introduction

Beginning in the late 1980s, senior managers of manufacturing businesses started to become familiar with Toyota Motor Corporation's unique management principles and practices, principally through benchmarking reports, site visits, and business books (Ohno, 1988; Womack *et al.*, 1990; Monden, 1993; Womack and Jones, 1996). More recently, senior managers of service businesses have also become familiar with Toyota's management principles and practices and have begun to implement them as well (Bowen and Youngdahl, 1998; Goland *et al.*, 1998; LEI, 2003; Swank, 2003; Emiliani, 2004a,b, 2005; PRHI, 2004; Wysocki, 2004). Toyota's management principles and practices are known by various names including: "Toyota Production System", "Toyota Management System", "Lean Manufacturing", "Lean Production" or "Lean Management System". The term "Lean Management System" is used in this paper because it is a comprehensive system of management applicable to any organization – for-profit, non-profit, or government. The term "Lean principles and practices" is used in this paper to describe the application of selected parts of the Lean management system by senior managers.

The Lean management system as it is known today did not start out that way. It has evolved purposefully over time, starting in the mid-1930s, with elements of the management system dating to the late 1800s (Toyota, 1988; Kimoto, 1991). It borrowed key concepts and practices developed by Henry Ford and Charles Sorenson (Sorenson, 1956; Ford, 1988; Ohno, 1988), as well as Frederick Taylor (Taylor, 1967). It was driven

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forward by management practitioners, in alignment with Toyota's corporate purpose (Basu, 1999), anchored in key principles (Ohno, 1988; Toyota, 2001; Emiliani *et al.*, 2003), and by applying the scientific method to the day-to-day practice of management (Spear and Bowen, 1999; Toyota, 2001):

- observe a phenomenon;
- formulate a hypothesis to explain the phenomenon;
- conduct experiments to prove or disprove the hypothesis; and
- reach a conclusion that validates or modifies the hypothesis.

Senior managers become interested in adopting Lean principles and practices because it results in many benefits, including: higher quality products and services, increased market share, margin expansion, revenue growth, higher productivity, better customer focus, faster response to changing market conditions, and higher asset efficiency. Importantly, a key focus of Lean is time and how time is used, with the intent of improving responsiveness to customers and ensuring that associates' lives are not being wasted while at work doing unnecessary things (Minoura, 2002). Leaders that understand and practice Lean well create formidable businesses that compete on the basis of time because information (e.g. parts, documents, data, verbal communication) flows with fewer or even no interruptions (Fujimoto, 1999; Emiliani *et al.*, 2003).

The purpose of this paper is to examine why most Lean transformations achieve only modest favorable results. It contributes to the literature by identifying numerous common errors made by senior managers, the rationale for why the errors have occurred, and suggests improvements when implementing Lean principles and practices. Companies that implement these improvements will realize a stronger competitive position, to the benefit of all stakeholders – including investors. But to do so will require senior managers to develop new beliefs (Emiliani, 2003a) and learn new processes and tools, some of which will be at odds with what they previously learned on-the-job or in business school (Emiliani *et al.*, 2003; Emiliani, 2004a; Spear, 2004).

Lean management system

Lean is a management system designed to be responsive to the needs of humans in business and deliver better outcomes for key stakeholders such as associates, suppliers, customers, investors and communities (Toyota, 2001; Emiliani *et al.*, 2003). It is rooted in two key principles – "continuous improvement" and "respect for people", as shown in Table I. The "continuous improvement" principle embodies the tools and methods used to improve productivity. The "respect for people" principle embodies leadership behaviors and business practices that must be consistent with efforts to eliminate waste and create value for end-use customers (Emiliani, 1998a, 2004b; Emiliani *et al.*, 2003).

The Lean management system has two primary objectives: "eliminate waste" and "create value for end-use customers," as shown in Table I. Waste is defined as any activity that adds cost but does not add value as perceived by end-use customers (Ohno, 1988; Womack and Jones, 1996). An end-use customer is the person that pays for and uses a product or service. Often, the person that pays for the product or service is different from the person that uses it. In that case, the value proposition is defined by both the buyer and the user.

		Explanation
Lean Principles Ohno (1988) and Toyota (2001)	Continuous improvement	Day-to-day activities performed to improve business processes in response to changing market conditions. Called "kaizen" in Japanese, which literally means "change for the better" (multi-lateral sense), and is often interpreted as "continuous improvement." Utilizes specific processes and tools to achieve improvements
	Respect for people	People (i.e. stakeholders such as associates, customer, suppliers, investors and the community) are valuable resources to which a business owes it existence. Disrespecting people creates waste
Objectives Ohno (1988)	Eliminate waste	Eliminate activities and behaviors that add cost but do not add value as perceived by end-use customers. The original seven wastes are (Ohno, 1988): overproduction, waiting, transportation, processing, inventories, movement and defects. The eighth waste is behaviors (Emiliani, 1998a). Waste is called "muda" in Japanese. Important related concepts are the elimination of unevenness ("mura" in Japanese), and unreasonableness ("muri" in Japanese)
	Create value for end-use customers	Focus on the value-creating activities that end-use customers desire

Table I.
Key lean principles and objectives

The Lean management system is supported by simple processes and tools that help associates eliminate waste and consistently deliver the value that customers seek in the products and services they buy. Some of the key processes and tools that are used are presented in Table II (Imai, 1997; Rother and Shook, 1999; Emiliani *et al.*, 2003). The intent of these processes and tools is to simplify work and the workplace, improve quality, reduce lead-time, and focus people on performing only those activities that create value. Importantly, they also help people realize their full potential and actualize innate desires to make positive contributions to the workplace.

Lean is distinctly different from conventional, or "batch-and-queue" (B&Q) business practices (Womack *et al.*, 1990; Monden, 1993; Womack and Jones, 1996; Emiliani, 2000; Emiliani *et al.*, 2003). B&Q means that materials are processed in large batches, which result in long queue times between operations. While the term B&Q originated in manufacturing, the conventional way to deliver services is also B&Q – e.g. processing information, documents, etc. in large batches, which again results in long queue times (Panchak, 2003; Swank, 2003; Corrie, 2004; Wysocki, 2004). B&Q processing – whether it is materials or information – has many serious deficiencies including long lead-times, lower quality, higher cost products or services, customer dissatisfaction and poor information flow (Womack and Jones, 1996; Bowen and Youngdahl, 1998; Goland *et al.*, 1998; Spear and Bowen, 1999; Brady, 2000; Barron, 2000; Emiliani *et al.*, 2003; Swank, 2003; Tapping and Shuker, 2003; Wysocki, 2004).

Companies that abandon B&Q practices and adopt Lean principles and practices across the enterprise are characterized as undergoing a "Lean transformation". While thousands of companies worldwide have been engaged in the Lean transformation for five to ten years or more, most have achieved only modest levels of improvement – typically in only one part of the business such as operations (Womack and Jones, 1996;

Lean process or tool	Explanation
Five Ss	Stands for: Sort, Sweep, Straighten, Shine, Sustain. Important for establishing an organized workplace
Just-in-time	Subsequent operation acquires parts (or information) from the preceding operation when needed, in the quantity needed
Kaizen	Literally means "change for the better;" also interpreted as "continuous improvement." Process used to identify and eliminate waste
Lean behaviors	Applying Lean principles and tools to improve leadership behaviors and eliminate behavioral waste (Emiliani 1998a, 1998b)
Load smoothing	Called "heijunka" in Japanese. Used to smooth fluctuations in customer demand
Percent loading chart	A one-page diagram depicting the cycle time between operations or workers compared with the rate of customer demand. Helps identify workload imbalances
Policy deployment	Called "*hoshin kanri*" in Japanese. A process used to connect corporate strategy to key objectives and resources, including daily activities across functions
Quality function deployment, ("voice of the customer")	A process used to incorporate the wants and desires of intermediate and end-use customers in the design of goods and services
Root cause analysis	Methods used to determine the root cause of a problem and identify countermeasures to avoid repeat occurrences. Key tools are "5 Whys" (asking why five or more times until the root cause of the problem is discovered) and fishbone or cause-and-effect diagram
Standard work chart	A one-page diagram showing the sequence in which work is performed
Takt time	The rate of customer demand. Used to establish a direct link between marketplace demand and workplace activities
Total productive maintenance	A program used to ensure that equipment is in good operating condition and available for use when needed
Value stream maps	A one-page visual representation of material and information flows. Used to identify improvement opportunities and eliminate waste
Visual controls	Signs and other forms of visual information used to simplify the workplace and make it easy to recognize abnormalities

Table II.
Lean processes and tools

Swank, 2003; Womack, 2004b). Why is that? Should not the success stories be more plentiful, given the length of time that people have been learning and applying Lean principles and practices?

Unfortunately, most senior managers currently understand and practice Lean as a set of tools – simple add-ons to conventional B&Q business practices – and also view Lean as a way to reduce labor costs, typically through layoffs (Post and Slaughter, 2000; Varnon, 2003; Womack, 2003). Thus, the term "Lean" has for many workers become synonymous with bad outcomes such as layoffs – e.g. layoff every associate now. Further, senior managers implementing Lean principles and practices typically fall prey to an abundance of misunderstandings and misconceptions about Lean and usually misapply some or all aspects (Spear and Bowen, 1999; Emiliani *et al.*, 2003; Smart *et al.*, 2003; Swank, 2003; Dyer and Hatch, 2004; Womack, 2003, 2004a; Spear, 2004), which impedes Lean transformation efforts.

In general, most people practicing Lean today possess a coarse understanding of Lean (i.e. tool-based), rather than fine or detailed understanding of Lean principles and practices. As a result, they often miss its intent and nuances such as:

- Lean is a stakeholder-based system of management, not a management practice that favors shareholders over all other stakeholders (Toyota, 2001; Emiliani *et al.*, 2003).
- Senior managers that define the corporation's purpose as "to maximize shareholder value" – in the literal sense (typically short-term) – is incompatible with the Lean management system because it forces zero-sum tradeoffs among key stakeholders and creates waste (Okuda, 1999; Kunio, 2000; Emiliani, 2003b; Morimatsu, 2003). The Lean management system requires senior management to adopt a corporate purpose that balances both human and economic objectives (Basu, 1999; Johnson and Bröms, 2000; Toyota, 2001; Emiliani *et al.*, 2003).
- Negative cutting, such as layoffs, is not the intent of the Lean, as it causes wasteful imbalances. Instead, the focus is positive improvement and stable long-term growth (Toyota, 2001).
- The Lean management system is rooted in key principles that apply to every business process (Emiliani *et al.*, 2003; Tapping and Shuker, 2003; Womack, 2004b).
- The Lean management system is designed to help workers realize their full potential (Emiliani *et al.*, 2003; Spear, 2004).
- Lean principles and practices are learned on-the-job; possessing only a basic intellectual understanding of Lean is insufficient (Spear and Bowen, 1999; Liker, 2004; Spear, 2004).
- The "respect for people" principle is the key to making the Lean management system work (Emiliani, 1998a; Toyota, 2001; Emiliani *et al.*, 2003).

Since these points are not widely understood among Lean management practitioners, it is not surprising that associates or other key stakeholders, such as suppliers, customers, or investors will experience negative outcomes. For example, most senior managers implement only "continuous improvement", and do not implement both "continuous improvement" and "respect for people". If they see it at all, "respect for people" is incorrectly understood as adding cost, when in fact it reduces costs (Johnson and Bröms, 2000; Emiliani *et al.*, 2003). As a result, most businesses – and their end-use customers – fail to realize the benefits of the Lean management system (Womack *et al.*, 1990; Nishiguchi, 1994; Dyer and Nobeoka, 2000; Emiliani *et al.*, 2003; Dyer and Hatch, 2004; Spear, 2004). In effect, they are lost in transformation.

While many organizations have high levels of awareness of Lean (Shingo, 2004), most senior managers lack detailed knowledge of Lean principles and practices (Spear, 2004), and they do not recognize it as a management system. As a result, most senior managers overstate their company's Lean capabilities and progress (Liker, 2004). This is consistent with their limited understanding of Lean, the common tendency to mix Lean and non-Lean business practices and metrics, and lack of direct participation in continuous improvement activities – called "*kaizen*" in Japanese (Emiliani *et al.*, 2003; Spear, 2004). The good news is that more manufacturing businesses are beginning to apply Lean principles and practices to processes other than in operations, such as

engineering, procurement, or accounting, but not yet to human resources, information systems, legal, sales, marketing, etc. and senior managers at many services businesses are beginning to realize that Lean principles and practices also apply to their business – though mainly in operations.

Lean transformation challenges

A recent survey by the Lean Enterprise Institute Inc. reported the "State of Lean", based on data from 999 respondents (LEI, 2004). Only 4 percent of respondents characterized their progress as "advanced", while 46 percent characterized their Lean implementation efforts as "early". The report identified the following "common obstacles" related to the respondents' Lean implementation efforts:

- backsliding to the old ways of working – 36 percent;
- lack of implementation know-how – 25 percent;
- lack of a crisis to create a sense of urgency – 24 percent;
- a traditional cost accounting system that does not recognize the financial value of shop-floor improvements – 22 percent;
- resistance by middle management – 21 percent;
- regarding Lean as the "flavor-of-the-month" – 19 percent;
- failing to remove "anchor draggers" who oppose change – 18 percent;
- resistance by hourly employees – 11 percent;
- resistance by supervisors – 10 percent; and
- failure of past Lean projects – 6 percent.

The data indicate that there are many obstacles, and that most companies have great difficulty implementing Lean principles and practices. Their ability to achieve a Lean transformation across the enterprise is severely limited by the implementation process normally used by companies, and often advocated by consultants (Swank, 2003). It is also limited by the current level of knowledge possessed by the people leading and participating in the Lean transformation.

Our research identifies the following 11 common errors that senior managers make when implementing Lean:

(1) *Management system.* Senior managers typically understand Lean as a "manufacturing thing", and not as a comprehensive management system. Thus, the application of Lean principles and practices is limited to only a portion of the company's activities such as operations. The rationale for doing so is faulty since there is waste in every business process (Emiliani *et al.*, 2003; Fiume and Cunningham, 2003; Womack, 2004b).

(2) *Leadership behaviors.* These remain deeply rooted in B&Q thinking, which greatly conflicts with efforts to implement Lean principles and practices (Emiliani, 2003a). In other words, senior managers often exhibit wasteful behaviors (Emiliani, 1998a), while at the same time telling workers to eliminate waste. People notice this inconsistency, and silently question senior management's commitment to Lean.

(3) *Leadership participation.* Every senior manager says they support Lean, but in reality most believe they should be doing other things, or claim they are too busy to get involved with continuous improvement activities – either as team leaders or as team members. The lack of personal participation in improvement activities sends the message that Lean implementation is the job of lower-level workers, and that senior managers do not have to get involved. As a result, senior managers miss important opportunities to deepen their understanding of Lean principles and practices (Spear, 2004). It is another source of inconsistency that results in questions about senior management's commitment to Lean.

(4) *Management turnover.* It is impossible to achieve a Lean transformation with high management turnover. Senior managers that come and go every few years do not effectively learn the Lean management system, or they introduce tools, methods, or metrics that conflict with Lean principles and practices. In cases where the Lean transformation has been most successful, there is long-term stability in senior management (Emiliani *et al.*, 2003).

(5) *Business metrics.* Financial and non-financial metrics usually remain rooted in B&Q thinking, which conflicts with efforts to implement Lean principles and practices (Emiliani *et al.*, 2003; Fiume and Cunningham, 2003; Maskell and Baggaley, 2003). Companies will show-off beautiful continuous flow work cells, but which are unfortunately measured two ways: the rate of customer demand and "earned hours". Invariably, the metric that matters most is that which is related to the budget, earned hours, thus trumping efforts to respond to actual customer demand. This violates the "respect for people" principle – specifically, respect for employees, suppliers, customers and investors.

(6) *Layoffs.* The result of productivity improvement is often unemployment. This action undercuts the desire of the remaining people to participate in future improvement activities. Not surprisingly, the pace of improvement is greatly slowed. This is also the major reason why companies experience "backsliding to the old ways of working". Layoffs due to productivity improvement are inconsistent with Lean because it violates the "respect for people" principle (Ohno, 1988; Okuda, 1999; Toyota, 2001; Emiliani *et al.*, 2003; Womack, 2003).

(7) *Strategy integration.* In most cases, Lean activities do not directly link to corporate strategy and goals. Kaizen is often applied haphazardly; fantastic improvements are achieved in activities that only provide "local" benefits, not system wide gains or benefits to its end-use customers. Some companies are beginning to address this by using "policy deployment" – called "*hoshin kanri*", in Japanese (Akao, 1991).

(8) *Total cost.* Senior managers typically do not understand the "total cost" of a purchase – just purchase price. They use purchasing tools that are inconsistent with Lean principles and practices such as economic order quantities and online reverse auctions (Emiliani, 2004c). Price-based metrics such as purchase price variance (PPV) promote destructive power-based bargaining with suppliers (Nishiguchi, 1994; Emiliani *et al.*, 2005). This makes it very difficult to apply best practices with suppliers, such as collaborative problem-solving (Womack *et al.*, 1990; Dyer and Nobeoka, 2000; Dyer and Hatch, 2004).

(9) *Time horizon.* It is common today among senior managers of publicly owned businesses to be focused on the short term. While most senior managers say they care a lot about the future of the company, they instead support business practices, metrics and behaviors that actually reduce competitiveness over time. The Lean transformation requires management to focus on the long term (Toyota, 2001; Emiliani *et al.*, 2003; Liker, 2004), without losing sight of important short- and mid-term goals.

(10) *Focus.* Senior managers of many publicly owned businesses are obsessively focused on shareholders, and usually make decisions that come at the expense of other stakeholders such as employees, suppliers, or local communities. It is impossible to achieve a Lean transformation with shareholders as the singular focus. Instead, managers must balance the interests of key stakeholders (Toyota, 2001), which in turn yield better results for shareholders (Emiliani *et al.*, 2003). Successful Lean transformations have a proper focus on end-use customers, which are the primary source of cash flow that investors care most about.

(11) *Supply chain.* It is difficult for suppliers to practice Lean effectively if their customers do not. Applying Lean throughout a supply chain requires the sponsorship and participation of large buying organizations that correctly apply Lean principles and practices to their own internal activities (Nishiguchi, 1994; Dyer and Nobeoka, 2000; Dyer and Hatch, 2004). Most companies practice variations of Lean that contain many flaws, thus making the "train-the-trainer" approach to implementing Lean in supply chains ineffective. Managers who are serious about Lean quickly abandon power-based bargaining and price-based purchasing metrics.

Without question, there is much room for improvement. Senior managers that do not understand the Lean management system, its intent, and its nuances are not bad people. Nor are they hopeless "concrete heads". Rather, most are valuable resources that can be shown how to improve their leadership and business skills if they are willing to learn new things. The Lean management system is a carefully designed way to manage a business and balance the interests of key stakeholders. Implemented correctly, it makes work fun, exciting, and much more fulfilling. It also leads to the kinds of favorable business results that senior managers seek.

Jefferson Pilot Financial's experience

Harvard Business Review recently published an article featuring Jefferson Pilot Financial's Lean implementation efforts (Swank, 2003). This article, and many others like it are heralded as great examples of Lean implementation. Most people who read the article judge the manner in which Jefferson Pilot Financial introduced Lean principles and practices to be quite reasonable. But is it really? Instead, we see a well-worn functional approach to improvement that does not deliver enterprise-wide benefits which end-use customers value. Jefferson Pilot Financial's approach to Lean implementation contains many errors. These include:

- *Lack of CEO participation.* The CEO did not personally participate in continuous improvement activities. This typically conveys to people that participation by the CEO (and the rest of the senior management team) is not needed. It usually

also indicates that the CEO is not really interested in Lean, and does not understand Lean as a management system for the entire organization.

- *Small-scale activity.* Initial implementation occurred in only one part of the organization (operations), and on a very small scale. This typically conveys to people outside of operations that Lean is an "operations thing", and that they do not need to participate or bother learning about Lean. It also indicates to people that being Lean in operations alone is good enough to gain competitive advantage.
- *Avoiding disruption.* Lean was implemented only in operations to avoid disrupting the organization. This conveys to people that Lean should not be disruptive, when in fact improvement should be disruptive. Among other things, this helps people quickly understand the massive amount of waste that exists in all business processes.
- *Lack of cross-functional participation.* The "Lean team" was small – five people, three of whom were consultants – and not cross-functional. This conveys to people that Lean is mainly the job of consultants, or that only the people doing the work in that area are qualified to identify ways to improve workflows. Kaizen teams are usually larger and contain people from upstream and downstream processes. People from outside the department invariably offer valuable insights and also learn many important new things.
- *No-blame policy not established.* Posting metrics (performance vs goal) on white boards is standard practice in Lean management for real-time visibility into the performance of the system – not for blaming people. In a Lean transformation done right, the CEO establishes and adheres to a no-blame policy so that people at all levels will feel comfortable participating in kaizen and learning new Lean principles, processes and tools (Toyota, 2001; Emiliani *et al.*, 2003).
- *Confusion over who is the customer.* Jefferson Pilot implemented Lean in order to better serve its independent life insurance advisors (also called "distributors", "producers," "sales reps", or "brokers"). The common view among life insurance company executives is that independent life insurance advisors are their customers. However, advisors themselves are not the source of future cash flows – the policyholder is. Advisors are a cost, with the first year or two of premiums being paid to the advisor. From a practical standpoint, both advisors and policyholders define the value proposition. The challenge is to expand the value proposition for both, not for one or the other. Most policyholders, if asked, would like to obtain better life insurance coverage for less money. Lean management implemented correctly in the life insurance business will lower costs, which will translate into better value for policyholders.
- *Choice of words.* The choice of words used in the article tells a lot about how managers think about Lean, and this in turn will influence how readers think about and practice Lean. Characterizing Lean as an "initiative" or "project" usually indicates to people that Lean efforts will last a fixed period of time, say two to four years. Lean is better characterized to as a "journey" because there is no end to improvement. The words "optimal design" indicate to people that there is one best solution, and thus conflicts with the continuous improvement principle. The word "tools" indicate to people that Lean is just that – a bunch of tools. Instead, Lean is a

management system rooted in key principles (continuous improvement and respect for people), with key objectives (such as create value for end-use customers, stable long-term growth, balance/harmony and innovation), supported by processes and tools (such as kaizen, quality function deployment, standard work, root cause analysis, total productive maintenance, etc.).

- *Reason for implementing Lean.* For most senior managers of large corporations, the main reason is to increase earnings through cost reduction – and thus increase stock price. This conveys to people that Lean is just another tool in the manager's tool kit to cut costs. Improved financials are a byproduct of improving the non-financial performance of value streams (Rother and Shook, 1999; Emiliani, 2001; Maskell and Baggaley, 2003; Emiliani *et al.*, 2005). Non-financial measures are the focus of work cell-level Lean metrics. Importantly, having a purely financial view of the benefits of Lean undercuts the respect for people principle and does not help people focus on improving business processes.
- *Using games to teach Lean.* Jefferson Pilot used the "Airplane Game", a simulation that teaches certain fundamental Lean principles and practices. While this and other types of Lean simulations are popular, Lean businesses do not use them because they do not:
  (1) develop people's capability to observe and discern between value-added work, non-value added but necessary work and waste in actual business processes;
  (2) eliminate waste in actual business processes;
  (3) create value for end-use customers; and
  (4) change people's belief system.

In short, they do not create conditions for valuable "double-loop" learning in the actual work environment (Emiliani *et al.*, 2003). Kaizen is the preferred day-to-day teaching method, not one-off games:

- *Qualified job guarantee not established.* Labor costs were reduced by 26 percent. What happened to the people? Did senior management offer all associates a "Qualified Job Guarantee" – i.e. nobody will be laid off as a direct result of their participation in continuous improvement activities (Emiliani *et al.*, 2003)? If no "Qualified Job Guarantee" was given, then this undercuts the respect for people principle.

These errors, while common, are not caused by bad intentions. Rather, they are due to a lack of awareness of improved practical Lean implementation methods, the difficulty that most senior managers have discerning between Lean and non-Lean principles and practices, and underestimating the ease with which confusing mixed messages can be delivered.

Senior management job searches

As the benefits of Lean principles and practices become more widely known among senior managers, it is common to find companies engaged in Lean for two to five years seeking to hire mid-and senior-level managers with Lean implementation experience. The job descriptions written by hiring companies and search consultants offer interesting insights into the current thinking with regard to roles and responsibilities,

and what it takes to successfully lead a Lean transformation. While most people would find the job description reasonable, close inspection reveals many problems. The following is a typical example of a vice-president-level job search announcement that seeks candidates to lead the creation of a Lean enterprise (LSA, 2004). The descriptions are followed by commentary highlighting the lack of knowledge and misunderstandings possessed by hiring companies and search firms.

The role of the Vice President will be to bring an accelerated Lean program to the entire organization.

Commentary

- Lean is a management system, not a program.
- A single Vice-President cannot accelerate Lean implementation. This places an unreasonable expectation on the VP, and will likely lead to diminished outcomes or even failure. It takes the dedicated efforts of the entire senior management team, led by the CEO or President to achieve a "widespread fast" (rather than a "local incremental") Lean transformation (Emiliani *et al.*, 2003).
- Using the term "accelerated" can imply that the company will soon be Lean, when in fact a company is never "Lean," since there is no end to continuous improvement and related learning.

The Vice President will have responsibility for building the Lean organization, training the personnel and coordinating the activities of an enterprise wide continuous improvement program.

Commentary

- Responsibility for building a Lean organization lies with the entire senior management team, led by the CEO or President.
- Each senior manager has the responsibility for training personnel, which is gained through their own direct participation in *kaizen* (Emiliani *et al.*, 2003; Spear, 2004).

Current understanding and practices of Lean must be augmented and implementation must be accelerated. To these ends senior management has elected to create this position that will have full focus on Lean deployment.

Commentary

- Each senior manager should be fully focused on Lean deployment if they truly expect implementation efforts to be accelerated.

The Vice President will initially create a strategy and plan for implementation along with the senior officers of the company. As this plan will affect all functions of the organization it is imperative that the officer obtain buy in from those concerned.

Commentary

- If senior management has elected to create this position, then it is odd that the Vice President would have to be saddled with the requirement to obtain buy-in from those who presumably support the activities associated with this position. Having to gain buy-in among senior officers will slow down the Lean implementation, thus contradicting the need for accelerating implementation.

It is anticipated that the plan be available for tactical deployment within the first three to six months.

Commentary

- Lean implementation must be connected to company strategy (Akao, 1991). The wording implies that Lean deployment can be independent of company strategy.
- Planning and justifications consume time, thus contradicting the stated need for accelerating implementation.

Metrics development for process monitoring is the responsibility of the Vice President.

Commentary

- Developing new metrics for process monitoring can result in: first, the proliferation of metrics, many of which will conflict with established metrics; second, unnecessary complexity, or both (Emiliani *et al.*, 2003; Fiume and Cunningham, 2003; Maskell and Baggaley, 2003).
- Ownership for business metrics is distributed among the senior management team. Current metrics should be examined for consistency with Lean principles and practices. Many will be eliminated and replaced with fewer, simpler metrics that give real-time visibility into the performance of workflows. This requires the involvement of all senior managers. Making the Vice President solely responsible for metrics development and process monitoring places an unreasonable expectation on the Vice President, and will likely lead to diminished outcomes or even failure.

Candidate should be able to produce quantifiable results including reductions in inventories, working capital reduction, increased service levels and improved operating profit and cash flow.

Commentary

- This wording implies that deployment of Lean principles and practices should be limited to operations, and the reason for implementing Lean is mostly financial.
- The reason for implementing Lean is to improve end-use customer satisfaction by becoming a better time-based competitor – i.e. develop capabilities to more rapidly respond to changing market conditions.

- Improved financial and non-financial results are achieved by improving workflows across functions and between companies (i.e. customers and suppliers). It is not the sole responsibility of one Vice President (Emiliani *et al.*, 2003).
- Improved financials and higher stock price are the byproduct of improving the non-financial performance of value-creating activities (Womack and Jones, 1996; Fiume and Cunningham, 2003).

Experience in culture change and Lean installation on a company wide basis is required. We are aware of the need to conduct improvement and change throughout the organization. A sense of timing and an understanding of the ramifications of each change on the organization as a whole are needed in this individual.

Commentary

- The words "culture change" are often subject to interpretation in Lean transformations. It is most often associated with changes in how specific activities are performed, with little or no emphasis on behavioral elements associated with work activities. In most cases, experience with "culture change" is limited in scope, and will likely lead to diminished results or even failure. What is needed is a change in dozens of beliefs among all senior managers, which then results in behaviors and competencies that support Lean principles and practices (Emiliani, 2003a; Emiliani and Stec, 2004). This establishes the basis for wider organizational support of the Lean management system.
- Having "a sense of timing and an understanding of the ramifications of each change" may contradict the need for accelerating implementation.

We envision this individual as a team builder. Change of this magnitude will not be successful unless the Vice President is capable of building strong team commitment for change and improvement throughout the organization. Our candidate of choice will have a proven record of coalescing attitudes for change.

Commentary

- Conventional business metrics focus on local optimization and thus discourage cross-functional teamwork. So does an environment based on fear and blame, as well as layoffs due to productivity improvement. The Vice President will be unable to successfully promote team building in the absence of a no-blame policy, qualified job guarantee and metrics that are fully aligned with Lean principles and practices (Fiume and Cunningham, 2003; Maskell and Baggaley, 2003; Emiliani *et al.*, 2005). This will contradict the need for accelerating implementation.
- Is it reasonable to expect the Vice President to be able to coalesce attitudes for change when the current senior managers have apparently been unsuccessful at achieving this requirement?

MBA Degree.

- There is not a business school in the world that teaches the Lean management system throughout its curriculum. Thus, MBA degrees are of limited value with respect to leading a Lean transformation (Emiliani *et al.*, 2003; Emiliani, 2004b). What counts is deep on-the-job experience in practicing continuous improvement and respect for people at the point where value-adding work is actually performed (Emiliani *et al.*, 2003; Liker, 2004; Spear, 2004).

Job candidates that have a deep understanding of the Lean management system would view the search announcement cautiously, as it reflects many misunderstanding about Lean by senior managers of the hiring company – including incorrectly suggesting that Lean implementation can be delegated to one senior manager. However, most candidates today do not yet have a deep understanding of Lean, partly driven by the fact that a detailed written description of the Lean management system and Lean transformation has only recently become available (Emiliani *et al.*, 2003). Thus candidates will likely have difficulty recognizing the challenges they will face and also meeting the expectations of the senior management team as expressed in executive search announcements.

"Real Lean" vs "Imitation Lean"

The senior managers of most companies that adopt selected parts of the Lean management system, or apply Lean in just one area such as operations, believe that this is sufficient for them to characterize their business as "Lean" (Liker, 2004). Mr Taiichi Ohno, former Executive Vice President of Toyota Motor Corporation who is largely credited with creating Toyota' management system, had this to say about managers that adopt only selected Lean principles and practices (Shinohara, 1988):

> Companies make a big mistake in implementing the Toyota production system thinking that it is just a production method. The Toyota production method won't work unless it is used as an overall management system. The Toyota production system is not something that can be used only on the production floors. The belief that it is only a production method is fundamentally wrong... those who decide to implement the Toyota production system must be fully committed. If you try to adopt only the "good parts", you'll fail.

So there is a distinction that can be made with regard to the extent to which Lean principles and practices are deployed, which we refer to as "Real Lean" and "Imitation Lean".

"Real Lean" is the faithful adoption of the Lean management system across the enterprise, perhaps with appropriate modifications suitable to a companies' individual circumstances – but still consistent with Lean principles. "Imitation Lean" occurs when only selected Lean principles and practices are adopted. In "Imitation Lean", the focus is on continuous improvement, typically just the tools, and not both "continuous improvement" and "respect for people".

Remarkably, most senior managers think that "Real Lean" is an idealistic approach to the Lean transformation, one that is not practical in the "real world", despite the existence of companies that have done just that (Womack and Jones, 1996; Emiliani *et al.*, 2003; Liker, 2004). Thus, the typical approach taken by most businesses is to begin Lean efforts as modest experiments to improve productivity in operations (Bowen and Youngdahl, 1998; Goland *et al.*, 1998; Liker, 1998; LEI, 2003; Panchak, 2003; Swank, 2003; Wysocki,

2004). As a result, opportunities to significantly improve the entire business system are lost – at least for a while. Senior managers should be very concerned if all that their company is doing is "Imitation Lean" for the following reasons:

- "Imitation Lean" (tools only) is easy for competitors to replicate. Thus, competitive advantage, if any was achieved, will be fleeting. "Real Lean" is much harder for competitors to copy.
- "Real Lean" results in much better financial and non-financial performance compared to "Imitation Lean" (Emiliani *et al.*, 2003; Fiume and Cunningham, 2003; Maskell and Baggaley, 2003).
- "Imitation Lean" can do more harm than good because senior management's message is not clear. It is a mix of Lean and non-Lean principles, practices and metrics. This is confusing, and most people will lose interest and disengage.
- Many people have the view that some improvement is better than no improvement. However, deploying Lean incorrectly from the start will undermine future Lean efforts. The errors will have to be undone – that is re-work. It will take time, effort and money to correct the errors; resources that you might not have.
- With "Imitation Lean", the rate of improvement is low. A company's competitive environment may not allow it the luxury of improving slowly.
- Deploying "Imitation Lean" is inconsistent with the "respect for people" principle (i.e. employees, suppliers, customers, investors and the community).

For these reasons, it is important to ensure that senior managers have an accurate understanding of how to implement a Lean transformation. While it is tempting to rush into applying Lean principles and practices and obtain quick results, principally in operations, senior managers must not forget to think deeply about the intent of Lean and related nuances in order to avoid poor outcomes or unintended consequences.

Summary

This paper examined the typical approach taken by senior managers seeking to implement Lean principles and practices in their organization to achieve a Lean transformation. Numerous misunderstandings about the Lean management system, including its intent and related nuances, where identified, which result in common implementation errors.

These errors reveal much about the current state of understanding of Lean among senior managers and supporting service providers such as Lean implementation consultants and executive search firms. Unfortunately, they result in inconsistencies with other management practices and business metrics in use, disenfranchise key stakeholders, and thus slow down that rate of improvement.

The Lean management system is very different from other efforts by senior managers to improve business activities, which are better characterized as "programs" or "initiatives". In seeking to implement a Lean transformation, senior managers must realize that they are embracing for the first time a principle-based system of management whose objective is to change the way all work activities are performed, not just those in operations.

The subtle nature of the Lean management system means that is it very easy to succumb to "Imitation Lean" and also become lost in transformation, thus losing valuable resources such as time, human effort and money. By eliminating waste and focusing only on value-creating activities that end-use customers are willing to pay for, organizations will realize much better financial and non-financial performance, as well as improved capabilities for competing on the basis of time. These are important outcomes that senior managers seek, and to achieve them they must be willing to invest their time and effort to learn the true nature and intent of the Lean management system.

References

Akao, Y. (1991), Hoshin Kanri*: Policy Deployment for Successful TQM*, Productivity Press, Portland, OR.

Barron, K. (2000), "Hurry up and wait", *Forbes*, 16 October, pp. 158-64.

Basu, S. (1999), *Corporate Purpose: Why it Matters More than Strategy*, Garland Publishing, New York, NY.

Bowen, D. and Youngdahl, W. (1998), "Lean service: in defense of a production line approach", *International Journal of Service Industry Management*, Vol. 9 No. 3, pp. 207-25.

Brady, D. (2000), "Why service stinks", *Business Week*, 23 October, pp. 118-28.

Corrie, M. (2004), "Lean success in an administrative environment", *Target*, Vol. 20 No. 1.

Dyer, J. and Hatch, N. (2004), "Using supplier networks to learn faster", *Sloan Management Review*, Vol. 45 No. 3, pp. 57-63.

Dyer, J. and Nobeoka, K. (2000), "Creating and managing a high-performance knowledge-sharing network: the Toyota case", *Strategic Management Journal*, Vol. 21, pp. 345-67.

Emiliani, M.L. (1998a), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-31.

Emiliani, M.L. (1998b), "Continuous personal improvement", *Journal of Workplace Learning*, Vol. 10 No. 1, pp. 29-38.

Emiliani, M.L. (2000), "Cracking the code of business", *Management Decision*, Vol. 38 No. 2, pp. 60-79.

Emiliani, M.L. (2001), "Redefining the focus of investment analysts", *Total Quality Management*, Vol. 13 No. 1, pp. 34-50.

Emiliani, M.L. (2003a), "Linking leaders' beliefs to their behaviors and competencies", *Management Decision*, Vol. 41 No. 9, pp. 893-910.

Emiliani, M.L. (2003b), "The inevitability of conflict between buyers and sellers", *Supply Chain Management: An International Journal*, Vol. 8 No. 2, pp. 107-15.

Emiliani, M.L. (2004a), "Improving business school courses by applying lean principles and practices", *Quality Assurance in Education*, Vol. 12 No. 4, pp. 175-87.

Emiliani, M.L. (2004b), "Is management education beneficial to society?", *Management Decision*, Vol. 42 Nos 3/4, pp. 481-98.

Emiliani, M.L. (2004c), "Sourcing in the global aerospace supply chain using online reverse auctions", *Industrial Marketing Management*, Vol. 33 No. 1, pp. 65-72.

Emiliani, M.L. (2005), "Using *kaizen* to improve graduate business school degree programs", *Quality Assurance in Education*, Vol. 13 No. 1, pp. 37-52.

Emiliani, M.L. and Stec, D.J. (2004), "Using value stream maps to improve leadership", *Leadership & Organizational Development Journal*, Vol. 25.

Emiliani, M.L., Stec, D. and Grasso, L. (2005), "Unintended responses to a traditional purchasing performance metric", *Supply Chain Management: An International Journal*, Vol. 10 No. 3.

Emiliani, B., Stec, D., Grasso, L. and Stodder, J. (2003), *Better Thinking, Better Results*, The Center for Lean Business Management, Kensington, CT.

Fiume, O. and Cunningham, J. (2003), *Real Numbers*, Managing Times Press, Durham, NC.

Ford, H. (1988), *Today and Tomorrow: An Autobiography*, special reprint ed., Productivity Press, Portland, OR.

Fujimoto, T. (1999), *The Evolution of a Manufacturing System at Toyota*, Oxford University Press, New York, NY, pp. 129-72.

Goland, A., Hall, J. and Devereaux, C. (1998), "First national Toyota", *The McKinsey Quarterly*, No. 4, pp. 59-66.

Imai, M. (1997), *Gemba Kaizen*, McGraw-Hill, New York, NY.

Johnson, H. and Bröms, A. (2000), *Profit beyond Measure*, The Free Press, New York, NY.

Kimoto, S. (1991), *Quest for the Dawn*, originally published in Japanese as *Yoake E No Chosen*, 1979, The Dougherty Company, Milwaukee, WI.

Kunio, N. (2000), "Respecting human beings", *Look Japan*, January.

LEI (2003), "LSG Sky chefs cater to new market realities", Lean Enterprise Institute, Brookline, MA, 29 April, available at: www.leanorg/Lean/Community/Registered/SuccessStorycfm?SuccessStoryId = 5

LEI (2004), "LEI's first annual state of Lean report detects solid gains and common obstacles", Lean Enterprise Institute, Brookline, MA, 18 February, available at: www.lean.org/WhoWeAre/NewsArticleDocuments/LEI%20State%20of%20Lean%20Report%202%2004.doc (accessed 23 October 2004).

Liker, J. (1998), *Becoming Lean*, Productivity Press, Portland, OR.

Liker, J. (2004), *The Toyota Way*, McGraw-Hill, New York, NY.

LSA (2004), Anonymous executive job search position posting.

Maskell, B. and Baggaley, B. (2003), *Practical Lean Accounting*, Productivity Press, New York, NY.

Minoura, T. (2002), "Address to the world-class manufacturing forum", available at: www.electronics-scotland.org/industry_comment/comment_item.cfm?itemID = 18 (accessed 18 May 2004).

Monden, Y. (1993), *The Toyota Management System*, Productivity Press, Portland, OR.

Morimatsu, H. (2003), "Toyota's ideals (2): huge reserves ensure high torque", *NikkeiNet Interactive*, 4 November.

Nishiguchi, T. (1994), *Strategic Industrial Sourcing*, Oxford University Press, New York, NY.

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Okuda, H. (1999), "Slashing payrolls shows executive incompetence", *Japan ECHO*, Vol. 26 No. 6, pp. 14-17.

Panchak, P. (2003), "Lean health care? It works!", *Industry Week*, 1 November, available at: www.industryweek.com/CurrentArticles/asp/articles.asp?ArticleId = 1503 (accessed 6 May 2004).

Post, C. and Slaughter, J. (2000), "Lean production: why work is worse than ever, and what's the alternative?", a Solidarity working paper, available at: solidarity.igc.org/LeanProduction.html (accessed 2 June 2004).

PRHI (Pittsburgh Regional Healthcare Initiative) (2004), Pittsburgh, PA, available at: www.prhi.org/ourmodel.cfm and www.prhi.org/publications.cfm (accessed 25 October 2004).

Rother, M. and Shook, J. (1999), *Learning to See*, Lean Enterprise Institute, Inc., Brookline, MA.

Shingo (2004), *Shingo Prize*, College of Business, Utah State University, Logan, UT, available at: www.shingoprize.org/BusPrize/recipients/current.htm (accessed 7 May 2004).

Shinohara, I. (1988), *NPS: New Production System*, Productivity Press, Cambridge, MA, pp. 153-5.

Smart, P., Tranfield, D., Deasley, P., Levene, R., Rowe, A. and Corley, J. (2003), "Integrating 'Lean' and 'High Reliability' thinking", *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, Vol. 217 No. 5, pp. 733-9.

Sorenson, C. (1956), in Williamson, S. (Ed.), *My Forty Years with Ford*, W.W. Norton Company, Inc., New York, NY.

Spear, S. (2004), "Learning to lead at Toyota", *Harvard Business Review*, Vol. 82 No. 5, pp. 78-86.

Spear, S. and Bowen, K. (1999), "Decoding the DNA of the Toyota production system", *Harvard Business Review*, Vol. 77 No. 5, pp. 96-106.

Swank, C.K. (2003), "The lean service machine", *Harvard Business Review*, Vol. 81 No. 10, pp. 123-9.

Tapping, D. and Shuker, T. (2003), *Value Stream Management for the Lean Office*, Productivity Press, New York, NY.

Taylor, F.W. (1967), *The Principles of Scientific Management*, originally published in 1911 by Harper & Brothers Publishers, New York, NY, W.W. Norton, Co., New York, NY.

Toyota (1988), *Toyota: A History of the First 50 Years*, Toyota Motor Corporation, Toyota City, Nagoya, pp. 15-77.

Toyota (2001), *The Toyota Way 2001*, internal document, April, Toyota Motor Corporation, Toyota City, Nagoya.

Varnon, R. (2003), "Job cuts imminent at Stratford firm", *Connecticut Post*, 13 May.

Womack, J. (2003), "Is Lean mean?", e-mail message to the Lean community, Lean Enterprise Institute, Brookline, MA, 2 December, available at: www.lean.org/Lean/Community/Registered/ShowEmail.cfm?JimsEmailId = 32 (accessed 8 May 2004).

Womack, J. (2004a), "Adding cost or creating value?", e-mail message to the Lean community, Lean Enterprise Institute, Brookline, MA, 3 March, available at: www.lean.org/Lean/Community/Registered/ShowEmail.cfm?JimsEmailId = 35 (accessed 8 May 2004).

Womack, J. (2004b), "Lean beyond the factory", e-mail message to the Lean community, Lean Enterprise Institute, Brookline, MA, 23 March, available at: www.lean.org/Lean/Community/Registered/ShowEmail.cfm?JimsEmailId = 36 (accessed 8 May 2004).

Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY.

Wysocki, B. (2004), "To fix health care, hospitals take tips from factory floor", *The Wall Street Journal*, Online, 9 April.

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Improving management education

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Abstract

Purpose – To present an outsider's view of how management education can be significantly improved.

Design/methodology/approach – Focuses on correcting several obvious deficiencies in courses and degree programs to create highly differentiated educational experiences that are more relevant to student's needs and the organizations that employ graduates.

Findings – Proposes a suite of 11 interconnected improvements as well as a fundamental re-structuring of the MBA program designed to simplify it, provide greater focus, improve relevancy, and impart needed thematic consistency.

Practical implications – Presents 11 practical improvements individual faculty or schools can readily incorporate into existing courses or degree programs. The proposed curriculum for a completely re-structured MBA program can add distinctiveness and expand the value proposition for students and their employers.

Originality/value – The suite of 11 improvements and proposed MBA program curriculum changes offers an alternate route for preparing students for future global business challenges. The proposed improvements are intended to serve as a foundation for discussion and debate, and hopefully future action as well.

Keywords Curriculum development, Master of business administration, Management development

Paper type Case study

Introduction

Recent studies questioning the relevance of management research and education in the USA and their role in the many recent corporate scandals clearly indicate a strong need for improvement (AACSB, 2002; Donaldson, 2002; Etzioni, 2002; Mangan, 2002; Mintzberg *et al.*, 2002; Pfeffer and Fong, 2002; Ghoshal, 2003, 2005; Emiliani, 2004a; Bennis and O'Toole, 2005; Ferraro *et al.*, 2005; Holstein, 2005; Tsurumi, 2005). However, the solutions proposed by most academics and management practitioners are predictable (Andrews and Tyson, 2004; AACSB, 2004; Kochan, 2002): nothing radical, just a few small changes that would have minimal impact among faculty, students, and businesses. Common examples include: adding a course in business ethics; greater emphasis on communication; interpersonal skills and teamwork; industry-specific specializations; team teaching; or re-packaging existing knowledge into programs with glamorous-sounding new names (Bisoux, 2005; Garten, 2005; Gloeckler, 2005).

This outcome should not be surprising because it is common for insiders to have a narrow view of opportunities and consider small changes as acceptable evidence of improvement. These solutions do not address the root cause of the problem, the need for more substantive re-structuring of management curricula, or even the fundamental premises on which modern management education is founded. In my view, management education is in critical condition, and the solutions offered to-date are grossly insufficient and will not yield better educated students. So how would an

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outsider – someone not saturated in conventional thinking about management education – see things? With this in mind, I offer my thoughts on how to improve management education, particularly graduate degree programs.

I am an outsider to the world of business school education. My undergraduate, master's, and PhD degrees are engineering, and I have 15 years of industrial management experience in three disciplines: engineering, manufacturing, and supply chain management. One of the things I learned while in industry was the practice of *kaizen*, a structured process for continuous improvement (Imai, 1986, 1997; Emiliani, 2000a). *Kaizen* teams consist of people that know the business process under scrutiny, as well as others that do not. Invariably, the people who are not familiar with the process offer some of the best new insights for improvement because they are not bound by convention. So please think of me simply as a *kaizen* team member from a different school.

After teaching for six years in a management school and having nearly 30 peer-reviewed papers published in management journals, my general impression of management education is that it lacks intellectual rigor compared to what I experienced in my engineering education. While engineering education is also in need of improvement, particularly with regards to human factors such as organizational behavior, leadership, and supply chain, it does offer some useful ideas for improving management education. I found that most management faculty had a remarkably poor understanding of obvious and not-so-obvious cause-effect relationships. Also notably lacking was an appropriate balance of quantitative and non-quantitative data analysis which would help students make better business decisions. Our management faculty was not unique with regards to these shortcomings, as evidenced by the relevancy issues that management education, textbooks, and academic journal publications face (London and Bradshaw, 2005), as well as the many bad real-world business outcomes that we have all witnessed in recent times (SEC, 2005).

This paper identifies and discusses 11 important deficiencies, which if addressed would greatly improve undergraduate and graduate management education. Please note that these areas for improvement are specific and can be acted upon by faculty, either individually or as a group. They are not marketing gimmicks, nor are they abstract notions that lack a clear path for incorporation into curricula. Importantly, they are also responsive to the current and future needs of manufacturing and service businesses, as well as non-profit and government organizations.

What follows is not intended to be a comprehensive prescription for improving management education in the USA. Nor is it intended to suggest that management education is solely responsible for every problem faced by businesses. Rather, it should serve a simpler purpose: that of a general blueprint which management educators can use to begin to make meaningful improvements and perhaps also create competitive advantage. Also, while the items may appear to readers as a list, I present them as a network of interconnected improvements that should not be separated. Cherry-picking a few items that faculty judge to be most important will do little to significantly improve management education and business decisions made by future managers.

Corporate purpose

Often, much time is spent in the classroom discussing what seems to be a very important question: Why do corporations exist? Is it to create shareholder value, or is it

to meet the needs of people? If we just observe the world around us, it should be plainly obvious that it is both (Basu, 1999; Senge, 2000; Kelly, 2001; Mitchell, 2001; Handy, 2002; Emiliani, 2003a; Tsurumi, 2005). However, the issue is typically presented as an either-or proposition, built on idealistic assumptions (Friedman, 1970; Jensen and Meckling, 1976; Jensen, 2000), which creates confusion and uncertainty among business leaders and stakeholders regarding corporate purpose (Allen, 1992; Begley, 2005; Ferraro *et al.*, 2005; Ghoshal, 2005; Grow, 2005; Witzel, 2005; Tsurumi, 2005).

So ask one simple question: "Who created the corporation?" The answer, of course, is people. So is seems logical that business should broadly satisfy human needs as well. Indeed, the very equation used to calculate shareholder value (shareholder value = corporate value − debt) indisputably acknowledges the existence of stakeholders and the human-economic purpose of business (see Appendix) (Emiliani, 2004a). Value stream maps, which are pictorial descriptions of the process used to create a product or service, do so as well (Rother and Shook, 1999; Jones and Womack, 2002; Maskell and Baggaley, 2003; Emiliani and Stec, 2004).

Rather than debate corporate purpose, a more productive classroom discussion would be to understand the difference between a corporation's intrinsic (i.e. inherent or natural) purpose and extrinsic (i.e. extraneous or man-made) purpose (Emiliani, 2003a). The long history of trade and the corporation (Micklethwait and Wooldridge, 2003) – topics that sorely need to be taught in business schools – clearly show the intrinsic purpose of the corporation is to satisfy both human and economic needs (Basu, 1999; Senge, 2000; Kelly, 2001; Mitchell, 2001; Mintzberg *et al.*, 2002; Ellsworth, 2004; Tsurumi, 2005).

It seems many academics, in the absence of critical thinking, prefer to advocate a naïve and simplistic corporate purpose neatly summed up by the popular phrase: "maximize shareholder value"[1] (Friedman, 1970; Jensen, 2000; Deutsch, 2005), typically in the short-term (Senge, 2000; Cassidy, 2002; Kay, 2005; Gore and Blood, 2005). However, this is reasonable only under very limited circumstances. For example, if I sell my home or car – a one-time event – then it is sensible to try to maximize value for me, the owner. But if my business enjoys viable continuing operations, then it is not sensible to maximize value in the short term because I risk damaging the long-term customer-satisfying and wealth generating enterprise that I have created.

Legal decisions in the USA regarding corporate ownership over the last century have typically favored shareholder's interests (Allen, 1992). This has compelled most academics and managers of large publicly-owned corporations to adopt an extrinsic interpretation of corporate purpose – one that strongly favors shareholders' economic interests (often short-term) over all other stakeholders' economic and non-economic interests. Board members who subscribe to the extrinsic interpretation compel top managers to follow what appears to be, on the surface, a much simpler path. But it creates a problem that agency theory – the study of differences in motives and behaviors between company owners and agents hired by owners to manage the company (Jensen and Meckling, 1976; Jensen, 2000) – will never solve. It is akin to saying that as a person, I favor my eyes above all else. Therefore, I do not care if I lose a leg, or if my hearing fails, or if my heart stops beating. People need all of their parts to fully function, and likewise a business also needs all of its stakeholders to fully function. To think otherwise is a logical fallacy – i.e. an error in reasoning.

Academics and senior managers who faithfully insist the purpose of a corporation is to maximize shareholder value should recognize that this can be realized in more than one way (Emiliani, 2003b; Tsurumi, 2005). There is the literal way, i.e. purely financial (naïve and simplistic); or the non-literal way, i.e. financial plus many other important factors such as market share, quality, service, innovation, etc. (realistic and challenging). Both interpretations are valid with regards to the fulfilment of legal responsibilities by corporate directors. However, only the latter is sensible in practice, ethical, and morally defensible (Emiliani, 2000a; Skapinker, 2005). And only the latter is worth the very high prices paid for ordinary executive labor in recent years (Hymowitz, 2005).

Business principles

One strong feature of engineering education is that the various disciplines contain clearly articulated principles which students, and later engineering practitioners, closely follow. They adhere to principles in the actual practice of engineering because they have been tested and shown to ensure favorable outcomes. When principles are not adhered to, the results can be catastrophic. While some of the principles are approximations or may not be perfect (e.g. the use of safety factors), there is little or no argument among engineers as to their usefulness in supporting good engineering practice.

The questions is: does US management education lead to a similar outcome? It seems that it does not. Top managers can adopt whatever business principles they desire, be they wholesome and balanced among stakeholders (Toyota, 2001; Liker, 2004) – or amoral and skewed to benefit of a single stakeholder (Jensen, 2000; Mitchell, 2001; Cassidy, 2002; Skapinker, 2005; Tsurumi, 2005) as long as the Board of Directors agrees and employees or other stakeholders do not make a fuss. To teach an important profession such as management in the absence of well-articulated business principles designed to ensure successful outcomes, or to promote clearly defective theories whose application by managers systematically marginalize the interests of key stakeholders is reckless (Grant, 1991; Cassidy, 2002; Etzioni, 2002; Mintzberg *et al.*, 2002; Ghoshal, 2003, 2005; Ferraro *et al.*, 2005; Tsurumi, 2005).

Consider the broad-based allegiance among business school faculty to the shareholder supremacy model of business. Recurring financial scandals and breaches of ethical conduct illustrate the great difficulty that senior managers have when business decisions are based on the concept of shareholder supremacy. While it may appear to be sensible in theory, its use in practice results in many unintended consequences that harm investors, as well as employees, suppliers, customers, and communities.

Instead faculty should adopt a balanced "human-economic" approach to business using general principles that are best articulated by the Caux Round Table Principles for Business (Caux Round Table, 1994). While there are many third-party expressions of business principles (COC, 2005), the Caux Round Table Principles for Business is preferred because it was developed by business leaders and includes all key stakeholders. These principles, used in their entirety, should serve as the basis for teaching and scholarly inquiry for all business research and education (Emiliani, 2004a). The document is available online, and can be easily used by faculty as a stand-alone item or as a supplement to any textbook, case study, or other teaching material.

Using the Caux Round Table Principles for Business would send many unmistakable messages to students, including the existence of stakeholders, the inappropriateness of making destructive tradeoffs between key stakeholders (Okuda, 1999), and the purpose of business beyond creating shareholder value. Unfortunately, no business school anywhere in the world has yet subscribed to the Principles for Business to guide teaching and research (AACSB, 2004; Young, 2005).

Problem recognition

Strategic and tactical errors are common in business and typically repetitive in nature. They are often caused by faulty internal communication, incorrect theories or assumptions about business, and incorrect application of new improvement methodologies such as six-sigma (Finkelstein, 2003; Ferraro *et al.*, 2005; Ghoshal, 2005; Tsurumi, 2005; White, 2005). While the managers who make these errors and the companies they work for change over time, the types of errors remain largely the same. The most common recurring tactical or day-to-day errors are presented in Table I. The question becomes, then, why are the same or similar errors repeated? Shouldn't management educators teach students how to avoid the common errors that they will likely encounter when they become managers? Of course we should, but instead most educators are content to let students learn these lessons the hard way and at great personal and business expense.

Students should be taught how to recognize a problem, how to formally identify the root cause of a problem, and how to identify and implement practical countermeasures to prevent recurrence (Emiliani, 2004a). This may sound trivial, but it is not. Incontrovertible proof that managers are very bad at doing these three things, especially the first one, can be found in what are called "current state value stream maps" (Rother and Shook, 1999; Emiliani and Stec, 2004)

These simple diagrams show, among many other things, the total time it takes to fulfill a customer requirement and the time it takes to create value that end-use (i.e. cash generating) customers are willing to pay for. Current state value stream maps typically reveal that weeks or months of lead time are needed to perform only a few minutes of value added work. This situation often goes uncorrected for decades, through generations of senior managers, and thus proves that management has great difficulty recognizing problems (Emiliani and Stec, 2004).

In addition to teaching students how to recognize problems (Spear and Bowen, 1999; Spear, 2004), students should leave each course knowing the top 10-15 most common errors made by managers in that discipline or knowledge area.

Root cause analysis and countermeasures

Managers use many different tools to analyse problems and identify potential solutions. However, while the problem-solving tools may identify various causes, they do not usually identify root causes or illuminate cascading cause-and-effect relationships. Thus, solutions indicated by the tools used will typically address only symptoms, which can then lead to repetition of the same or similar problems in the future (Table I) and further consumption of valuable resources. The capability to rigorously identify root causes using formal methods – versus casual identification of seemingly related causes and then naming one cause as the "root cause" (e.g. Grossman, 2001; Kochan, 2002) – and also identify countermeasures to eliminate

Stakeholder	Management error
Employees	Unpaid labor; unfair pay; uneven pay (exec/non-exec)
	Elective layoffs
	Cutting benefits; uneven benefits (exec/non-exec)
	Discrimination; harassment
	Unsafe workplace – physical and mental
	Ignoring employee suggestions
Suppliers	Avoiding or cutting payments; debiting suppliers' accounts; pay to play
	Squeezing suppliers margins
	Ignoring supplier suggestions
Customers	Channel stuffing
	Incomplete disclosure of terms; withholding information from customers
	Bid rigging
	Ignoring customers and their complaints
	Profile-based pricing; non-uniform pricing; tying; overcharging; hidden fees; stealing
	Consistently poor quality products or services
Investors	Inflating earnings; hiding debt; self-dealing
	Failure to respond to the competition
	Lack of new products or services
	Incomplete disclosure; withholding information
	Overpaying when buying companies, consulting services, executive labor, perks, etc
Community	Plant or office closings
	Tax evasion; reincorporating offshore
	Damaging the environment
	Incomplete disclosure
Competitors	Predatory pricing
	Antitrust violation
	False or misleading advertising
	Acquiring competitor's proprietary documents
All	Power-based bargaining
	Not understanding the problem
	Blaming people
	Politicizing the workplace
	Conflicts of interest

Table I.
Common errors made by senior managers

Source: Collected from hundreds of articles in *The Wall Street Journal*, 1999-2005

repeat errors should be considered a basic managerial skill and included in managers' overall problem-solving tool set.

A second strong feature of engineering education is that it is common for students to take one or more courses in failure analysis. In these courses, engineered components or structures that have failed are studied to determine the root cause of failure. These are popular courses whose teachings students typically remember for a very long time. However, with rare exception (Argenti and Finkelstein, 2006), there is no analogue for these types of courses in business schools (Doria *et al.*, 2003).

Nor are formal root cause analyses typically conducted within individual business school courses (Doria *et al.*, 2003). A non-scientific but detailed review of course syllabi

from several top business schools, dozens of conversations with faculty, and feedback from several hundred of my adult working professional students confirm this observation. The absence of formal root cause analysis across the curriculum appears to be due in part to there being no requirement for it (AACSB, 2002, 2005) and misunderstandings. Like most other people, business school professors think that root cause analysis is applicable only to technical manufacturing or engineering problems, and not for human resource, finance, or marketing problems. If a finance or organizational behavior professor never came across root cause analysis while pursuing their advanced degrees over many years, then it must not be relevant. In general, I find that both faculty and managers have other misconceptions, such as root cause analysis takes a long time to do or is a chart-making exercise. Or they may think, incorrectly, that root cause analysis of business problems is harder to do or more complex than for engineering problems.

Because formal root cause analysis is widely marginalized, students graduate from school not knowing how to determine the root cause of business problems. Not surprisingly, when managers encounter problems in business, they typically address the symptom and not the cause, and are thus likely to encounter the same error again at a later date (Table I). I know of no senior manager at a major US corporation that personally engages in formal root cause analysis. If the boss does not think it is important, then the workers won't care about it either.

As educators, we must admit that it is bad for our graduates to repeat the same errors made by others before them (Emiliani, 2004a). It is indicative of a truly poor quality education, unmentionable as it is. Imagine engineering graduates who design bridges that keep falling down because they ignore errors made by their predecessors. We would not consider these engineers to be well educated. Failed companies such as Sunbeam, Warnaco, Rite-Aid, Arthur Andersen, Enron, K-Mart, WorldCom, etc., are the business equivalent of the engineer's bridge that has fallen down. We should not consider the leaders of those businesses, our former students, as well educated either. We must take more seriously the negative consequences of one-time and repeat errors on employees' careers, customers' experience, corporate financial and non-financial results, and other important factors such as supplier and community relations.

The root cause of most business problems can be understood more completely by using two additional tools: "5 Whys" (Ohno, 1988) and "cause-and-effect" or "fishbone" diagrams. This should be part of every course, as students' skills in conducting root cause analyses will improve with practice. Understanding the root cause of problems is very good first step, but an equally important task is to identify practical countermeasures to prevent recurrence. I find that students (and managers) are capable of identifying theoretical or high-level countermeasures, but not good at identifying specific, practical countermeasures to implement at the exact point in the process where the error occurred. This is something that must be taught, and improvement comes with practice.

Organizational politics and blame

In order to succeed at problem recognition, root cause analysis, and the identification and implementation of countermeasures, the leaders of an organization must be willing to confront and admit errors. However, most leaders are not good at this. They prefer to hide errors and blame other people, often engaging in elaborate organization politics to

obfuscate (Argyris, 1990) – instead of focusing on improving the products and services that customers want to buy. These defensive routines are supported by mental models which are created by observing the day-to-day behaviors of leaders in organizations.

As educators, we should teach students that improvement is a human-centered activity, and that it is impossible to improve business processes if people will be blamed by managers for trying new things and possibly failing. While it is easy to understand why people engage in blaming, we must ask a simple but deeper question: "Who benefits from blame?" Does blame make customers more loyal? No. Does it make employees happier? No. Does blame create value? No. Does it speed up information flow? No. Does blame enrich the corporation? No. If blame has no benefits, then why do it?

Organizational politics and blame need to be exposed by all faculty members, regardless of discipline, for what they really are: waste, which is defined as: activities that add cost but do not add value (Ohno, 1988; Emiliani, 1998, 2003b; Emiliani and Stec, 2004). Too often educators present organizational politics and blame as necessary evils and whose effects can be mitigated by "growing a thicker skin" or through organizational behavior or organizational development interventions – when in fact organizational politics and blame serve no useful purpose (Pearson and Porath, 2005) and can be eliminated. Students can be taught how to do this by using value stream maps, but in a novel way: as a diagnostic tool to reveal the strong linkages between leaders' beliefs, behaviors, and competencies (Emiliani and Stec, 2004).

Business leaders that establish and adhere to a "no-blame" policy will encourage the detection, elimination, and prevention of errors and at the same time dampen or eliminate destructive blame and organizational politics (Emiliani *et al.*, 2003). Management concern about the physical safety of employees is highly commendable, but their lack of concern over employee's mental health and safety, and stress-related illnesses represents an enormous improvement opportunity. Faculty can do a better job emphasizing these important points to students. Specific step-by-step methods for doing diagnosing and eliminating organizational politics and blame have been previously reported (Emiliani, 1998, 2003b; Emiliani and Stec, 2004), and can be easily incorporated into the curriculum.

Results-only focus versus process and results

A common management slogan is: "It's only results that matter." It is possible that this slogan sprang entirely from management practitioners, but it is likely that educators contributed to its allure because it sounds good. But if instead this slogan leads to decisions and activities that hurt a business and its key stakeholder much more than it helps, then shouldn't students be made aware of that? How can this happen? Often, this slogan degenerates into an unhealthy results-at-any-cost mentality among business leaders. Students, when confronted with the many direct and indirect problems associated with having a strong results-only focus readily appreciate and accept how having a balanced process and results focus leads to better and more consistent outcomes. The most convincing evidence for students are real-world examples from business periodicals such as *Financial Times*, *The Wall Street Journal*, *The Nikkei Weekly*, or by using specific examples from their own workplace.

Knowing business processes in detail is very important and should matter greatly to senior managers for two reasons:

(1) if the process yields bad results, then they would want to stop the bad result from happening again – without blaming people; and

(2) if the process yields great results, they would want to share the process with other people in our business so that they can reliably repeat favorable outcomes.

Either way, understanding the process is the baseline from which improvement takes place to achieve results (Imai, 1986; Ohno, 1988). If we do not know the process, then how can anyone be sure that something called an "improvement" really is an improvement?

Understanding business processes in detail results in less variation in product or service quality, lower costs, and shorter lead-times (Imai, 1986, 1997; Womack and Jones, 1996; Rother and Shook, 1999). *Ad hoc* problem solving focused on symptoms rather than root causes drains resources from organizations and slowly erodes their competitiveness. A countermeasure would be to teach students – in every course – the importance of understanding all business activities as processes, and how to utilize systematic approaches for process improvement that yield tangible results. If this is not done, many students will leave school thinking activities in operations consists of processes, while those in marketing, finance, or human resources do not.

One simple yet very powerful tool is value stream maps, which help people understand any business process and how to improve the flow of material and information (Rother and Shook, 1999; Jones and Womack, 2002). These maps invariably point people towards identifying simple, low-cost solutions to challenging problems, rather than towards expensive new software, machines, facilities, or additional headcount. They encourage people to spend ideas, not dollars – and thus contribute to more effective utilization of valuable human resources.

Value added and waste

By focusing on the process, people will begin to question all activities that are performed to fulfil a customer request (Ohno, 1988; Womack and Jones, 1996). They will say:

- Does this activity add value that end-use customers are willing to pay for?
- This work adds no value but needs to be done. We can't eliminate it – for now.
- These activities are waste. All they do is add cost. They can be eliminated.

It should not be a surprise that people who are focused on results never think of work activities in these three ways. They do not make any differentiation between value-added work and activities that are waste (Ohno, 1988). As a result, managers and workers spend much of their time creating and managing waste because to them it appears to be important work. But it is not. The formal definitions of value-added work and waste should be understood by all faculty, and faculty should teach these to students because they are critical to the long-term success of a company.

Invariably faculty, like any other person who is not aware of what waste is, will think that there is no waste in the business processes that encompass their knowledge area. Nor will they think there is waste in the design and delivery of the courses they teach or perhaps even within their own University's operations (Woods and Zaher, 2004; Temponi, 2005; Comm and Mathaisel, 2005a, b). Evidence of such thinking can be found in the very common desire among faculty to add more material to a course,

rather than eliminate material, or say: "Everything I do adds value." Of course they are mistaken on both counts (Zimmerman, 1991; Emiliani *et al.*, 2003; Emiliani, 2004b, 2005), but therein lay dozens of opportunities to improve courses in ways that are more relevant to future management practitioners (Grossman, 2001; Emiliani, 2005).

Time-based competition

An important factor for achieving long-term success in the marketplace is the ability to satisfy customer demand faster than competitors at the same or lower price and with equal or higher quality (Stalk, 1988; Stalk and Hout, 1990). Companies that do this well are comprised of managers, workers, and suppliers who want to know the details of every business process. They have to know the details if they expect to compete effectively on the basis of time (Ohno, 1988; Nishiguchi, 1994; Dyer and Hatch, 2004; Liker and Choi, 2004). Thus, time-based competition should be a prominent facet of management education. Is should be present throughout the curriculum because entire organizations, not just one function such as operations, compete in the marketplace on the basis of time.

Since "time is money," managers from the best time-based competitive organizations know they must eliminate waste from processes and focus on performing only value added work (Womack and Jones, 1996; Emiliani *et al.*, 2003). In addition, they must not do things that annoy key stakeholders such as customers, employees, and suppliers, because this reduces cooperation and dampens system response time to identify and correct problems or take advantage of new opportunities.

The best time-based competitors experience stable long-term growth and do not need to resort to layoffs, plant closings, squeezing supplier's profit margins, etc., to improve their own profitability and increase the stock price (Johnson and Bröms, 2000). Further, it does not make sense to marginalize the interests of key stakeholders such as customers, suppliers, or investors whose dedicated efforts are needed to realize continuing success in the marketplace (Basu, 1999; Mintzberg *et al.*, 2002; Emiliani, 2003a; Liker and Choi, 2004; Tsurumi, 2005). In fact, it erodes long-term competitiveness, in part due to long-standing organizational routines that favor short-term power-based bargaining and blame (Emiliani, 2004c).

The best time-based competitors know they must strive to achieve balance among mostly shared but sometimes competing stakeholder interests. While counterintuitive, organizations that do this well enjoy consistently superior long-term financial and non-financial performance. For example, think of Dell Inc., Progressive Insurance Co., Southwest Airlines, Toyota Motor Corporation, or Zara (Emiliani *et al.*, 2003). Unfortunately, faculty often treat the best time-based competitors as business oddballs whose success is largely attributable to expensive computer systems, charismatic CEOs, or a unique corporate culture. Instead, the proper focus should be on why process knowledge is important and the specific details of how people go about systematically improving processes and achieving desired results.

Performance metrics

Surprisingly, most businesses schools do not include a deep analysis throughout the curriculum of the financial and non-financial business performance metrics used in each functional area to gage success, as well as their contribution to errant human behavior and flawed decision-making. As a result, it becomes easy for students to

assume that all metrics in use are accurate and helpful in the day-to-day management of a business. Graduates entering the workplace will naturally think the $200 million their *Fortune* 1000 company spent on a new software system produces useful measures. It is cutting-edge software sold by global leaders in enterprise software systems, so people reason that it must be a good product. This is a faulty assumption which clearly illustrates a lack of critical thinking (Fiume and Cunningham, 2003; Emiliani *et al.*, 2005; Brown, 2006).

As a result of faulty assumptions, people – including CEOs and directors – do not question if the metrics drive behaviors and decisions that are inconsistent with business processes, stated company goals, business principles, or corporate purpose. This leads to dysfunction on a large scale, where people work to achieve their metrics even if they lead to bad results for the company or its customers. Examples include: purchase price variance, standard costs, earned hours, sales commission structure, number of patents, etc. (Emiliani *et al.*, 2003, 2005).

For example, the purchase price variance metric is easily subject to abuse, and results in negative outcomes with regards to cost management, the timely delivery of goods to customers, and supplier relations (Emiliani *et al.*, 2005). While in manufacturing businesses, the "earned hours" metric, based on standard direct labor cost, is often skilfully manipulated to meet budgets by producing goods that "earn" the most labor hours instead of making the specific goods that customers ordered.

But precise numerical metrics are not the only thing managers must pay attention to. There is also non-quantitative data that must be factored into decision-making. But often it does not because if it cannot be made quantitative, on a spreadsheet, then the data will often be viewed by top management as inconsequential. This highlights the importance of corporate purpose and business principles, because part of their function is to serve as guide for understanding the relevance of non-quantitative data. This can include, for example, assessments by management of one or more stakeholder's likely response to a business decision, encouraging managers to take a long-term perspective, or engaging in activities or pursuing opportunities that are consistent with corporate purpose or strategic principles even if the payoff is not known (Caux Round Table, 1994; Basu, 1999; Toyota, 2001; Liker, 2004). Thus, business principles and corporate purpose help define management responsibilities, increase managers' awareness of cause-and-effect, and expand the base of relevant information used for decision-making.

Top managers who scrutinize their metrics to ensure they do not focus employee's activities on creating or managing waste, and also bring to life corporate purpose and business principles, are better able to balance quantitative and non-quantitative data. This leads to better business decisions because managers will avoid falling prey to the most common decision-making traps (Hammond *et al.*, 1998; Emiliani, 2006): i.e. "status-quo" (preference for solutions that preserve the current state); "anchoring" (giving disproportionate weight to the first information received); "sunk-cost" (decisions that support past decisions); "framing" (making a decision based on how a question or problem is framed); "confirming evidence" (seeking information that supports a favored viewpoint); and "estimating and forecasting" (making estimates or forecasts of uncertain events) –, as well as power-based bargaining, blame, and ignoring or marginalizing the interests of key stakeholders (see Table I).

Total cost and outsourcing

In the context of industrial procurement, the term "total cost of ownership" is used to describe all costs that are incurred, in addition to the initial purchase order price, such as: inspection, support personnel, warehousing, service, logistics, repair, maintenance, litigation, etc. Unfortunately, most senior managers do not understand or seek the "total cost" of various business transactions such as the goods and services their company purchases (Ellram and Siferd, 1998; Ferrin and Plank, 2002) – just purchase price (Emiliani *et al.*, 2005; Emiliani, 2006). This leads to an incomplete or inaccurate understanding of current and future costs. Managers commonly use purchasing tools such as economic order quantities and online reverse auctions, as well as price-based metrics such as purchase price variance (PPV). While savings may be achieved on a unit cost basis, they often lead to higher costs on a total cost basis (Emiliani *et al.*, 2005).

A common example is when purchasing people shop for the lowest price, driven by the PPV metric whose use is fully supported generations of top managers – the CEO, CFO, and VP of purchasing. Invariably, the goods will be late, caused by delays in the placement of purchase orders for goods that do not meet the metric, and the company will miss important sales opportunities. Or the quality is bad and the product has to be recalled, resulting in customer dissatisfaction, warranty expense, and possibly litigation.

What about when companies, faced with deteriorating financial performance, pressure suppliers to reduce prices, often unilaterally? Suppliers will typically acquiesce on price, but most will look for opportunities to get even in the future. They will charge their customer higher prices for expedited orders or a high price for inexpensive new tooling – both of which accrue to different budget categories that do not negatively impact the unit prices paid. Thus, the total cost associated with destructive power-based bargaining goes unnoticed.

In most manufacturing businesses, general managers are driven by the "earned hours" metric, a measure of labor efficiency whose use is again fully supported by senior managers. The general manager will seek to avoid the pain of budget variances by directing workers to make products that require a lot of labor but are not what customers ordered. The result is increased inventories, slower response to customer demand, and late deliveries. But the general manager met his or her operating budget targets, which is what matters most, and remains in good standing with the boss for another quarter.

It is popular lately to outsource call center activity to manage customer support. On the surface, call centers located in low wage countries appear to be a significant cost savings – until negative press reports appear due to customer complaints or lost sales. The rationale for outsourcing call centers to low wage countries would be diminished if the narrow focused was expanded to ask customers about ways in which products and services could be improved, and if this information was rapidly transmitted to people nearby who are responsible for new product and service development. Organizations that are able to quickly act on this new information will experience sales growth and margin expansion.

The costs associated with each of these four examples are comprised of both quantitative and non-quantitative data. The general inability of managers to process non-quantitative data and also recognize important cause-effect relationships leads to poor business decisions. Again, corporate purpose and business principles, if understood and used correctly, will aid in the analysis of quantitative and non-quantitative data.

Respect for people

Educational programs that culminate in the awarding of degrees in business, management, and related disciplines must clearly point the way on how to improve business. But they must do more than just that. They must also lead to steady improvement in manager's comprehension and application of "respect for people" over time (Kunio, 2000; Toyota, 2001; Emiliani *et al.*, 2003), where people are employees, suppliers, customers, investors, and the communities in which businesses operate.

While the words "respect for people" sound simple and all managers will say they are totally committed to it, "respect for people" is, in fact, very challenging to fully comprehend and put into daily practice (Ohno, 1988; Okuda, 1999; Kunio, 2000; Toyota, 2001; Emiliani, 2003b; Emiliani and Stec, 2004; Tsurumi, 2005). This is particularly true with regards to long-established business practices such as corporate policies, financial analyses, business performance metrics, and software systems, because there are facets hidden within these that are at odds with "respect for people Emiliani *et al.*, 2003".

Further, no key stakeholder benefits if company personnel:

- Cannot articulate or act on the corporations' purpose.
- Operate in the absence of business principles.
- Have difficulty recognizing problems.
- Do not know how to determine root cause of problems and identify and implement countermeasures.
- Are mired in wasteful organizational politics and blame.
- Do not understand business processes.
- Cannot tell the difference between activities that add value and those that are waste.
- Do not understand how to compete on the basis of time.
- Are bound by metrics that are inconsistent with company goals or customer desires, and create waste.
- Do not understand the total cost of outsourcing or other business transactions.

In fact, these are concrete examples of disrespect for people because they will, either alone or in combination, lead to outcomes that negatively impact one or more stakeholders at some point in time. Often, these items will recur periodically and cause repetitive distress among stakeholders through, for example, higher costs, quality problems, longer lead-times, personnel turnover, customer defections, loss of investor confidence, etc. Improving management education is one important avenue that can help correct obvious deficiencies in how most managers interpret and apply "respect for people". It is a wonderful opportunity for faculty and students to dig deeper and uncover new connections between assumptions, knowledge, activities, behaviors, and outcomes.

Improving the MBA degree

Today, many senior managers have concluded that the work of a $100,000 finance professional with an MBA is equivalent to a finance professional with an MBA earning $15,000 in a low wage country. So some are outsourcing knowledge work related to finance and other activities that appear to offer similar savings. To arrive at this conclusion, senior managers must think the knowledge and capabilities that MBA

graduates possess is largely the same worldwide. They also must think that they have done an outstanding job utilizing their expensive human resources, and no further utilization can be achieved. And they surely think they are saving money.

This outcome vividly points to several shortcomings of current management education, including: increasing homogeneity in course content, a limited view of human potential and creativity, and poor integration of diverse knowledge areas across the curriculum. The narrow discipline-based approach to courses commonly found in graduate business school education is known to be deficient in many practical respects, post-graduation. For example, it usually results in local optimization – i.e. functional "smokestacks" – in actual business practice.

When courses are presented largely as a list of disconnected topics, it is generally left up to students to figure out how to integrate what they learned once they enter the workplace (AACSB, 2002, 2005) – including how to continuously improve and utilize human resources in ways that demonstrate respect for people. Take for example finance courses. They typically do not discuss organizational behavior, and organizational behavior courses typically do not discuss finance. However, in actual business practice the two are indeed closely coupled:, e.g. failure to meet financial targets often precipitates dysfunctional organizational behaviors. Graduates gain an understanding of the interplay between finance and organizational behavior on-the-job, and much less so in the classroom.

As a result of these and other factors, many degree programs fail to produce graduates with identifiable value-adding capabilities such as knowing precisely how to create innovative products or services that customers desire, or how to systematically improve productivity using non-zero sum methods. In a global economy, this puts students at risk of future job elimination, which does not reflect favourably on the University, the school, its faculty, or the management education curriculum. On the other hand, students that understand processes for creating innovative products or services or improving productivity through fundamental process improvement, rather than well-worn budget cutting – which clearly illustrates managers' ignorance of the root cause of problems – will be more highly valued than those that do not.

While the need to change may be recognized by some faculty and administrators (Frank, 2005), the traditional process for improving curricula is slow and cumbersome, and the desired result is not well understood. In the future, graduates must know how to improve the entire business system, rather than individual functional parts, in order to better satisfy end-use customers. But how can they do that when most managers are trained at work, and perhaps also in business school, to be functional experts?

I propose an improved MBA curriculum that moves from the traditional discipline-based list of courses to an integrated network of stakeholder-centered courses, as shown in Table II. This proposed curriculum would address each of the following items:

- 11 deficiencies cited previously;
- simplify the curriculum;
- add needed focus;
- improve relevancy;
- make it more interesting;
- improve thematic consistency;

Course	Primary topics
The company	History of the corporation; corporate purpose; CRT *Principles for Business*, political and legal constructs; structure, function, and organization; board of directors and officer responsibilities to stakeholders; fundamentals of value creation in design and manufacturing and service operations; performance measures
Business leadership	Shareholder versus stakeholder-driven leadership; balancing stakeholder interests; leadership beliefs/behaviors/competencies; results versus process focus; metrics, human motivation, and multi-channel communication
Employees	Effective and responsible interaction between employees and other stakeholders; organizational behavior; employment law; compensation and benefits; business practices/metrics that block or enable information flow; feedback mechanisms
Suppliers I	Organization and process; buyer-seller relationships; managing supply networks; performance measurement; strategic cost management; negotiations, B2B e-business; unit cost versus total cost; green procurement
Suppliers II	Supplier evaluation and selection; developing supply networks; continuous improvement; target costing; collaborative problem solving
Communities	Impact of business on the community and its interests; corporate philanthropy and associated decision making processes; taxation; standard of living, infrastructure, prestige, growth, education; economic policy
Customers I	Internal customer-supplier relationships; end-use customer relationships; customer acquisition and retention; marketing and advertising; B2C e-business; distribution and logistics; linkage to employee care
Customers II	Market feedback/voice of the customer; value stream mapping; quality function deployment; time-based competition; pull systems; leveling sales
Investors I	Role of investors in privately-owned businesses; conventional financial and managerial accounting; value stream accounting; beyond budgeting; profit planning
Investors II	Role of investors in publicly owned businesses; intangible assets (brands, intellectual capital), social capital, etc.; GAAP and fallacy of pro-forma reporting; debt policy; valuation of firms; futures and options; fixed income securities
Competition – domestic	Methods by which nations, states, and companies address the development of industrial capabilities and domestic competition; resource allocation; decision-making; local optimization versus business system improvement; business cycles
Competition – global	How nations, states, and companies address the development of industrial capabilities and international competition; international trade; competitive strategies; exchange rates; monetary policy; stock listing on foreign exchanges; mergers and acquisitions
Complementors	Businesses that provide complimentary products and services; new product/service development; pricing strategies; marketing strategies and tactics
Environment	Environmental management; design for environment; EH&S legal issues; industrial safety and ergonomics; resource management and conservation; compulsory versus voluntary compliance; green balance sheet; remediation; acquisition and divestiture
Intrapreneurship	Gaining management's interest in new ideas; organizing internal resources; use and leverage of distributed resources; project portfolio management; R&D management
Entrepreneurship	Starting a new business; organizing internal and external resources; raising capital; resource conservation, make/buy; selling products and services; technological innovation; creating business plans
Elective Courses	Forensic accounting; quantitative marketing research; intellectual property; new product and service design; corporate public relations and communications; business process improvement; international negotiations

Note: Three credit hour courses. Total = 48 credit hours, plus up to 12 credit hours of electives

Table II.
Improved MBA curriculum

- improve connectivity to the "real-world"; and
- offer greater lifetime utility to students.

I present this as a starting point for fundamental improvement, and not as a finished product. It is intended to be a specific example that current and future management educators can used to focus their dialogue and carry forward actions to improve management education. Some educators may find it to be a useful starting point for differentiating their program, gaining competitive advantage, increase enrolments, perhaps gain some pricing power, improve student and employer satisfaction, etc.

Creating such a program could simply be dictated by a Dean, but that would likely breed strong resentment among faculty and perhaps other key stakeholders. A better approach would be to create an editor or editorial board to oversee the curriculum to ensure thematic consistency and continuous improvement in all courses and programs. Consider, by analogy, a multi-author book devoted to a particular topic. The book would be of little value to readers without the direction of an editor to improve thematic consistency and avoid duplication of content. An MBA program is a multi-author product that should be supervised by a qualified editor or editorial board[2].

If business schools do not change, they will face an uncomfortable future. For example, what happens when senior managers decide that they no longer want to invest in their employee's career development though company-paid degree programs? What happens when students decide that a graduate business degree offers no substantive advantage in the job market, and instead decide to pursue a second skill such as carpentry or interior design (Skapinker, 2004)? The very real threat that business schools face is self-inflicted declines in enrolment (Merritt, 2005; Colvin, 2005), commoditization of their service (Gerdes, 2005), reduced relevancy of graduate business degrees for corporations (Merritt and Lavelle, 2005), trivialization of management research and scholarship (Pfeffer and Fong, 2002), and the rise of new competitors (Jaschik, 2005; Colvin, 2005; Arenson, 2006) – not a good outcome given the dedicated efforts of so many faculty, administrators, corporate sponsors, and alumni over the years.

The typical approach to dealing with these problems is to try harder to sell what is currently offered. This becomes an expensive marketing and construction capital campaign that ultimately will be, in most cases, a losing proposition over the long-term. A better way to would be to fundamentally improve the value proposition of higher education. This would include dramatic improvement of the curriculum, as well as the many other factors that shape value as perceived by students and prospective employers. Subsequently, efforts would be focused on continuously improving the curriculum thereafter using a structured process such as *kaizen* (Emiliani, 2004b, 2005). Mapping the current and future states of higher education value streams would reveal abundant opportunities to eliminate waste and create more value for students, as well as the people who pay tuition, corporations that hire graduates, and ultimately corporations' end-use customers.

Summary

I have provided an outsider's view of how management education can be significantly improved. Nothing that I have said in this paper is impossible to do, nor is it inconsistent with AACSB International's accreditation standards (AACSB, 2005) or the

current and future needs of business (Doria *et al.*, 2003; Colvin, 2005). However, achieving improvements that students and hiring managers will recognize as favorable requires faculty and administrators to question many things about their own knowledge areas and educational delivery routines.

Improving business school education should be a fun process, not an uncomfortable one driven by fear of failure or blame. The question is whether or not Deans and faculty possess a sense of urgency and are willing to confront existing paradigms and change well-established courses and programs.

In my view, business schools do not have time on their side. Global labor markets and CEOs strong desire to reduce labor costs, often regardless of the total cost, will likely reduce wages and cause the job market for new graduates to contract (Tyson, 2005; Uchitelle, 2005; Colvin, 2005). The problem will be exacerbated as the knowledge offered by business schools become even more uniform[3] (AACSB, 2005; London and Bradshaw, 2005), in contrast to the distinctive alternate approach I have presented in this paper.

There is much more that management educators can do to set students up to succeed in business and in life. This reminds me of a profound comment made by Eiji Toyoda, former CEO of Toyota Motor Corporation (Minuora, 2002):

> . . . employees are offering a very important part of their life to us. If we don't use their time effectively, we are wasting their lives.

Shouldn't all students, many of whom will become managers in the future, be instilled with this way of thinking?

Notes

1. Managers who rigidly conform to maximizing shareholder value in the short-term typically encounter the many problems including: under-funded pension plans, lack of new products or production capability, shortages of materials (vaccines or oil, for example), channel stuffing, expense and revenue recognition, reduced information flow, data integrity issues, sociopath behavior among managers and workers, loss of focus on end-use customer needs, skilled labor shortages, etc. (see Table I).
2. Qualifications would include several years of cross-functional industrial management experience.
3. AACSB's accreditation standards do not require business schools to achieve uniform curricula or homogeneous faculty in terms of qualifications. However, that increasingly seems to be the outcome, and is apparently driven by risk-aversion among Deans, curriculum committees, and faculty search committees.

References

AACSB (2002), *Management Education at Risk*, AACSB International, Tampa, FL,, August, available at: www.aacsb.edu/publications/metf/METFReportFinal-August02.pdf (accessed June 7, 2005).

AACSB (2004), *Ethics Education in Business Schools*, report of the Ethics Education Task Force to AACSB International's Board of Directors, S. Phillips, Chair, available at: www.aacsb.edu/Resource_Centers/EthicsEdu/EETF-report-6-25-04.pdf (accessed June 29, 2005).

AACSB (2005), *Eligibility Procedures and Standards for Business Accreditation*, AACSB International, Tampa, Fl, January, available at: www.aacsb.edu/accreditation/standards.asp (accessed June 7, 2005).

Allen, W. (1992), "Our schizophrenic conception of the business corporation", *Cardozo Law Review*, Vol. 14 No. 2, pp. 621-81.

Andrews, N. and Tyson, L.D. (2004), "The upwardly global MBA", *Strategy + Business*, Nos 36, Fall, pp. 1-10.

Arenson, K. (2006), "Regents impose limits on colleges that seek profit", *The New York Times*, January 21, p. A1.

Argenti, A. and Finkelstein, S. (2006), "Course syllabus: 'Analysis for general managers'", Tuck School of Business, Dartmouth College, Hanover, NH, available at: http://oracle-www.dartmouth.edu/dart/groucho/tuck_mba_program.syllabus?p_id = AGM (accessed February 22, 2006).

Argyris, C. (1990), *Overcoming Organizational Defenses*, Allyn and Bacon, Boston, MA.

Basu, S. (1999), *Corporate Purpose: Why it Matters More than Strategy*, Garland Publishing, New York, NY.

Begley, S. (2005), "People believe a 'fact' that fits their views even if it's clearly false", *The Wall Street Journal*, February 4.

Bennis, W. and O'Toole, J. (2005), "How business schools lost their way", *Harvard Business Review*, Vol. 83 No. 5, pp. 96-104.

Bisoux, T. (2005), "The extreme MBA makeover", *BizEd*, May/June, pp. 26-33.

Brown, A. (2006), "Lies your ERP system tells you", *Mechanical Engineering*, March, pp. 36-9, available at: www.memagazine.org/contents/current/features/lieserp/lieserp.html, (accessed March 15, 2006).

Cassidy, J. (2002), "The greed cycle", *The New Yorker*, September 23, pp. 64-77.

COC (2005), Industry Codes of Conduct, LPA, available at: www.codesofconduct.org/industry.htm (accessed September 21, 2005).

Caux Round Table (1994), *Principles for Business*, Caux Round Table, Saint Paul, MN, available at: www.cauxroundtable.org/documents/PrinciplesforBusiness.doc (accessed 7 June 2005).

Colvin, G. (2005), "Is America: the world's 97-lb weakling?", *Fortune*, Vol. 152 No. 2, pp. 70-82.

Comm, C. and Mathaisel, D. (2005a), "A case study in applying lean sustainability concepts to universities", *International Journal of Sustainability in Higher Education*, Vol. 6 No. 2, pp. 134-46.

Comm, C. and Mathaisel, D. (2005b), "An exploratory study of best lean sustainability practices in higher education", *Quality Assurance in Education*, Vol. 13 No. 3, pp. 227-40.

Deutsch, C. (2005), "An early advocate of stock options debunks himself", *The New York Times*, April 3.

Donaldson, L. (2002), "Damned by our own theories: contradictions between theories and management education", *Academy of Management Learning and Education*, Vol. 1 No. 1, pp. 96-106.

Doria, J., Rozanski, H. and Cohen, E. (2003), "What business needs from business schools", *Strategy + Business, Issue*, No. 32, Fall, pp. 38-45.

Dyer, J. and Hatch, N. (2004), "Using supplier networks to learn faster", *Sloan Management Review*, Vol. 45 No. 3, pp. 57-63.

Ellram, L.M. and Siferd, S.P. (1998), "Total cost of ownership: a key concept in strategic cost management decisions", *Journal of Business Logistics*, Vol. 19 No. 1, pp. 55-84.

Ellsworth, R. (2004), "The corrosion of corporate purpose", *BizEd*, March/April, pp. 66-7.

Emiliani, M.L. (1998), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-31.

Emiliani, M.L. (2000a), "Cracking the code of business", *Management Decision*, Vol. 38 No. 2, pp. 60-79.

Emiliani, M.L. (2000b), "The oath of management", *Management Decision*, Vol. 38 No. 4, pp. 261-2.

Emiliani, M.L. (2003a), "The inevitability of conflict between buyers and sellers", *Supply Chain Management: An International Journal*, Vol. 8 No. 2, pp. 107-15.

Emiliani, M.L. (2003b), "Linking leader's beliefs to their behaviors and competencies", *Management Decision*, Vol. 41 No. 9, pp. 893-910.

Emiliani, M.L. (2004a), "Is management education beneficial to society?", *Management Decision*, Vol. 42 Nos 3/4, pp. 481-98.

Emiliani, M.L. (2004b), "Improving business school courses by applying lean principles and practices", *Quality Assurance in Education*, Vol. 12 No. 4, pp. 175-87.

Emiliani, M.L. (2004c), "Sourcing in the global aerospace supply chain using online reverse auctions", *Industrial Marketing Management*, Vol. 33 No. 1, pp. 65-72.

Emiliani, M.L. (2005), "Using *kaizen* to improve graduate business school degree programs", *Quality Assurance in Education*, Vol. 13 No. 1, pp. 37-52.

Emiliani, M.L. (2006), "Executive decision-making traps and B2B online reverse auctions", *Supply Chain Management: An International Journal*, Vol. 11 No. 1, pp. 6-9.

Emiliani, M. and Stec, D. (2004), "Using value stream maps to improve leadership", *Leadership & Organizational Development Journal*, Vol. 25 No. 8, pp. 622-45.

Emiliani, M.L., Stec, D.J. and Grasso, L.P. (2005), "Unintended responses to a traditional purchasing performance metric", *Supply Chain Management: An International Journal*, Vol. 10 No. 3, pp. 150-6.

Emiliani, M.L., Stec, D., Grasso, L. and Stodder, J. (2003), *Better Thinking, Better Results*, The CLBM, Kensington, CT.

Etzioni, A. (2002), "When it comes to ethics, B-schools get an F", *The Washington Post*, August 4, p. B4.

Ferraro, F., Pfeffer, J. and Sutton, R. (2005), "Economics language and assumptions: how theories can become self-fulfilling", *Academy of Management Review*, Vol. 30 No. 1, pp. 8-24.

Ferrin, B.G. and Plank, R.E. (2002), "Total cost of ownership models: an exploratory study", *The Journal of Supply Chain Management*, Vol. 38, Summer, pp. 18-29.

Finkelstein, S. (2003), *Why Smart Executives Fail*, Portfolio, New York, NY.

Fiume, O. and Cunningham, J. (2003), *Real Numbers*, Managing Times Press, Durham, NC.

Frank, R. (2005), "The opportunity cost of economics education", *The New York Times*, September 1.

Friedman, M. (1970), "The social responsibility of business is to increase its profits", *The New York Times Magazine*, September 13.

Garten, J. (2005), "B-schools: only a C + in ethics", *BusinessWeek*, September 5, p. 110.

Gerdes, L. (2005), "B-Schools with a niche", *BusinessWeek*, 5 September, pp. 70-2.

Ghoshal, S. (2003), "Business schools share the blame for Enron", *Financial Times*, July 18.

Ghoshal, S. (2005), "Bad management theories are destroying good management practices", *Academy of Management Learning and Education*, Vol. 4 No. 1, pp. 75-91.

Gloeckler, G. (2005), "This is not your father's MBA", *BusinessWeek*, May 16.

Gore, A. and Blood, D. (2005), "It is essential that investors look to the long term", *Financial Times*, July 6.

Grant, C. (1991), "Friedman fallacies", *Journal of Business Ethics*, Vol. 10 No. 12, pp. 907-14.

Grossman, T. (2001), "Causes of the decline of the business school management science course", *INFORMS Transactions on Education*, Vol. 1 No. 2, available at: http://ite.pubs.informs.org/Vol1No2/Grossman/Grossman.php (accessed February 21, 2006).

Grow, B. (2005), "The debate over doing good", *BusinessWeek*, August 15, pp. 76-8.

Hammond, J., Keeney, R. and Raffia, H. (1998), "The hidden traps in decision making", *Harvard Business Review*, Vol. 76 No. 5, pp. 47-58.

Handy, C. (2002), "What's a business for?", *Harvard Business Review*, Vol. 80 No. 12, pp. 49-55.

Holstein, W. (2005), "Are business schools failing the world?", *The New York Times*, June 19.

Hymowitz, C. (2005), "To rein in CEO's pay, why not consider outsourcing the post?", *The Wall Street Journal*, July 19.

Imai, M. (1986), *Kaizen*, Random House, New York, NY.

Imai, M. (1997), *Gemba Kaizen*, McGraw-Hill, New York, NY.

Jaschik, S. (2005), "Is phoenix the future?", *Inside Higher Ed*, March 28, available at: www.insidehighered.com/careers/2005/03/28/phoenix (accessed June 11, 2005).

Jensen, M. (2000), "Value maximization and the corporate objective function", in Beer, M. and Nohira, N. (Eds), *Breaking the Code of Change*, Harvard Business School Press, Harvard Business School Press, Boston, MA, pp. 37-57.

Jensen, M. and Meckling, W. (1976), "Theory of the firm: managerial behavior, agency costs, and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-60.

Johnson, H. and Bröms, A. (2000), *Profit Beyond Measure*, Free Press, New York, NY.

Jones, D. and Womack, J. (2002), *Seeing the Whole*, Lean Enterprise Institute, Brookline, MA.

Kay, J. (2005), "A misleading obsession with share prices", *Financial Times*, June 6.

Kelly, M. (2001), *The Divine Right of Capital*, Berrett-Koehler Publishers, Inc., San Francisco, CA.

Kochan, T. (2002), "Addressing the crisis in confidence in corporations: root causes, victims, and strategies for reform", *Academy of Management Executive*, Vol. 16 No. 3, pp. 139-41.

Kunio, N. (2000), "Respecting human beings", *Look Japan*, January.

Liker, J. (2004), *The Toyota Way*, McGraw-Hill, New York, NY.

Liker, J. and Choi, T. (2004), "Building deep supplier relationships", *Harvard Business Review*, Vol. 82 No. 12, pp. 104-13.

London, S. and Bradshaw, D. (2005), "The MBA industry may be facing a shakeout", *Financial Times*, April 28.

Mangan, K. (2002), "The ethics of business schools", *The Chronicle of Higher Education*, Vol. 40 No. 9, p. A14.

Maskell, B. and Baggaley, B. (2003), *Practical Lean Accounting*, Productivity Press, New York, NY.

Merritt, J. (2005), "MBA applicants are MIA", *BusinessWeek*, April 18, pp. 28-31.

Merritt, J. and Lavelle, L. (2005), "Tomorrow's B-school? It might be a D-school", *BusinessWeek*, August 1, pp. 80-1.

Micklethwait, J. and Wooldridge, A. (2003), *The Company*, The Modern Library, New York, NY.

Minuora, T. (2002), "Address to the world class manufacturing forum," May, available at: http://www.electronics-scotland.com/industry_comment/comment_item.cfm?itemID=18 (accessed June 12, 2005).

Mintzberg, H., Simons, R. and Basu, K. (2002), "Beyond selfishness", *Sloan Management Review*, Vol. 44 No. 1, pp. 67-74.

Mitchell, L. (2001), *Corporate Irresponsibility*, Yale University Press, New Haven, CT.

Nishiguchi, T. (1994), *Strategic Industrial Sourcing*, Oxford University Press, New York, NY.

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Okuda, H. (1999), "Slashing payrolls shows executive incompetence", *Japan ECHO*, Vol. 26 No. 6, pp. 14-17.

Pearson, C. and Porath, C. (2005), "On the nature, consequences, and remedies of workplace incivility: no time for 'nice?' think again", *Academy of Management Executive*, Vol. 19 No. 1, pp. 7-18.

Pfeffer, J. and Fong, C. (2002), "The end of business schools? Less success than meets the eye", *Academy of Management Learning and Education*, Vol. 1 No. 1, pp. 78-95.

Rother, M. and Shook, J. (1999), *Learning to See*, Lean Enterprise Institute, Brookline, MA.

SEC (2005), United States Securities and Exchange Commission, listing of civil lawsuits brought by the Commission in federal court, available at: http://www.sec.gov/litigation/litreleases.shtml (accessed June 12, 2005).

Senge, P. (2000), "The puzzles and paradoxes of how living companies create wealth", in Beer, M. and Nohira, N. (Eds), *Breaking the Code of Change*, Harvard Business School Press, Boston, MA, pp. 59-81.

Skapinker, M. (2004), "Use your hands for job security", *Financial Times*, October 6.

Skapinker, M. (2005), "On business schools and morality", *Financial Times*, January 4.

Spear, S. (2004), "Learning to lead at Toyota", *Harvard Business Review*, Vol. 82 No. 5, pp. 78-86.

Spear, S. and Bowen, K. (1999), "Decoding the DNA of the Toyota production system", *Harvard Business Review*, Vol. 77 No. 5, pp. 96-106.

Stalk, G. Jr (1988), "Time – the next source of competitive advantage", *Harvard Business Review*, Vol. 66 No. 4, pp. 41-51.

Stalk, G. Jr and Hout, T. (1990), *Competing on the Basis of Time*, Free Press, New York, NY.

Temponi, C. (2005), "Continuous improvement framework: implications for academia", *Quality Assurance in Education*, Vol. 13 No. 1, pp. 17-36.

Toyota (2001), *The Toyota Way 2001*, internal document, Toyota Motor Corporation, Toyota City, April.

Tsurumi, Y. (2005), "Dysfunctional corporations and flawed business education in America", *Japanese Journal of Administrative Science*, Vol. 18 No. 3, pp. 179-92.

Tyson, L.D. (2005), "Behind the EU backlash", *Business Week*, July 11, p. 94.

Uchitelle, L. (2005), "College degree still pays, but it's leveling off", *The New York Times*, January 13.

White, E. (2005), "Rethinking quality improvement", *The Wall Street Journal*, September 19.

Witzel, M. (2005), "Profits and charity are not mutually exclusive", *Financial Times*, August 16.

Womack, J. and Jones, D. (1996), *Lean Thinking*, 2nd ed., Free Press, New York, NY.

Woods, B. and Zaher, M. (2004), "Application of lean management to improve educational operations", unpublished work, www.nzsses.org.nz/Conference/Session5/67Zaher.pdf (accessed February 22, 2006).

Young, S. (2005), Global Executive Director of the Caux Round Table, Saint Paul, MN, personal communication, 25 June.

Zimmerman, W.J. (1991), "*Kaizen*: the search for quality", *The Journal of Continuing Higher Education*, Vol. 39 No. 3, pp. 7-10.

Appendix

The equation used to estimate shareholder value supports this point:

$$\text{Shareholder value} = \text{Corporate value} - \text{Debt}$$

where:

Corporate Value = Present value of cash flow from operations during the forecast period + Residual value+Marketable securities

and

Cash flow = Cash inflow − Cash outflow

The key stakeholders in a business include: customers, employees, suppliers, investors, and communities. Examining the shareholder value equation reveals the following:

- Shareholder value represents the investor.
- Corporate value is determined largely by cash flow, the principal source of which is sales to customers.
- Debt, as expressed by current liabilities in the balance sheet, contains money owed to suppliers (accounts payable), employees (accrued expenses), and communities (income taxes payable).

Not surprisingly, all five key stakeholders are represented in the shareholder value equation, which proves their existence and thus recognizes business as a human-economic activity.

Source: Emiliani (2004a)

Glossary

AACSB	Formerly an abbreviation for The Association to Advance Collegiate Schools of Business, and now known as AACSB International.
CEO	Chief Executive Officer
CFO	Chief Financial Officer
MBA	Master of Business Administration
VP	Vice President

Origins of lean management in America

The role of Connecticut businesses

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Abstract

Purpose – The purpose of this paper is to provide a historical account of the significant role that Connecticut businesses and business leaders had in the spread of Lean management throughout the USA. The paper aims to describe what happens when managers do not understand and apply an important principle of Lean management.

Design/methodology/approach – Survey of published and unpublished records, as well as personal communications with key figures.

Findings – Establishes the role and importance of Connecticut businesses and business leaders in the discovery and dissemination of Lean management in America since 1979, external to Toyota and its affiliated suppliers.

Research limitations/implications – The accuracy of some past events necessarily relies on the recollection of key figures that were obtained by personal communications.

Practical implications – Describes how an important principle, "respect for people," was not understood by most management practitioners, thus hindering efforts to correctly practice Lean management and improve business performance.

Originality/value – The paper provides a historical account of Lean management in America, focusing on activities that occurred in the State of Connecticut post-1979. Description and relevance of a key area of misunderstanding among practitioners of the Lean management system.

Keywords Management technique, Lean production, Manufacturing systems, History, Automotive industry, United States of America

Paper type Research paper

Introduction

Toyota Motor Corporation is widely recognized for having created an important new management system that top managers of many manufacturing and service businesses now seek to emulate. Toyota's management system is variously referred to as "Toyota Production System" (Ohno, 1988a), "Toyota Management System" (Monden, 1993), "Lean Production," (Womack *et al.*, 1990) or "Lean Management" (Emiliani *et al.*, 2003). It is also commonly referred to as "Lean manufacturing" due to its origins in production and operations management (Shingo, 1981; Ohno, 1988a). However, this description implies a narrow focus and is now recognized as incorrect because Lean principles and practices can be applied to any organization. Thus, the emergent preferred description for this management system external to Toyota Motor Corporation is "Lean management."

The roots of Toyota's management system dates to the early 1890s, when self-taught inventor Sakichi Toyoda designed and patented a manually operated loom for weaving cloth that greatly improved worker productivity and the quality of the

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cloth (Kimoto, 1991; Togo and Wartman, 1993; Reingold, 1999; Wada and Yui, 2002). In the 1920s, Sakichi's son, Kiichiro, designed and patented many new loom features, including improved mechanisms invented by his father that would automatically stop the machine when a thread broke, thus avoiding the production of defective cloth (Kimoto, 1991; Wada and Yui, 2002). In part as a result of these innovations, key objectives of Toyota's early management practice have been characterized as "production efficiency by consistently and thoroughly eliminating waste", and "the equally important respect for humanity" (Ohno, 1988b).

Two people are widely credited for having created the Toyota Production System as it is known today: Ohno (1988a), who rose to the level of Executive Vice President of Toyota Motor Corporation, and Shingo (1985), a consultant to Toyota employed by the Japan Management Association, famous for his work on single-minute exchange of dies. Toyoda (1985), former President of Toyota Motor Corporation, and Saito Naichi also played key roles (Ohno and Mito, 1988; Womack *et al.*, 1990; Womack and Jones, 1996).

Both Kiichiro Toyoda and Taiichi Ohno were greatly influenced by American industrialists and their production and management practices (Ohno, 1988a; Toyota, 1988), but not by management theorists. By far the most influential person was Henry Ford, through his books *My Life and My Work* and *Today and Tomorrow* (Ford and Crowther, 1922, 1926). Another highly influential management practice was the "Training Within Industry Service" (TWI), a structured four-step program for training manufacturing workers – particularly supervisors (Huntzinger, 2005). TWI was created by the US government in the 1940s to increase wartime production. It came to Japan in the early 1950s (Fujimoto, 1999) as part of allied efforts to rebuild industrial infrastructure. Kiichiro Toyoda, Taiichi Ohno, and Shigeo Shingo were likely familiar with Taylor's (1911) book *The Principles of Scientific Management*. However, Taylor's work appears to have not made significant direct contribution to the evolution of Toyota's management system. It is more likely to have influenced Toyota managers through their understanding of Ford's system of production (Fujimoto, 1999).

While the influence of western industrial management practice is clear, it is very important to recognize that it is also rather limited. Toyota managers have, over generations, purposefully made many very important improvements to industrial management practice over time (Shingo, 1981; Ohno, 1988a; Womack *et al.*, 1990; Monden, 1993, 1998; Basu, 1999; Fujimoto, 1999), consistent with the dual objectives of "production efficiency by consistently and thoroughly eliminating waste" and "the equally important respect for humanity" (Monden, 1983; Ohno, 1988a). While these were the major drivers, Japanese business conditions and Japanese culture played recognizable but less significant roles (Ohno, 1988a; Nishiguchi, 1994; Basu, 1999; Fujimoto, 1999; Wada and Yui, 2002).

There is no direct connection between the theoretical development of western management thought over the last 100 years and the evolution of Toyota's management system. This reflects both a lack of formal management training among key personnel, as well as a strong belief among Toyota managers that they must be very practical, see reality clearly, understand the true nature of problems, and be willing to challenge existing paradigms (Shingo, 1981; Ohno, 1988a). These attributes were much more highly regarded among managers than theoretical analysis by them or others (Monden, 1983). In addition, there was a strong interest among Toyota

managers, since the days of Sakichi Toyoda, to develop production capabilities and management practices that were uniquely Japanese (Toyoda, 1985; Ohno, 1988a; Toyota, 1988, 2001; Wada and Yui, 2002) – including contributions of ideas and practices from Henry Ford and his colleagues, whom they greatly admired. Despite being Japanese, the principal architects felt that Toyota's management system could be applied to any type of business in any country (Shingo, 1981; Ohno, 1988a; Ohno and Mito, 1988).

Since the late 1970s, Lean management has become an important route for improving the performance of businesses in the USA – e.g. reducing costs, improving quality, reducing lead-times, increasing market share, developing new products and services, human resources, etc. (Imai, 1986; Monden, 1986). Practiced correctly, Lean management can help avoid decisions that result in undesirable trade-offs that negatively impact key stakeholders such as employees, suppliers, customers, investors, or communities. While many top executives today view the adoption of Lean management as critical and something they must understand and apply to help achieve long-term business success, it remains an obscure topic in undergraduate and graduate business school degree programs (Emiliani, 2004a, 2005a).

Ohno characterized the key objectives of Toyota's early management practice as "production efficiency by consistently and thoroughly eliminating waste," and "the equally important respect for humanity" (Ohno, 1988a). In 2001, Toyota Motor Corporation published an internal document titled "The Toyota Way 2001" (Toyota, 2001), which presents these two objectives as top-level company principles: "continuous improvement" and "respect for people." The 13-page document provides a detailed description of these two principles and reveals explicit and implicit beliefs that have long guided management thinking. While this document is not publicly available, most of what appears in it can be found in a recent trade book (Liker, 2004).

The "respect for people" principle has long been unrecognized, ignored, or misunderstood by most senior managers outside Toyota and its affiliated suppliers, even though Ohno and other Toyota personnel referred to it directly or indirectly in their writings (Kamiya, 1976; Sugimori *et al.*, 1977; Kato, 1981; Toyoda, 1985; Ohno, 1988a; Togo and Wartman, 1993; Kawahara, 1998; Togo, 1998; Okuda, 1999; Nishimura, 2000). Publication of "The Toyota Way 2001" document helped raise awareness of this principle external to Toyota Motor Corporation and its affiliated suppliers. The correct practice of Toyota's management system – Lean management – would require, at a minimum, acknowledgement and practice by management of both principles: "continuous improvement" and "respect for people." However, most managers practice only the first principle, "continuous improvement," which greatly limits amount of improvement that can be achieved (Aeppel, 2002; Emiliani *et al.*, 2003; Smalley, 2005; Bhasin and Burcher, 2006). It is the second principle, "respect for people," that enables the first principle.

Simultaneous application of both principles results in the elimination of waste, called "muda," in Japanese. Waste is defined as: activities (Ohno, 1988a) and behaviors (Emiliani, 1998) that add cost but do not add value as perceived by end-use customers (Womack and Jones, 1996). Eight distinct types of waste are recognized in the Lean management system. Effective implementation of Lean management results in the establishment of intra- and inter-organizational capability building routines and improved time-based competitiveness through the use of Lean principles, structured

processes, and supporting tools (Imai, 1986, 1997; Womack *et al.*, 1990; Nishiguchi, 1994; Fujimoto, 1999; Emiliani *et al.*, 2003). Major benefits include improved flexibility and responsiveness to rapid changes in customer requirements or when economic conditions deteriorate, employee involvement, and better financial and non-financial performance.

The purpose of this paper is to provide a historical account of the significant role that Connecticut businesses and business leaders had in the discovery and adoption of Lean management and subsequent spread of Lean management in the US, external to Toyota Motor Corporation and its affiliated suppliers. This historical account is noteworthy for the following reasons:

- existence of a critical mass of forward-thinking senior managers in a small geographic region;
- a high concentration of industrial activity related to implementing Lean management, particularly post-1986;
- lean management was implemented at established "brownfield" businesses rather than in new "greenfield" businesses, as is more commonly done;
- the success achieved by two Connecticut businesses in implementing Lean management;
- dissemination of Lean management by Connecticut managers as they moved to other businesses in the USA and abroad, and former managers acting as consultants;
- many important new contributions to the body of Lean knowledge that have emerged from management practitioners and area academics; and
- highlights the importance of recognizing and applying the "respect for people" principle to achieve improved outcomes.

Historical development

Among the earliest reporting in the USA that described Toyota's unique management system was a 1977 article in *American Machinist* (Ashburn, 1977). The first application of Toyota's management system in the USA was likely at a Kawasaki engine and motorcycle manufacturing facility located in Lincoln, Nebraska, between 1975 and 1978 (Butt, 1981). However, the overall level of awareness of Toyota's management system among US business leaders remained low until the early 1980s, when it gained increasing attention in the US business press (Monden, 1983; Monden, 1986; Womack *et al.*, 1990).

The focus of these early writings was mostly descriptions of operational aspects of the Toyota Production System designed to improve "production efficiency by consistently and thoroughly eliminating waste" (Ohno, 1988a). No direct or indirect mention is made to "the equally important respect for humanity" (Ohno, 1988a). Descriptions of Japanese human resource practices typically appeared as a separate topic, and were disaggregated into simpler elements (Drucker, 1971). In general, descriptions of post-World War II Japanese management practices were written by different authors whose focus was either operations management or human resources management, but not a tight integration of both – though there were some exceptions (Monden, 1983; Imai, 1986; Ohno, 1988a).

The State of Connecticut has a centuries-long history as a source for high-quality manufactured goods. Its economy rapidly transitioned from agricultural to manufacturing around the time of the US industrial revolution, c. 1780 (Grant, 1974; Porter and Miller, 2003). The state was home to Eli Whitney's cotton gin, Samuel Colt's Patent Firearms Manufacturing Company, Hitchcock chairs, Pratt & Whitney machine tools, Dexter paper products, Ensign-Bickford safety fuses, Seth Thomas clocks, Stanley Works iron door bolts, etc. and process innovations such as the assembly line. Today, Connecticut continues to have a high concentration of manufacturing activity, with nearly 5,500 manufacturing businesses in 2004 (DOL, 2005a). These include several large publicly owned multi-national corporations that manufacture sophisticated products such as helicopters, space suits, jet engines, nuclear submarines, and thousands of privately owned mid- and small-sized businesses, many of which support the state's largest corporations. In 2004, durable and non-durable goods manufacturing contributed 12.5 percent to state domestic product (BEA, 2005), and accounted for over 195,000 jobs (DOL, 2005b).

In general, manufacturing management in Connecticut, and elsewhere, had been governed by the "batch-and-queue" production method, which is defined as:

> ... a mass production approach to operations in which large lots (batches) of items are processed and moved to the next process ... where they wait in a line (queue) (LEI, 2003).

In almost every case, services are also delivered using the "batch-and-queue" method. The batch-and-queue production method is regarded as inferior because it requires much higher consumption of physical, financial, human, time, and natural resources (Womack *et al.*, 1990; Emiliani *et al.*, 2003), and is not able to respond quickly to changes in market conditions (Womack and Jones, 1996; Jones and Womack, 2002). While many companies experienced great success with batch-and-queue for decades, this way of managing a business became a burden as customer wants and needs changed more rapidly and as global competition intensified.

Connecticut's earliest involvement with Lean management began in 1979, when Bodek (2004, 2005) founded Productivity Inc., in Greenwich, Connecticut. Productivity Inc. was created to educate business leaders in Japanese industrial management practices. Its primary activities were publishing newsletters, distributing books, running national conferences and seminars, and organizing study tours starting in 1981, in which US business executives would visit Japanese companies to learn how they achieved such remarkable improvements in productivity and quality (Bodek, 2004).

Between 1980 and 1981, General Electric Co., headquartered in Fairfield, Connecticut, conducted benchmarking visits for its managers to manufacturing companies in Japan. These visits led to a training program conducted at a GE facility in Bridgeport, Connecticut, around 1981, and was marketed by Productivity Inc. (Bodek, 2005)[1]. Arthur Byrne, General Manager of a GE plant in Cleveland, Ohio, who would later become President of The Wiremold Company in West Hartford, Connecticut (Smith, 2000), implemented a just-in-time (JIT) production method at his facility in 1982 (Emiliani *et al.*, 2003), based upon the findings of one of his managers who participated in a benchmarking visit.

In 1984, Bodek (2004a) created a separate company called Productivity Press Inc. Productivity Press published and distributed English translations of dozens of

Japanese books written by management practitioners and consultants. These highly influential books, which included works by Ohno (1988a, b) , Ohno and Mito (1988) and Shingo (1981, 1985, 1986), described the Toyota Production System and other Japanese management practices. Productivity's books, workshops, and Japan study tours played a large role in bringing Lean to America. Today, the publishing arm of Productivity Inc. is located in New York City, while consulting arm of Productivity Inc. is located in Shelton, Connecticut (Productivity, 2005)[2].

In February 1984, Toyota Motor Corporation established a joint venture with General Motors Corporation called New United Motor Manufacturing, Inc. (NUMMI) in Fremont, California (Toyota, 1988; NUMMI, 2005). This became the first application of the Toyota Production System by Toyota Motor Corporation its affiliated suppliers in the US. Soon thereafter, the level of awareness of Toyota's management system among US businesses began to increase slightly (Monden, 1986).

In 1985, the US government funded a study at Massachusetts Institute of Technology called the "International Motor Vehicle Program" (Womack *et al.*, 1990). The study set out to determine why Japanese automakers were so much more productive and produced better quality products at competitive prices compared to the "Big Three" Detroit automakers. It was during this study that a graduate student named John Krafcik, who had been an engineer at NUMMI, coined the term "Lean" to describe Toyota's production system and how it yielded better results while consuming less resources compared to traditional batch-and-queue production (Womack *et al.*, 1990).

Soon other managers would begin to learn about Lean principles and practices and apply them in their businesses. In 1984, Danaher Corporation purchased The Jacobs Manufacturing Company of Bloomfield, Connecticut, from Chicago Pneumatic. Jacobs, a maker of truck engine brakes, was likely the first non-Toyota affiliated company in the northeastern USA to implement two key elements of Toyota's production system: JIT and cellular manufacturing, starting in late 1987 (Jacobs, 2005)[3].

Yoshiki Iwata, Chihiro Nakao, and Akira Takenaka were disciples of Taiichi Ohno. In 1987, these former industrial engineers and production managers from Toyota Motor Corporation formed the consulting company Shingijutsu Co., Ltd in Gifu City, Japan, to teach Toyota's production system to other companies (Shingijutsu, 2005a). Iwata, Nakao, and Takenaka's first consulting client in the USA was Productivity Inc., in 1987 (Shingijutsu, 2005b).

At a conference in Chicago in 1987, Heist (2005), Corporate Relations Manager at the Hartford Graduate Center (now called Rensselaer at Hartford) in downtown Hartford, Connecticut (Weaver and Swift, 2003)[4], met Imai (2005), President of the Kaizen Institute of America. Imai (1986) was speaking about his recently published book: *Kaizen: The Key to Japan's Competitive Success*. Heist thought Connecticut area business leaders would be interested in learning about the Japanese process for continuous improvement, and invited Imai and other kaizen experts to speak at the Hartford Graduate Center.

As part of the preparations for the May 1988 seminar, Heist (1988) solicited top managers from several Hartford-area manufacturing companies and asked them to consider hosting the in-plant kaizen portion of the seminar. The letter stated:

> [The Kaizen Institute] stressed that the company must have good labor-management relations and that the employees "under the gun" [during the kaizen] must be assured that their jobs are not in jeopardy – kaizen teaches how to improve, not destroy.

Importantly, kaizen was presented from the very beginning to Connecticut business leaders as a means for improving and growing a business, not as a way to reduce costs by cutting jobs. Doing so would violate the "respect for people" principle.

The May 1988 seminar featured talks by Imai (1988) and others, as well as presentations and hands-on activities led by Iwata, Nakao, and Takenaka from the newly-formed Shingijutsu Co., Ltd. Imai (1988), at the start of the seminar, presented the literal definition of kaizen as: "change for the better", in the context of multi-lateral improvement; i.e. non-zero sum gains among stakeholders. Presentations given later in the week by Iwata, Nakao, and Takenaka did not discuss this – though they were indeed fully aware of the true meaning of kaizen – and instead focused on introducing the technical aspects of the Toyota Production System.

Managers from manufacturing businesses across the USA attended the seminar, including two executives from The Jacobs Manufacturing Company, George Koenigsaecker (President) and Bob Pentland (Vice President of Operations). Koenigsaecker and Pentland were greatly impressed by what they had learned in the classroom and especially during the kaizen facilitated late one evening by Iwata, Nakao, and Takenaka at the Jacobs facility in Bloomfield. This was likely one of the first kaizens conducted in Connecticut. A few days later, they were able to convince a reluctant Iwata to provide kaizen consulting services to Danaher business units starting in the summer of 1988 (Koenigsaecker, 2005; Shingijutsu, 2005c)[5]. Danaher Corporation was Shingijutsu's first US-based industrial client.

Typically, Iwata, Principal of Shingijutsu Co., Ltd, did not explain in detail the full meaning of kaizen to the President or CEO of the US-based businesses that his company served (Doi, 2005). Instead, Iwata would tell top managers at the start of a consulting engagement, though an interpreter, that they must not lay people off as a result of productivity improvements achieved through kaizen, because doing so would undermine future efforts to improve. He apparently thought that expressing this simple, real-world, cause-and-effect relationship would be sufficiently persuasive to avoid outcomes that would be inconsistent with the "respect for people" principle.

However, it appears this advice from a consultant was commonly perceived by CEOs who did not fully understand kaizen as idealistic and inconsistent with the short-term business pressures they faced from influential stockholders (DeLuzio, 2005a) – pressure that at the time was steadily increasing for leaders of US-based publicly traded businesses. Therefore, most CEO's made statements to Iwata along the lines of: "I am the CEO, and you have never run a company. So do not tell me what I should do. I will do whatever I think is necessary". This reaction, though flawed, reveals three important items:

(1) CEOs' traditional ways of thinking about business, both technical and human aspects, is not ready-made for kaizen.

(2) CEOs did not quickly comprehend the importance of the "respect for people" principle.

(3) Many CEOs are accustomed to thinking in terms of simple short-term trade-offs; e.g. higher profits are obtained by reducing labor costs – versus the

kaizen view, which is: labor is a valuable resource for determining how to reduce costs and improve products and services.

It also highlights the importance of immediately putting the "respect for people" principle into practice at the start of kaizen if a company expects to achieve authentic continuous improvement (Okuda, 1999). Despite the steady flow of cautionary statements from numerous informed sources, particularly since 1988, kaizen remains widely misunderstood and misapplied by management practitioners, especially in the USA, who continue to use it as a way to cut jobs (David, 1996, 2005; Holmes, 2001; Calnan, 2002; Gates, 2003; Nagy, 2003; Varnon, 2003; Haar, 2004; Sanchez, 2005). Not surprisingly, kaizen is usually perceived negatively by workers and other interested stakeholders, including educators and the media in Connecticut and elsewhere. The reputation of firms that use kaizen to lay off workers will suffer as well.

Mark DeLuzio joined Jacobs in 1989 as the Cost Systems Manager charged with establishing a new management accounting system consistent with Jacob's JIT production method. DeLuzio's, who would later become Vice President of the Danaher Business System office, led efforts to establish "JIT accounting" between 1989 and 1990. This was likely the first application of what is now known as "Lean accounting" (DeLuzio, 1993, 2005b; Fiume and Cunningham, 2003; Maskell and Baggaley, 2003). Danaher companies in Connecticut and elsewhere in the USA have, over the years, also made notable progress with regards to applying Lean principles and practices to product design and administration using the "Danaher Business System" (Danaher, 2005).

Shingijutsu consultants were hired by other Connecticut business a few years later. John Cosentino, Arthur Byrne's peer at Danaher Corporation, re-joined Hartford-based United Technologies Corporation (UTC) in late 1990 as President of Otis North America. Cosentino convinced his skeptical CEO, George David, in early 1991 to hire Shingijutsu Co., Ltd (Cosentino, 2005; Shingijutsu, 2005d)[6]. According to David (1998):

> It began for us with Shingijutsu at Otis in Bloomington, Indiana, in 1991 ... We moved to Pratt [& Whitney, in East Hartford, Connecticut] with Shingijutsu the following year, 1992.

The manner in which Shingijutsu's agreed to work with Pratt & Whitney, a unit of UTC that manufactures gas turbine engines, is noteworthy. Shingijutsu's was considering consulting with General Electric Aircraft Engines in early 1992. So John Cosentino arranged an "emergency meeting" between George David and Iwata to convince him that Shingijutsu Co. Ltd should instead work with Pratt & Whitney, GE Aircraft Engine's main rival (Cosentino, 2002). The meeting was held at The Wiremold Company in West Hartford, Connecticut, and Arthur Byrne, Wiremold's new President, played a key role in convincing Iwata to consult with Pratt & Whitney (Byrne, 2002; Fiume, 2002). In 2005, one of Shingijutsu's largest customers is General Electric Company.

Shingijutsu consultants later worked at other Connecticut-based business units of UTC, including Carrier Corporation in 1992, Hamilton Standard in 1993 (now called Hamilton Sundstrand), and Sikorsky Aircraft in 1995 (Shingijutsu, 2005b). A decade later, when asked by securities analysts what his biggest accomplishment had been at UTC, CEO George David (Courant, 2003):

> ... quickly mentioned the introduction of "lean" Japanese manufacturing techniques to UTC factories. "It has remade the company", he said.

In September 1991, The Wiremold Company (Smith, 2000; Wiremold, 2005) hired a new President, Arthur Byrne, from Danaher Corporation. Byrne, one of the two Group Executives at Danaher (Cosentino was the other), was hired in part because he had specific knowledge of how to implement JIT based on his prior experience at GE and through his overall responsibility for the Jacobs facility in Bloomfield, Connecticut. Byrne skillfully led a Lean transformation at Wiremold, with support from Shingijutsu consultants starting in early 1992, and a management team eager to learn new things. Byrne was one of the few senior managers in the US outside of Toyota group companies who at that time understood Lean as a comprehensive management system for the entire enterprise. Byrne and his team set out to apply Lean principles and practices to every facet of the business – human resources, finance, sales, marketing, engineering, MIS, etc. – not solely operations as is commonly done (Emiliani *et al.*, 2003). This had never before been attempted by a US-owned business.

Brief summaries of Wiremold's and Pratt & Whitney's Lean efforts were featured in the influential book *Lean Thinking*, published in 1996 (Womack and Jones, 1996). A detailed description of Wiremold's enterprise-wide Lean transformation was chronicled in a book written and published in Connecticut titled *Better Thinking, Better Results: Using the Power of Lean as a Total Business Solution*, published in 2003 (Emiliani *et al.*, 2003). This book is recognized by executives around the world as a practical blueprint for achieving a Lean transformation.

In 1994, the Connecticut State Technology Extension Program, called CONNSTEP, was created by the State of Connecticut to serve as an affiliate of the US Department of Commerce's National Institute of Standards and Technology manufacturing extension partnership (CONNSTEP, 2005a). The purpose of CONNSTEP Inc. was to help small manufacturers in the state improve their competitiveness. In 1997, CONNSTEP changed its focus from general methods of improvement to helping manufacturers "implement Lean Manufacturing techniques" (CONNSTEP, 2005a).

The many small- and mid-sized aerospace businesses located in Connecticut are part of an important economic cluster that began to face more intense global competition starting in the mid-1990s (Porter and Miller, 2003). So in 1999, a non-profit 501c (6) corporation was formed by area businessmen Doug Rose and Bill Evans called the Aerospace Components Manufacturers (ACM, 2005a, b). Its principal focus was the adoption by member companies of Lean principles and practices to improve competitiveness in the global aerospace market.

In 1999, ACM received funding from the State of Connecticut, Department of Economic and Community Development, to train managers and associates in Lean principles and practices (DECD, 1999, 2005a, b; Emiliani, 2004b). State funds were matched by member companies, which provided about 75 percent of the total funding. This unique approach to economic development and the expansion of competitive capabilities has been cited by many as a successful public-private sector partnership. Today, ACM lists over 40 member companies. The State of Connecticut continues to support small- and medium-sized aerospace and defense manufacturing businesses by providing financial assistance for workforce training in "lean manufacturing techniques" (DECD, 2005a).

Four Connecticut businesses have won the prestigious international Shingo prize for excellence in manufacturing (Shingo, 2005a)[7], including: Johnson & Johnson

(Southington) in 1994, Union Carbide (Danbury) in 1994, The Wiremold Company (West Hartford) in 1999, and Ensign-Bickford (Simsbury) in 2002[8]. Connecticut's manufacturing extension partnership, CONNSTEP Inc., is administering a new state-wide Shingo prize for excellence in manufacturing (CONNSTEP, 2005b)[9].

Since 2000, key elements of Lean management have spread to Connecticut service businesses, including: Kaman industrial technology (distribution) (Trombly, 2002); Phoenix wealth management (financial services) (Phoenix, 2003; IBRO, 2005); St Francis hospital (healthcare) (CBIA, 2002); Rensselaer at Hartford (higher education) (Emiliani, 2004c, 2005b), and Connecticut state government (Department of Labor) (Hasenjager *et al.*, 2001; Hutton *et al.*, 2004).

Various aspects of Lean management have also become important topics in undergraduate and graduate courses or degree programs in Connecticut's engineering and business schools, including: Central Connecticut State University, University of Connecticut, Fairfield University, University of Hartford, University of New Haven, Quinnipiac University, Rensselaer at Hartford, and Yale University. Because of Connecticut's long heritage of Lean management in area businesses, some courses are taught by former managers in addition to academics.

Discussion

Connecticut's links to Lean management stretch back over 25 years. While many Connecticut manufacturing and service businesses have in the past or are currently implementing Lean management, the early adopters – Jacobs and Wiremold – have become two of the best known examples of Lean management practice outside Toyota Motor Corporation and its affiliated suppliers. They can claim a significant level of improvement in business performance across a range of business, technical, and human factors. That is because top managers led the Lean transformation through direct participation and consistent application of both principles: "continuous improvement" and, either explicitly or implicitly, "respect for people."

Further, what makes Jacobs' and Wiremold's Lean transformations even more significant is that they occurred at established "brownfield" businesses, where Lean management is much more difficult to implement because it requires significant changes in thinking and day-to-day activities of associates and managers who have been immersed in conventional business practices (Emiliani, 2003; Emiliani and Stec, 2004).

In most other cases, managers in Connecticut, and elsewhere, applied only one principle, "continuous improvement," resulting in an undesirable hybrid batch-and-queue/Lean management system that is rife with conflicts between top management's stated goals in relation to company policies, practices, performance measures, and computer information systems that help inform people's day-to-day activities (Emiliani *et al.*, 2003; Emiliani and Stec, 2004).

While many people made important contributions (Womack and Jones, 1996), the historical record reveals the key people and events that contributed to the discovery and dissemination of Lean management in Connecticut, external to Toyota Motor Corporation and its affiliated suppliers:

- *Norman Bodek*, for creating Productivity Inc. in 1979 and Productivity Press, Inc. in 1984. Bodek's role in disseminating the Toyota Production System through newsletters, workshops, seminars, and study tours to Japan was significant. Perhaps of greater importance were the books that Productivity Press published,

which provided an inexpensive and easily accessible means to learn about the Toyota Production System. These books proved to be very influential among future Lean leaders such as Arthur Byrne of The Wiremold Company (Byrne, 2001)[10].

- *Alice Heist* of the Hartford Graduate Center, for inviting Imai, and Iwata, Nakao, and Takenaka to speak about kaizen, expertly organizing the seminar, and introducing area business leaders to kaizen and Shingijutsu Co., Ltd, in early 1988.
- *George Koenigsaecker* and *Bob Pentland* of The Jacobs Manufacturing Company, for convincing Iwata and his team to provide consulting services, and also for leading a well executed Lean transformation, principally in operations, from 1987 to 1992.
- *Art Byrne* and *Orry Fiume* of The Wiremold Company for leading a highly regarded enterprise-wide Lean transformation of a "brownfield" business from 1991 to 2002.
- *John Cosentino* for bringing Shingijutsu consultants into a major US multinational industrial conglomerate, UTC, in early 1991.

The business leaders that made this happen, as well as research papers and case studies produced by area academics and management practitioners (Emiliani, 1998, 2003; Emiliani and Stec, 2004; Fiume, 2004; Fransson *et al.*, 2004a, b, c; Arnheiter, 2005; Arnheiter and Maleyeff, 2005; Fransson, 2005; Grasso, 2005; Grasso *et al.*, 2005; Maleyeff, 2005), have resulted in many valuable new contributions to the body of Lean knowledge.

The books *Lean Thinking* (Womack and Jones, 1996); *Better Thinking, Better Results* (Emiliani *et al.*, 2003), and *Real Numbers* (Fiume and Cunningham, 2003) are Shingo Research Prize winning publications (Shingo, 2005b). The large number of scholarly papers produced and the success of these books reveal the fertile ground that has existed in Connecticut regarding the adoption of a new management system. These resources are being used by managers world-wide to help them achieve enterprise-wide Lean transformations and improve the competitiveness of manufacturing and service businesses, as well as government and non-profit organizations.

The critical failure in the disseminating knowledge related to the correct Lean management practice has been non-existent, inconsistent, or incomplete representation of the importance of the "respect for people" principle, despite clear writings and presentation of Lean management, kaizen, and related processes and tools by Toyota managers and other knowledgeable people. Indeed, simple logical arguments would reveal that authentic "continuous improvement" is not possible without "respect for people." This was understood by the leaders of Jacobs and Wiremold, led by Koenigsaecker and Byrne, respectively – years before it was made explicit in "The Toyota Way 2001" document (Toyota, 2001) – through their reading of books by Ohno and Shingo, and the training they received from Shingijutsu consultants recently retired from Toyota Motor Corporation and its affiliates. The challenge for other leaders is to comprehend what "respect for people" really means.

Some of the above mentioned resources that have recently entered the literature emphasize the importance of "respect for people" principle. However, Lean

management is learned by doing, and not by reading, classroom lectures, or through distant theoretical analysis. So while these resources can be helpful, top company managers seeking to practice Lean management must apply both "continuous improvement" and "respect for people" in everyday management practice if they expect to achieve their stated goals and also be seen by followers as credible leaders.

Summary

This paper presented an historical account of the discovery, adoption, and dissemination of the Lean management system among Connecticut businesses staring in the late 1970s to establish the interests and actions of key participants, and resultant outcomes. Many of the key participants made substantial contributions to further understanding various aspects of Lean management among managers in America and elsewhere. While most Connecticut businesses achieved poor or modestly favorable outcomes, two early adopters – Jacobs and Wiremold – experienced significant improvement across a wide range of indicators.

This account also highlights a significant opportunity missed by most top managers in their adoption of Lean management. It was, and remains today, the application of the "respect for people" principle. It is noteworthy that from the very beginning, the focus of the business press and also among most top managers was "continuous improvement" – specifically the operational methods used to achieve improvements in productivity and quality, reductions defects and lead-time, cost savings, etc. while the creators of Lean management, people from Toyota, simultaneously focused on "respect for people." As both principles are put into practice, their application must be improved upon over time as top manager's understanding of them deepens.

A future challenge for educators is to ensure that Lean management is taught as a comprehensive system of management that embodies two key principles, not one, and that the management system evolves as people improve their understanding of both the obvious and hidden interconnections between corporate purpose, company strategy, and Lean principles, processes, and tools (Nishiguchi, 1994; Basu, 1999; Fujimoto, 1999; Emiliani *et al.*, 2003; Liker, 2004).

Top managers who practice Lean management must make greater efforts to ensure they understand the true meaning of kaizen – "change for the better" – and the "continuous improvement" and "respect for people" principles, in order to achieve favorable financial and non-financial outcomes that benefit all key stakeholders. The only way managers can learn and understand Lean management is through direct participation in kaizen and other process improvement activities. This will also lead to a better balance between thinking and doing.

Management historians should benefit from this work by recognizing how certain aspects of the Lean management were selectively incorporated by most managers into existing batch-and-queue management practice, with little thought given to how this could affect their business or its stakeholders. The tendency to reduce lean management to short-term cost-cutting tactics or simple tools to add to manager's tool kit discounts the likelihood of confusion, lack of participation, and poor outcomes (Aeppel, 2002; Smalley, 2005), thereby corrupting a well-thought out and potentially beneficial management system. And when things do not work out, whom will historians hold accountable?

Notes

1. GE (2005), For about 20 years, GE's interest in Lean management has been uneven. GE's interest in Lean has increased greatly since 2004.
2. Productivity Inc. and Productivity Press, Inc. were combined in 1995 and then sold by Norman Bodek to The Kraus Organization, Ltd, in 1999. In 2003, Kraus divested the consulting business and retained the publishing business.
3. The name of the company was changed to Jacobs Vehicle Equipment Company in 1987. The company is commonly known as Jake or by the trade name JakeBrake®. Art Byrne recalls the date for implementation of JIT and cellular manufacturing as late 1986, personal communication, March 23.
4. The name was changed to "Rensselaer at Hartford" in 1997. Rensselaer at Hartford is a unit of Rensselaer Polytechnic Institute, Troy, NY.
5. Otis Elevator Company is headquartered in Farmington, Connecticut. Shingijutsu consulted at Otis' manufacturing facility in Bloomington, Indiana.
6. According to Shingijutsu's web site, their consultants started working at Danaher in 1989. The correct date is 1988.
7. Named after Dr Shigeo Shingo, and is administered by Utah State University's College of Business.
8. Conn (2005), Johnson & Johnson, recently known as Medex, is now owned by Smiths Medical, available at: www.smiths-medical.medex.com. Union Carbide is now a subsidiary of The Dow Chemical Company, available at: www.unioncarbide.com. The Wiremold Company is now a unit of Legrand Holding SA, available at: www.legrandelectric.com, owned in part by Kohlberg Kravis Roberts & Co., available at: www.kkr.com. Ensign-Bickford is now called Dyno Nobel, available at: www.dynonobel.com (accessed July 9).
9. The Connecticut Shingo Prize recognizes four levels of achievement in the application of Lean principles and practices.
10. The Productivity Press books that influenced Byrne the most were Shingo's *Study of Toyota Production System from Industrial Engineering Viewpoint and A Revolution in Manufacturing: The SMED System*, and Ohno's *Toyota Production System*.

References

ACM (2005a), Aerospace Components Manufacturers, Inc., available at: www.aerospacecomponents.org (accessed October 20).

ACM (2005b), Doug Rose is President of Aero Gear, Inc., Windsor, CT and Bill Evans is President of Delta Industries, Inc., East Granby, CT, available at: www.aerogear.com, www.delta-industries-ct.com (accessed July 11).

Aeppel, T. (2002), "On factory floors, top workers hide know-how from managers", *The Wall Street Journal*, 1 July.

Arnheiter, E. (2005), "A case study: lean and R&D at Henkel Loctite", *Rensselaer Journal of Management and Technology*, Vol. 1 No. 2, pp. 19-25.

Arnheiter, E. and Maleyeff, J. (2005), "The integration of lean management and six sigma", *The TQM Magazine*, Vol. 17 No. 1, pp. 5-18.

Ashburn, A. (1977), "Toyota's 'Famous Ohno System'", *American Machinist*, July.

Basu, S. (1999), *Corporate Purpose: Why it Matters More than Strategy*, Garland Publishing, New York, NY.

BEA (2005), US Department of Commerce, Bureau of Economic Analysis, Gross State Product, available at: www.bea.doc.gov/bea/newsrelarchive/2005/gsp1005.xls (accessed December 21).

Bhasin, S. and Burcher, P. (2006), "Lean viewed as a philosophy", *Journal of Manufacturing Technology Management*, Vol. 17 No. 1, pp. 56-72.

Bodek, N. (2004), *Kaikaku: The Power and Magic of Lean*, PCS Press, Vancouver, WA, pp. 5-9.

Bodek, N. (2005), Personal communication with Norman Bodek, March 24. Bodek is now President of PCS Press, Inc., Vancouver, WA, available at: www.pcspress.com (accessed July 9).

Butt, D. (1981), "Just-in-time in Lincoln, Nebraska: why and how", paper presented at seminar titled Productivity: Three Practical Approaches, February 23, Chicago, IL, in Monden (1986).

Byrne, A. (2001), personal communication, October 24.

Byrne, A. (2002), personal communication, August.

CBIA (2002), "Lean, clean and defect-free", *Connecticut Business and Industry Association News*, available at: www.cbia.com/NewsCovers/cov0702.htm (accessed July 13, 2005).

Calnan, C. (2002), "Bloomfield, Conn.-Based Aerospace Company to Expand in Jacksonville, FL", *The Florida Times-Union*, 15 August, p. 1.

CONNSTEP (2005a), "CONNSTEP History", available at: www.connstep.org/web/frames.nsf/pages/about (accessed December 19).

CONNSTEP (2005b), The Connecticut Shingo Prize, available at: www.connstep.org/ctshingo (accessed July 10).

Cosentino, J. (2002), personal communication, March 19.

Cosentino, J. (2005), personal communication, April 12.

Courant (2003), "UTC a tortoise in naming heir? David Hints at critical traits", *The Hartford Courant*, 27 September.

Danaher (2005), Danaher Corporation, available at: www.danaher.com/about/businesssystem.htm (accessed July 10).

David, G. (1996), "Technology and the American economy", speech by George David at Yale University, New Haven, CT, April 24, available at: www.eng.yale.edu/sheff/David/david-remarks.html (accessed September 19, 2005).

David, G. (1998), "Ito University – opening remarks", speech by George David, July 13, available at: www.utc.com/profile/facts/executives/speeches/ito.htm (accessed July 9, 2005).

David, G. (2005), Speech by George David to the Middlesex Chamber of Commerce, Cromwell, CT, June 1, available at: www.utc.com/profile/facts/executives/speeches/2005-06-01_gd.htm (accessed September 19, 2005).

DECD (1999), "Industry clusters progress report", State of Connecticut, Department of Economic and Community Development, November, available at: www.ct.gov/ecd/cwp/view.asp?a = 1100&q = 249800 (accessed July 12, 2005).

DECD (2005a), "Industry cluster related sites", State of Connecticut, Department of Economic and Community Development, available at: www.ct.gov/ecd/cwp/view.asp?a = 1100&Q = 249792&ecdNav = | (accessed July 12, 2005).

DECD (2005b), "Governor Rell announces new 'Lean Manufacturing' initiative for aerospace and defense suppliers", State of Connecticut, Department of Economic and Community Development, May 19, available at: www.ct.gov/ecd/cwp/view.asp?Q = 292912&A = 1104 (accessed December 26).

DeLuzio, M. (1993), "Management accounting in a just-in-time environment", *Journal of Cost Management*, Winter, pp. 6-15.

DeLuzio, M. (2005a), personal communication, September 18.

DeLuzio, M. (2005b), personal communication, March 23.

Doi, Y. (2005), personal communication, September 18.

DOL (2005a), Connecticut Department of Labor, "Covered employment by wages and industry – 2004", available at: www.ctdol.state.ct.us/lmi/202/202state_2004.htm (accessed December 21).

DOL (2005b), US Department of Labor, Bureau of Labor Statistics, Connecticut employment, available at: http://stats.bls.gov/eag/eag.ct.htm (accessed December 21).

Drucker, P. (1971), "What we can learn from Japanese management", *Harvard Business Review*, March-April, pp. 110-22.

Emiliani, M.L. (1998), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-31.

Emiliani, M.L. (2003), "Linking leaders' beliefs to their behaviors and competencies", *Management Decision*, Vol. 41 No. 9, pp. 893-910.

Emiliani, M.L. (2004a), "Is management education beneficial to society?", *Management Decision*, Vol. 42 Nos 3/4, pp. 481-98.

Emiliani, M.L. (2004b), "Sourcing in the global aerospace supply chain using online reverse auctions", *Industrial Marketing Management*, Vol. 33 No. 1, pp. 65-72.

Emiliani, M.L. (2004c), "Improving business school courses by applying lean principles and practices", *Quality Assurance in Education*, Vol. 12 No. 4, pp. 175-87.

Emiliani, M.L. (2005a), Lean in higher education, available at: www.theclbm.com/articles/lean_ed2.html (accessed July 11).

Emiliani, M.L. (2005b), "Using Kaizen to improve graduate business school degree programs", *Quality Assurance in Education*, Vol. 13 No. 1, pp. 37-52.

Emiliani, M.L. and Stec, D.J. (2004), "Using value stream maps to improve leadership", *Leadership & Organization Development Journal*, Vol. 25 No. 8, pp. 622-45.

Emiliani, M.L., Stec, D., Grasso, L. and Stodder, J. (2003), *Better Thinking, Better Results*, The Center for Lean Business Management, Kensington, CT.

Fiume, O. (2002), personal communication, August.

Fiume, O. (2004), "Lean at Wiremold: beyond manufacturing, putting people front and center", *Journal of Organizational Excellence*, Vol. 23 No. 3, pp. 23-32.

Fiume, O. and Cunningham, J. (2003), *Real Numbers*, Managing Times Press, Durham, NC.

Ford, H. and Crowther, S. (1922), *My Life and Work*, Garden City Publishing, Garden City, NY.

Ford, H. and Crowther, S. (1926), *Today and Tomorrow*, Doubleday, Page & Co., New York, NY.

Fransson, M. (2005), "Lean and the marketing process", *Rensselaer Journal of Management and Technology*, Vol. 1 No. 2, pp. 13-18.

Fransson, M., Chase, R., Miller, E. and Bartosch, S. (2004a), "The Wiremold Company: the Wiremold® distributor incentive program", *Business Case Journal*, Vol. 12 No. 1, pp. 60-77.

Fransson, M., Chase, R., Miller, E. and Bartosch, S. (2004b), "The Wiremold Company: the field sales organization", *Business Case Journal*, Vol. 12 No. 2, pp. 43-64.

Fransson, M., Maynard, S. and LaPlaca, P. (2004c), "The Wiremold Company: listening to the voice of the customer", *Business Case Journal*, Vol. 12 No. 1, pp. 1-20.

Fujimoto, T. (1999), *The Evolution of a Manufacturing System at Toyota*, Oxford University Press, New York, NY, pp. 85-222.

Gates, D. (2003), "Boeing Boss is keen for lean ways, production on a smaller scale", *The Seattle Times*, 27 June.

Grant, E. (1974), *Yankee Dreamers and Doers*, Pequot Press, Chester, CT.

Grasso, L. (2005), "Performance measurement in a lean organization: the case of the Wiremold Company", case study, unpublished.

Grasso, L., Fransson, M. and Emiliani, M. (2005), "The Wiremold Company: ensuring shareholder commitment", case study, submitted for publication.

Haar, D. (2004), "Trani leaves job half done at Stanley", *The Hartford Courant*, January 4, p. D1.

Hasenjager, J., Mullins, R. and Emiliani, B. (2001), "Lean government: a commitment to improvement", paper presented at the Journey to Performance Excellence 2001 Conference, Anaheim, CA, available at: www.workforce-excellence.net/html/journey/2001/workshops/lean.pdf (accessed July 13, 2005).

Heist, A. (1988), Letter from Alice Heist to the President of a large central Connecticut-based manufacturing company considering hosting the in-plant kaizen portion of the seminar, February 1.

Heist, A. (2005), personal communication, March 26.

Holmes, S. (2001), "Boeing goes lean", *BusinessWeek*, June 4.

Huntzinger, J. (2005), "The roots of lean. Training within industry: the origin of Japanese management and Kaizen", unpublished, available at: www.lean.org/Community/Resources/ThinkersCorner.cfm (accessed December 19, 2005).

Hutton, T., Stankiewicz, M. and Hasenjager, J. (2004), "Connecticut department of labor's lean to last initiative", paper presented at US Department of Labor Network '04 Conference, South Portland, Maine, November 3-5, available at: www.doleta.gov/regions/reg01bos/trainingresources/2004/network04/learn2last.pdf (accessed October 19).

IBRO (2005), "Company profile: the Phoenix companies", Insurance Business Review Online, available at: www.insurance-business-review.com/companyprofile.asp?guid = 2B002488-1594-4822-B2F6-3CECDDE52988 (accessed July 13).

Imai, M. (1986), *Kaizen: the Key to Japan's Competitive Success*, Random House, New York, NY.

Imai, M. (1988), "JIT/Toyota Production System Seminar" and "Basics of Kaizen® Seminar", training presentations handout materials, unpublished collective work by Imai and several other authors, The Kaizen® Institute of America, Camarillo, CA.

Imai, M. (1997), *Gemba Kaizen*, McGraw-Hill, New York, NY.

Imai, M. (2005), Kaizen Institute, available at: www.kaizen-institute.com (accessed July 10, 2005).

Jacobs (2005), available at: www.jakebrake.com/pdf/jake_timeline.pdf (accessed July12).

Jones, D. and Womack, J. (2002), *Seeing the Whole*, Lean Enterprise Institute, Brookline, MA.

Kamiya, S. (1976), *My Life with Toyota*, Toyota Motor Sales Co., Ltd, Toyota.

Kato, S. (1981), *My Years with Toyota*, Toyota Motor Sales Co., Ltd, Toyota.

Kawahara, A. (1998), *The Origin of Competitive Strength*, Springer-Vaerlag, Tokyo.

Kimoto, S. (1991), *Quest for the Dawn*, The Dougherty Company, Milwaukee, WI.

Koenigsaecker, G. (2005), Personal communication, 22 March.

LEI (2003), *Lean Lexicon*, Lean Enterprise Institute, Brookline, MA, p. 4.

Liker, J. (2004), *The Toyota Way*, McGraw-Hill, New York, NY.

Maleyeff, J. (2005), "Report from the field: an exploratory analysis of service systems using lean principles", *Rensselaer Journal of Management and Technology*, Vol. 1 No. 2, pp. 19-25.

Maskell, B. and Baggaley, B. (2003), *Practical Lean Accounting*, Productivity Press, New York, NY.

Monden, Y. (1983), *Toyota Production System*, 1st ed., Industrial Engineering and Management Press, Norcross, GA, pp. 233-6.

Monden, Y. (Ed.) (1986), *Applying Just In Time: The American/Japanese Experience*, Industrial Engineering and Management Press, Norcross, GA.

Monden, Y. (1993), *The Toyota Management System*, Productivity Press, Portland, OR.

Monden, Y. (1998), *Toyota Production System*, 3rd ed., Industrial Engineering and Management Press, Norcross, GA.

Nagy, B. (2003), "Factories bleeding jobs: manufacturing cutbacks speeding up in Connecticut", *The Hartford Courant*, August 6, p. E1.

Nishiguchi, T. (1994), *Strategic Industrial Sourcing*, Oxford University Press, New York, NY.

Nishimura, K. (2000), "Respecting human beings", interview of H. Okuda, *LookJapan*, January.

NUMMI (2005), *New United Motor Manufacturing, Inc.*, available at: www.nummi.com/us_roots.html (accessed December 19).

Ohno, T. (1988a), *Toyota Production System*, Productivity Press, Portland, OR, p. xiii.

Ohno, T. (1988b), *Workplace Management*, Productivity Press, Portland, OR.

Ohno, T. and Mito, S. (1988), *Just-in-Time For Today and Tomorrow*, Productivity Press, Cambridge, MA, p. 75.

Okuda, H. (1999), "Slashing payrolls shows executive incompetence", *Japan ECHO*, Vol. 26 No. 6, pp. 14-17.

Phoenix (2003) The Phoenix Companies, 2003 Annual Report, available at: www.phoenixwm.phl.com/servlet/DocDelivery?DocID = docu_publ_abou_annl_2003_full.pdf&DocType = 0#page = 8 (accessed July 13, 2005).

Porter, M. and Miller, K. (2003), "The state of Connecticut: strategy for economic development", Harvard Business School Case No. 9-703-426.

Productivity (2005), available at: www.productivityinc.com (accessed July 8).

Reingold, E. (1999), *Toyota: People, Ideas, and the Challenge of the New*, Penguin Books, London.

Sanchez, F. (2005), "Boeing: most cuts are hourly", *Long Beach News*, 25 August.

Shingijutsu (2005a), *Shingijutsu Co., Ltd, available at: www.shingijutsu.co.jp/E.HTM/vol01.htm/poly.htm (accessed June 29)*.

Shingijutsu (2005b), Shingijutsu Co., Ltd, available at: www.shingijutsu.co.jp/E.HTM/vol01.htm/sammary.htm (accessed June 29).

Shingijutsu (2005c), available at: www.shingijutsu.co.jp/E.HTM/vol01.htm/sammary.htm (accessed June 29).

Shingijutsu (2005d), available at: www.shingijutsu.co.jp/E.HTM/vol01.htm/sammary.htm (accessed June 29).

Shingo, S. (1981), *Study of Toyota Production System from Industrial Engineering Viewpoint*, Japan Management Association, Tokyo.

Shingo, S. (1985), *A Revolution in Manufacturing: The SMED System*, Productivity Press, Portland, OR.

Shingo, S. (1986), *Zero Quality Control: Source Inspection and the Poka-Yoke System*, Productivity Press, Portland, OR.

Shingo, S. (2005a), *The Shingo Prize for Excellence in Manufacturing*, available at: www.shingoprize.org/Recipients/BusPrize/current.htm (accessed July 10).

Shingo, S. (2005b), "Recipients of the research prize", available at: www.shingoprize.org/Recipients/RschPrize/current.htm (accessed July 10).

Smalley, A. (2005), "TPS vs lean and the law of unintended consequences", available at: www.superfactory.com/articles/smalley_tps_vs_lean.htm (accessed December 23).

Smith, J. (2000), *The Wiremold Company, A Century of Solutions*, The Wiremold Company, West Hartford, CT.

Sugimori, Y., Kusunoki, K., Cho, F. and Uchikawa, S. (1977), "Toyota production system and Kanban system – materialization of just-in-time and respect-for-human system", *International Journal of Production Research*, Vol. 15 No. 6, pp. 553-64.

Taylor, F.W. (1911), *The Principles of Scientific Management*, Harper & Brothers, New York, NY.

Togo, Y. (1998), *Yuki Togo's Sell Like Hel!!l*, self-published by Y. Togo.

Togo, Y. and Wartman, W. (1993), *Against All Odds: The Story of Toyota Motor Corporation and the Family that Created It*, St Martin's Press, New York, NY.

Toyoda, E. (1985), *Toyota: Fifty Years in Motion*, Kodansha International, New York, NY, pp. 57-8.

Toyota (1988), *Toyota: A History of the First 50 Years*, Toyota Motor Corporation, Toyota.

Toyota (2001), *The Toyota Way 2001*, Toyota Motor Corporation, Toyota, internal document, April.

Trombly, R. (2002), "Running lean running strong", *Industrial Distribution*, August 1, available at: www.manufacturing.net/IND/index.asp?layout = article&articleid = CA235267&stt = 001&pubdate = 08%2F01%2F02 (accessed July 13, 2005).

Varnon, R. (2003), "Job cuts imminent at stratford firm", *Connecticut Post*, May 13.

Wada, K. and Yui, T. (2002), *Courage and Change: The Life of Küchiro Toyoda*, Toyota Motor Corporation, Toyota.

Weaver, G. and Swift, M. (2003), *HARTFORD Connecticut's Capital: An Illustrated History*, American Historical Press, Sun Valley, CA, pp. 198-201, available at: www.rh.edu (accessed July 7, 2005).

Wiremold (2005), The Wiremold Company, Inc., available at: www.wiremold.com (accessed July 9).

Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, HarperPerennial, New York, NY.

Further reading

Gosselin, K. (2004), "Phoenix to cut more costs", *The Hartford Courant*, October 29, p. E2.

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Standardized work for executive leadership

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Abstract

Purpose – The purpose of this paper is to describe common errors made by business leaders as the foundation of a new approach for improving leadership capabilities and effectiveness. Introduces the concept and practice "standardized work" to the duties of executive-level leadership.

Design/methodology/approach – This paper utilizes a qualitative approach coupled with deductive reasoning and empirical data from the management practitioner community.

Findings – A practical framework for implementing standardized work can be created in relation to the strategic and day-to-day tasks of executive leadership by providing a new definition of leadership, a precise description of business principles, and a standard skill set for executives.

Research limitations/implications – This proposal for applying standardized work to the role of executive leadership has not been validated in actual business conditions, though similar concepts have been in effect at some large corporations for decades, with varying degrees of success.

Practical implications – Many of the same types of errors are repeated over generations of leaders. Most of these errors can be eliminated if executive leadership will practice the proposed standardized work.

Originality/value – This paper contributes to the literature and to leadership practice by introducing the concept "standardized work" to the duties of executive-level leadership and providing a framework for its application that can aid in the long-term success of organizations through generations of leaders.

Keywords Executives, Quality control, Leadership, Stakeholder analysis, Standardization

Paper type Research paper

Introduction

It is common to find in lower levels of an organization procedures to guide workers in their day-to-day activities. In some organizations, work procedures are written as simple but highly detailed descriptions called standardized work[1] (Monden, 1998; Liker, 2004). Workers are trained to understand the importance of adhering to standardized work, and also to know the circumstances under which standardized work needs to be created or updated. Sometimes, due to unusual business circumstances, a standardized temporary deviation must be made to standardized work in order to satisfy a customer requirement. Standardized work can be found in various functional areas such as manufacturing (Monden, 1998; Liker, 2004), purchasing and supplier development (Bounds, 1996; Dyer and Nobeoka, 2000), and engineering and new product development (Liker and Morgan, 2006).

The benefits of standardized work are many if it is used correctly. The benefits include the creation of reference point from which to continuously improve, process control, reduction in variability, improved quality and flexibility, stability (i.e. predictable outcomes), visibility into abnormalities, clear expectations, and a platform

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for individual and organizational learning. Many people misunderstand or misapply standardized work. They view it as a coercive and never-changing, set-in-stone, "one best way" to do work that robs workers of their creative abilities. This is not the intent. Standardized work changes when people come up with better ideas for how to perform the work or when business conditions change. Creative ideas are strongly encouraged and incorporated in a controlled manner, rather than in an *ad hoc* manner as is normally done.

Most executives do not perform their day-to-day work according to detailed work descriptions as do lower-level workers. Rather, they perform their work in accordance with procedures that often lack details of how to actually do the work, and of course they are often mired in time-consuming "firefights". As a result, there is a common perception among executives that their duties are so widely varied day-to-day that the application of standardized work to their activities is impossible. However, senior managers tend to think their entire workday is highly varied because that is what they remember most. In fact, observing them at work reveals that only part of their activities vary significantly from one day to the next. Thus, executives conform to processes in some of their day-to-day work and in some aspects of their leadership role, with the recognition that process and leadership are not synonymous – nor are they completely distinctive.

The cause of variation in leaders' workdays often can be traced to inconsistencies in decision-making and incorrect decisions which introduce errors and other forms of variability. Since much of an executive's work is decision making, a type of knowledge work, decision-making processes that lack standards can be inefficient and costly. Thus, top leaders may inadvertently create much of the variation that they encounter. Leaders who rationalize the variation they experience as "just the way things are" introduce barriers to the consideration of new ideas that might reduce variation and make their job easier to do and more enjoyable.

In addition, business leaders commonly claim there is a shortage of qualified leaders. This statement indicates that in their view, leadership is a specialized activity. However, the literature is divided on this point (Hay and Hodgkinson, 2006; McCartney and Campbell, 2006). Historically, specialization has tended toward standardization in the case of manual labor (Going, 1911; Kimball, 1913) and some types of knowledge work (Bounds, 1996; Liker and Morgan, 2006). The question is: Can standardization be applied to executive-level knowledge work? If so, standardization could help alleviate leadership shortages and reduce the total cost of leadership, inclusive of compensation and benefits, the cost of common errors that leaders make, etc. Standardized work could offer leaders many of the same benefits that workers and organizations as a whole experience, as previously mentioned. Leaders who are open to the concept of standardized work applied to their activities also would send a clear message that they are serious about participating in continuous improvement and avoiding costly errors.

This paper begins by describing the many types of errors commonly made by senior managers, and then presents this as the rationale for seeking to change how leaders perform some of their daily activities. It proposes the correction of leadership's errors through the use of "standardized work" which is comprised of a definition of leadership, an expression of business principles, and identification of a skill set for executives. Examples are given of three corporations that have made efforts to create standardized work for leaders, and which have met with varying degrees of long-term

success. The definition and framework for executive-level standardized work that is developed serves as a starting point for scrutiny and possible refinement among potential users. This paper contributes to the literature and to leadership practice by introducing the concept "standardized work" to the duties of executive-level leadership and providing a framework for its application that can aid in the long-term success of organizations through generations of leaders.

The proposed framework is not without limitations. For example, it is not clear that leadership is a specialized activity (Hay and Hodgkinson, 2006; McCartney and Campbell, 2006). Further, not every aspect of a leader's duties can or should be standardized. It is not the intent of this paper to advocate standardizing 100 percent of a leaders' day at work, to undercut creativity, to carelessly force conformance of leadership to process, or to suggest a "one best way". However, rationale is provided that shows a substantial portion of an executive's daily work activities could be standardized, and that this might have wide-ranging benefits to an organization and its key stakeholders through the reduction or elimination of costly errors. Standardized work also could be helpful in relation to the management of exceptional circumstances generated by the business environment. Getting top leaders to accept standardized work, no matter what the rationale, will not be easy and many mistakes will be made that will cause some leaders to give up. However, perseverance could lead to substantial long-term benefits.

Leadership's recurring errors

Daily reading of top business periodicals such as *Financial Times*, *The Nikkei Weekly*, and *The Wall Street Journal* tell an interesting story of the more significant errors made by senior managers of the world's top corporations. Over time, an unmistakable trend emerges that reveals clusters of common errors in executive thinking and business practice (Table I). These errors are remarkable in the sense that they are committed by educated leaders who typically have decades of business experience. In general, the leaders who commit these errors change over time, but occasionally errors are committed repetitively by the same leaders in the same or different organizations.

The financial and non-financial costs of these errors are enormous, as evidenced by the wave of corporate fraud that has occurred since 1998, particularly in the USA (Cassidy, 2002; Emiliani, 2004; Dash, 2006). They affect not just the company and its managers and employees, but also customers, suppliers, investors, the community, and competitors. Were these errors one-time, isolated events, they might be of less concern. Instead, these errors seem to be part of the fabric of doing business for over 100 years (Kimball, 1913). The damage these errors cause can be so large that leaders should want to ensure they never occur. But unfortunately they continue to occur.

Small leadership errors often cascade into larger errors, which can threaten the existence of a business. Figure 1 shows the primary causes of business failures between 1907 and 1911. Figure 2 shows the primary causes of business failures in the last several years. There is a high degree of consistency between the categories and percentages listed over a nearly 100-year period. This further supports the observation that similar types of errors are being made by senior managers over the long term. Among other things, this should call into question the efficacy of higher education – particularly business school education (Pfeffer and Fong, 2002) – in

Affected stakeholder	Practice or behavior
Employees	Unpaid labor or unfair pay
	Uneven pay and benefits between executives and workers
	Elective mass layoffs
	Cutting benefits
	Discrimination and harassment
	Unsafe workplace – physical or mental
	Ignoring employee suggestions
Suppliers	Delaying, avoiding, or cutting payments
	Debiting suppliers' accounts
	Requiring "pay to play"
	Squeezing suppliers margins
	Ignoring supplier suggestions
Customers	Chronic quality problems
	Price fixing and bid rigging
	Channel stuffing
	Incomplete disclosure of terms of sale
	Withholding information from customers
	Underpaying claims
	Ignoring customers or customer complaints
	Profile-based pricing or non-uniform pricing
	Tying
	Differential treatment (throttling)
	Overcharging or extra fees
	Underpayment
Investors	Inflating earnings (expense and revenue recognition)
	Back-dating contracts,
	Hiding debt
	Self-dealing
	Channel stuffing
	Insider trading
	Stock option grant or exercise back-dating
	Failure to respond to the competition
	Lack of new products or services
	Supply products or services customers don't want
	Incomplete disclosure or providing false information
	Overpaying – acquisitions, consulting services, etc.
Community	Underpayment of royalties
	Plant and office closings
	Tax evasion or reincorporating offshore
	Damaging the environment
	Incomplete disclosure
	Stock option exercise back-dating
Competitors	Predatory pricing
	Antitrust violation
	False or misleading advertising
	Acquiring competitor's proprietary documents
All	Power-based, zero-sum bargaining
	Not sharing gains
	Blaming people
	Politicizing the workplace
	Conflicts of interest

Source: Collected from hundreds of articles in *The Wall Street Journal* (1999-2007)

Table I.
Common errors made by senior managers

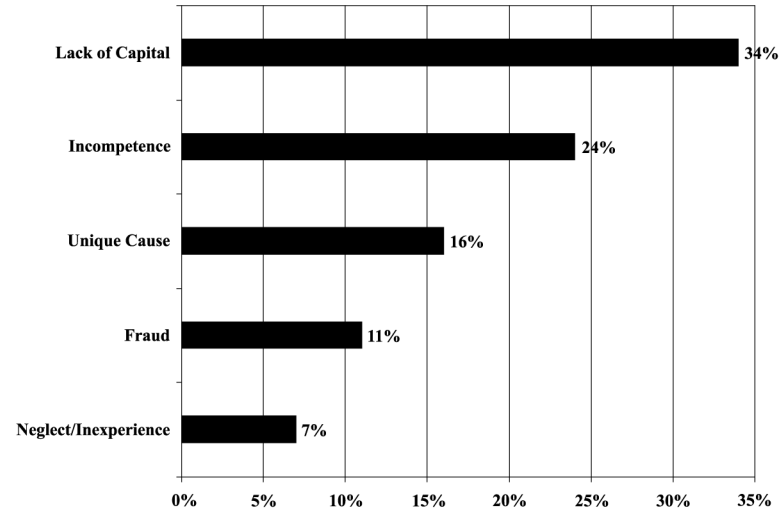


Figure 1.
Principal causes of business failures between 1907-1911

Source: Kimball (1913)

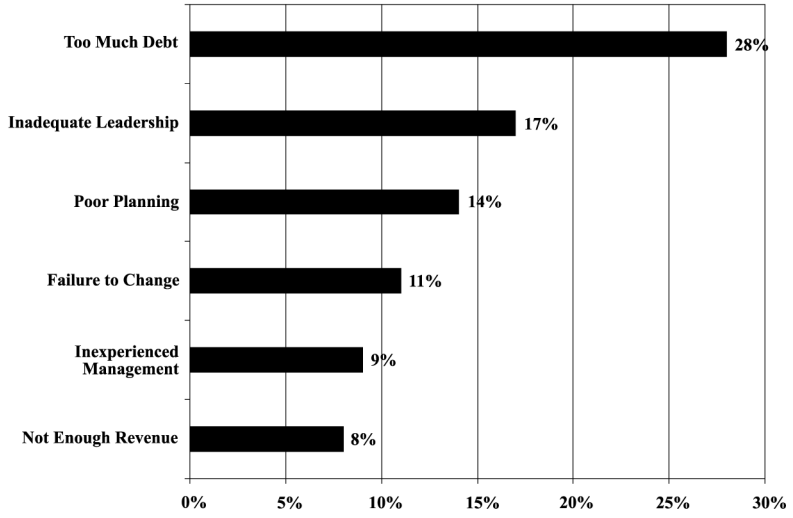


Figure 2.
Principal causes of business failures between 1998-2003

Source: BW (2003)

educating future business leaders, and will hopefully lead to effective reforms (Emiliani, 2006; Hay and Hodgkinson, 2006).

Based on the author's experience since 1999 in teaching graduate students who work full-time for a living, they have almost no understanding of the scope and magnitude of the types of repetitive errors listed in Table I. They tend to have a strong internal focus on their company's activities, and only a low single-digit percentage of workers keep abreast of developments in the business world by reading national

business periodicals. In other words, most of the few thousand workers whom the author has come into contact with as graduate students – and also as co-workers in a previous decade of experience working as a manager in industry – are almost completely unaware. This is partly because they lack frames of reference or benchmarks for comparison. However, when given a benchmark for comparison, they quickly gain awareness of leadership's errors and their impact upon stakeholders.

The author has regularly included the Caux Round Table *Principles for Business* (Caux, 1994) as a practical, real-world frame of reference in the courses he teaches (see Appendix). The *Principles for Business* is a six-page expression of principled business leadership crafted by CEO-level business leaders in 1994. These business principles differ markedly from personal principles or characteristics that managers might seek to embrace (Schell, 1926; Tead, 1935; Barnard, 1938; Covey, 1992). The former is concerned with inter-organizational business relationships, while the latter is focused more narrowly on personal characteristics, rooted in sociology and psychology, in the context of intra-organizational relationships (Parayitam *et al.*, 2002).

For more than five years the author has conducted an informal, non-scientific survey among adult graduate students who work full time in his leadership course. Nearly 250 working professionals participated in the survey, which was anonymous to both the students and the companies they worked for and approved by the university. Over 90 percent were employed by for-profit service and manufacturing businesses with sales typically between US $100 million to $6 billion. Approximately half were supervisors or mid-level managers, about 15 percent were senior managers, and the remainder was independent contributors. Over 95 percent had greater than ten years of business experience.

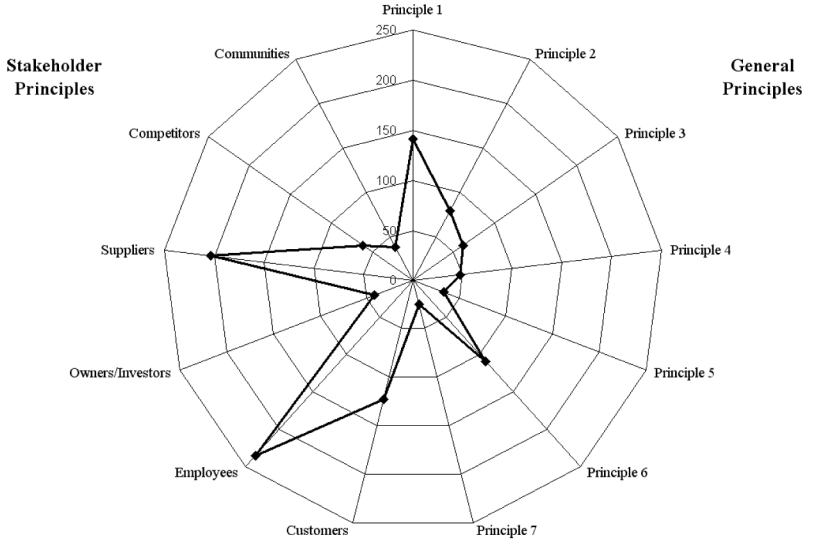
At the start of the course (first class), students were asked to read the Caux Round Table *Principles for Business* and identify the categories in which they felt their company was inconsistent. The results are shown in Figure 3. The radar chart is interpreted as follows: data points further away from the center indicate a perception of increasing inconsistency between their company's performance and the *Principles for Business*, whereas data points near the center indicate a perception of increasing consistency. If, in aggregate, company leaders were broadly consistent with the Caux Round Table *Principles for Business*, then the radar chart would consist of a small circle located close to the center. Instead, we see a highly irregular shape that is indicative of large variances or a lack of balance. In other words, the leaders appear to strongly favor some stakeholders over others (left side of chart), and is more responsive to some of the general principles but not to others (right side of chart). The radar chart reveals other interesting things:

Stakeholder principles

The largest variances are for the stakeholder categories "Employees" and "Suppliers". Students feel their leaders strongly marginalize their interests and supplier's interests.

The smallest variances are for the stakeholder categories "Community" and "Owners/Investors." Students feel their leaders effectively satisfy the interests of owners/investors and the communities in which they operate.

However, one can easily question the perception that business leaders strongly satisfy the interests of owners/investors. This cannot be the case if employees and suppliers interests are marginalized. After all, they are key stakeholders engaged in the



Source: Caux (1994)

Figure 3.
Radar chart showing student's perceptions of their company's performance relative to the Caux Round Table *Principles for Business*

Notes: Data points further from the centre of the radar chart indicate unfavourable variances. The categories on the left are the "Stakeholder Principles," while the categories on the right are the "General Principles," which are: Principle 1. The Responsibilities of Businesses: *Beyond Shareholders toward Stakeholders;* Principle 2. The Economic and Social Impact of Business: *Toward Innovation, Justice and World Community;* Principle 3. Business Behavior: *Beyond the Letter of Law Toward a Spirit of Trust;* Principle 4. Respect for Rules; Principle 5. Support for Multilateral Trade; Principle 6. Respect for the Environment; Principle 7. Avoi dance of Illicit Operations

value-creating activities that customers desire, and whose performance for customers would likely be much better if they did not feel marginalized.

General principles

The largest variances are for Principle 1, "The responsibilities of businesses: *beyond shareholders toward stakeholders*" and Principle 6, "Respect for the environment." Students feel their leaders could do much more to balance the interests of other stakeholders and reduce the company's environmental footprint.

The smallest variances are for Principle 5, "Support for multilateral trade" and Principle 7, "Avoidance of illicit operations." Students feel their leaders effectively satisfy efforts to support global commerce (though many said they are uncomfortable with the increasing levels of work that are outsourced domestically or sent offshore), and avoidance of illicit operations was perceived to be an area of strong compliance.

Principle 1 represents advancement in thinking about the purpose of business and its responsibility to share the wealth more broadly, which the creators of the *Principles for Business* thought was necessary to ensure long-term prosperity in a global

economy. Students' perception relative to Principle 1 correlates with their perception that their interests as an "Employees" category stakeholder have been marginalized, as have suppliers' interests. Principle 6, "Respect for the environment," was seen by students as a major area for improvement that can lead to substantial benefits for owners/investors and other stakeholders.

Of course, the news is not all bad. Students were generally proud of their company's products and services and overall performance in the marketplace. However, they uniformly wished their senior management would recognize the need for improvement in the areas identified and lead efforts to make favorable changes. Current business trends indicate the possibility of greater perceived inconsistency with the *Principles for Business*, particularly in companies where leaders indiscriminately seek to outsource or offshore work, increase the use of temporary labor, cut employee wages or benefits, etc.

Overall, this informal, non-scientific survey indicates that when given a point of reference such as the *Principles for Business*, workers can more easily determine if their leaders have made errors, though not necessarily the specific type of errors. Figure 3 graphically illustrates variation that likely has negative effects on stakeholders, even to those which leader's attention may be fully focused on such as shareholders. Thus, leaders who make explicit efforts to "maximize shareholder value" may be undermined by financial and non-financial costs generated by these imbalances, resulting in less efficient operation.

Correcting errors

In general, it is fair to say that most leaders possess a casual view of errors. The evidence of this can be seen in how they attempt to correct errors. It is usually at the symptom level rather than at the root cause, and they often blame other people or external conditions or events for having caused the errors. If leaders viewed errors seriously, they would focus on understanding deficiencies in business processes such as decision making that leads to errors. While leaders are often trained in root cause analysis, it is rare to find any who actually use the root cause analysis tools they were taught for the types of problems they face.

Some businesses have leaders who emphasize the need to understand the source and nature of errors, and to identify countermeasures to prevent their recurrence. Most notably, this includes leaders that correctly practice Lean management (Womack *et al.*, 1990; Womack and Jones, 1996; Emiliani *et al.*, 2007), a system of management closely aligned with Toyota Motor Corporation's management system (Ohno, 1988; Monden, 1993; Liker, 2004). Errors are viewed as abnormalities that cause undesirable variation which leads to instability. Every employee, from CEO to shop-floor or office worker, is trained in specific methods to:

- recognize a problem;
- analyze a problem quickly;
- identify countermeasures;
- implement countermeasures to prevent recurrence; and
- measure and evaluate results.

As a result, leaders who correctly apply Lean principles and practices do not suffer from the quantity and frequency of errors that others must endure (Womack *et al.*, 1990; Basu, 1999; Spear and Bowen, 1999; Emiliani *et al.*, 2007).

Another approach for eliminating errors and to enable continuous improvement is to establish a precise procedure for doing work; to create what is called "standardized work" (Shingijutsu, 1992; Liker and Meier, 2006). It is an essential part of the Lean management system and efforts to eliminate waste, unevenness, and unreasonableness (Ohno, 1988), and is characterized by Toyota Motor Corporation (Toyota, 1998) as:

> Standardized work is a tool for maintaining productivity, quality, and safety at high levels. It provides a consistent framework for performing work at the designated takt time [rate of customer demand] and for illuminating opportunities for making improvements in work procedures…
>
> Standardized work provides detailed, step-by-step guidelines for every job…
>
> Because standardized work involves following procedures consistently, any inherent problems in the working sequence surface repeatedly and conspicuously. Team leaders and their team members therefore can *identify the problems easily*. And they can *rectify problems promptly*.

Thus, standardized work is the foundation for improvement. In the words of Massaki Imai (1986): "There can be no improvement where there are no standards." This coupling of improvement to standards is thus viewed to be of critical importance in relation to manual labor and will be carried forward in the development of standardized work for the knowledge work performed by executives. The definition of standardized work published by the Lean Enterprise Institute is (LEI, 2006):

> Establishing precise procedures for each operator's work in a production process, based on three elements:
>
> (1) Takt time, which is the rate at which products must be made in a process to meet customer demand.
> (2) The precise work sequence in which an operator performs tasks within takt time.
> (3) The standard inventory, including units in machines, required to keep the process operating smoothly.
>
> Standardized work, once established … is the object of continuous improvement through *kaizen*.

Where *kaizen* is a Japanese word that literally means "change for the better" in a multilateral context; i.e. the change must be good for all stakeholders. It is typically translated as "continuous improvement" and implies a specific process for continuous improvement.

Standardized work is not a fixed-in-stone one-best-way description to do the work. Instead, standardized work is the current best known method for doing the work, and it is continuously revised based upon kaizen and changes in business conditions (Shingijutsu, 1992). The benefits of standardized work include (LEI, 2006):

- documentation of current process;
- reduction in variability (fewer errors);

- simplify training of new personnel; and
- establishes baseline for improvement.

The definitions and context of standardized work that have been presented obviously relate to the work of shop-floor personnel in a manufacturing business. These definitions are not suitable in context of senior management's day-to-day activities, but the concept of standardized work can be applied to the knowledge work of senior executives in a similar fashion.

Standardized work for executives

Conceptually, the idea is to realize improvement by eliminating the types of errors that leaders commonly make, as shown in Table I and Figures 1 to 3. While the diligent use of formal root cause analysis tools will be necessary, so too will be the establishment of standardized work to make processes such as decision making more efficient and less costly. The logic is as follows: If standardized work is important enough to be applied at the shop-floor level to avoid errors costing anywhere from a few dollars to a several thousand dollars (perhaps more), then it certainly makes sense to apply standardized work to leader's knowledge work to avoid more expensive financial and non-financial errors, perhaps even up to those that lead to forced sale, reorganization under bankruptcy code, or liquidation. The definition of standardized work for executives is:

> Establishing precise framework for each leader's work in business processes, based on three elements:
>
> (1) Definition of leadership that satisfies the needs of internal and external customers.
> (2) A precise description of business principles that leaders use to perform their work.
> (3) A standard skill set to keep business processes operating smoothly.
>
> Standardized work, once established, is the object of continuous improvement through *kaizen*.

A document that specifies standardized work for labor-based activities is, in essence, a definition of how to do a type of work. If the type of work one does is knowledge-based such as leadership, then there should be a definition of leadership that serves as a guide for people in leadership positions. Recall Imai's words (Imai, 1986): "There can be no improvement where there are no standards." Figures 1 and 2 show that over a nearly 100-year period, the cause of business failures has remained largely the same. Table I shows the specific type of repetitive errors that leaders make. Thus, there has not been much improvement in part because there have been no standards or very poor standards. For example, noted leadership writer Warren Bennis had this to say about leadership (Bennis, 1989):

> To an extent, leadership is like beauty; it's hard to define, but you know it when you see it... at bottom, becoming a leader is synonymous with becoming yourself.

Because there is much ambiguity surrounding how leadership is conceptualized (Hay and Hodgkinson, 2006), there are innumerable definitions of leadership (McCartney and Campbell, 2006; University of Exeter, 2007) that introduce significant variability, which typically leads to uneven outcomes (e.g. Creswell and Barbaro, 2007). The top leaders of large corporations have been very highly compensated in recent years

(Cassidy, 2002; Dash, 2006a, b; Fabrikant, 2006; Morgenson, 2006), so one would expect that their performance would be less subject to chance. But the best-known definitions of leadership do, in fact, leave a great deal of room for interpretation among leaders and thus help introduce unwanted variability. For example, John Maxwell's definition of leadership is (Maxwell, 1998):

> Leadership is influence – nothing more, nothing less.

Peter Drucker's definition of leadership is (Hesselbein *et al.*, 1996):

> The only definition of a leader is someone who has followers.

Warren Bennis's widely quoted definition of leadership is (Bennis, 2003):

> Leadership is a function of knowing yourself, having a vision that is well communicated, building trust among colleagues, and taking effective action to realize your own leadership potential.

These common definitions of leadership are inadequate if we are to avoid the problems shown in Table I and Figures 1 to 3. The principal shortcomings are that they lack sufficient detail to know precisely what to do; most are focused on the leader and not the followers – the customers of leadership; and they can be interpreted by leaders in many different ways. Further, and most importantly, both good and bad leaders can satisfy these definitions, which render them useless. For example, the corrupt leaders at Enron, WorldCom, Computer Associates, Rite-Aid, Warnaco, and Sunbeam Corporation had influence; they had no difficulty building trust among colleagues; they were able to communicate a vision; and the actions they took helped them realize their leadership potential.

I offer a new standardized definition of leadership; one that is more specific and actionable. It is less concerned with leaders' personal attributes and more focused on the effect leaders should have on others in the execution of their day-to-day activities. The first element of standardized work for leaders is this:

> Beliefs, behaviors, and competencies that demonstrate respect for people, motivate people, improve business conditions, minimize or eliminate organizational politics, ensure effective utilization of resources, and eliminate confusion and rework.

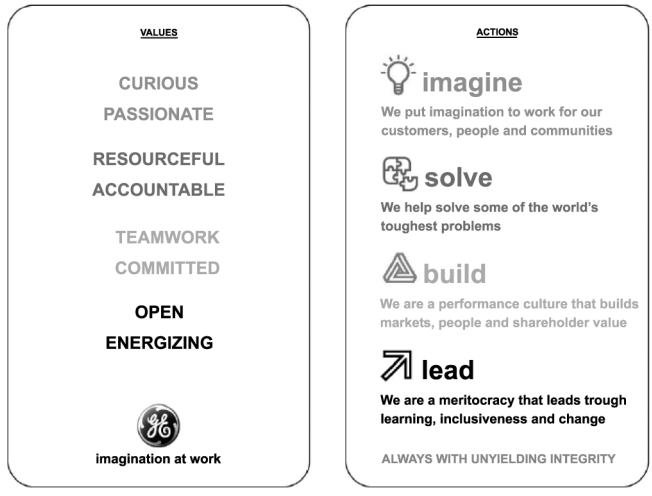
This definition brings to the forefront several critical aspects of leadership that are often very poorly practiced, as illustrated by Table I and Figures 1 to 3. This new leadership definition seeks to inform leaders of their responsibility to eliminate waste and inefficiency, and to avoid marginalizing the interests of key stakeholders. Thus, it begins to inform leaders that a principal aspect of their function is to facilitate information flows, not to block them. This is a unique view of the role of leadership; one that suggests many interesting research opportunities.

The second element of standardized work is a description of business principles that leaders can use to perform their work. Attempts have been made by corporations to do this, including General Electric (GE), Hewlett-Packard (HP), and Toyota Motor Corporation.

General Electric's representation of the "GE Way" under former CEO John F. Welch, Jr (Slater, 1999) is given in the form of GE leadership values (i.e. beliefs) and actions in the context of "what we do" (GE, 2000, 2007):

All of us [GE Leaders] … always with unyielding integrity …
Are passionately focused on driving customer success
Live Six Sigma Quality … ensure that the customer is always its first beneficiary … and use it to accelerate growth
Insist on excellence and are intolerant of bureaucracy
Act in a boundaryless fashion … always search for and apply the best ideas regardless of their source
Prize global intellectual capital and the people that provide it … build diverse teams to maximize it
See change for the growth opportunities it brings … e.g., "e-Business"
Create a clear, simple, customer-centered vision … and continually renew and refresh its execution
Create an environment of "stretch," excitement, informality and trust … reward improvements … and celebrate results
Demonstrate … always with infectious enthusiasm for the customer … the "4-E's" of GE leadership: the personal Energy to welcome and deal with the speed of change … the ability to create an atmosphere that Energizes others … the Edge to make difficult decisions … and the ability to consistently Execute

This representation of the "GE Way" has come under criticism as GE executive alumni have moved on to lead other organizations with less success than expected (Deutsch, 2001, 2007). General Electric's representation of the "GE Way" under current CEO Jeffrey Immelt, shown in Figure 4, is similar in approach to the earlier expression, but significantly different in its focus and style of presentation (GE, 2007). Rather than an expression of business principles, this new version of the "GE Way" also describes GE values and the actions that people are expected to take.



Source: GE (2007)

Figure 4.
General Electric's representation of the "GE Way"

Hewlett-Packard's original 1957 representation of the "HP Way" is (HP, 2007a,b):

> In the company's first off-site meeting of senior managers, the HP corporate objectives are written. In keeping with the company's practice of management by objective, the purpose of these objectives is to serve as a day-to-day guide for management decision-making in a rapidly growing company. "We thought that if we could get everybody to agree on what our objectives were and to understand what we were trying to do, then we could turn them loose and they would move in a common direction," Dave [Packard] later says about the meeting. The objectives cover seven points: **profit, customers, fields of interest, growth, our people, management and citizenship**. [bold added]. These management philosophies, radically different from the top-down management style of many companies, serve as the basis of HP's management style, which comes to be known as the "HP Way."

This representation is given both as "objectives" and "management philosophies", rather than as business principles, and remained in use through 1999. The current representation of the "HP Way", shown in Figure 5, is similar in that it is a statement of shared values, yet significantly different from the 1957 version in its areas of focus. The original "HP Way" served as a successful expression of business objectives for about 40 years, or two to three generations of leaders. Both General Electric's and HP's current descriptions, as publicly available, are not precise, lack the scope and detail

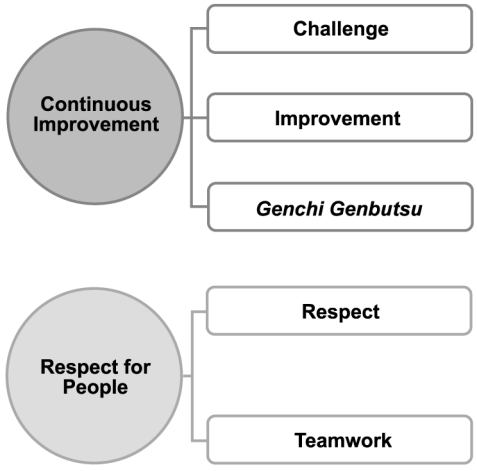
Figure 5.
Hewlett-Packard's representation of the "HP Way"

Source: HP (2007a)

contained in the Caux Round Table *Principles for Business*, and are more similar to each other than they are to Toyota's representation of the "Toyota Way".

Toyota Motor Corporation's representation of the "Toyota Way" is contained in an 11-page internal document titled "The Toyota Way 2001" (Toyota, 2001). While Figure 6 shows the top-level representation of "The Toyota Way", the booklet contains a large amount of detail and examples that capture leadership's long-standing implicit and explicit beliefs, their behaviors, and important competencies. Some of the contents of "The Toyota Way 2001" dates back to the start of its automotive business in 1937, which itself has roots to the Toyoda family's textile business from the 1890s. "The Toyota Way 2001" represents an expression of Toyota's "fundamental DNA" (Toyota, 2001) that has existed for over 70 years, or four to six generations of leaders.

"The Toyota Way 2001" is intended not just for leaders, but for all Toyota employees. It is much more precise in comparison to GE's and HP's representation of their respective "Ways". Additional precision comes in the form of key Toyota documents such as the "Toyoda Precepts" dating from the 1890s and codified in 1935 (Toyota, 1988), "Guiding Principles" dating from 1963, and the "Contribution Towards Sustainable Development" released in 2005 (Basu, 1999; Toyota, 2007). The "Contribution Towards Sustainable Development" document is based on the "Guiding Principles" and closely resembles the Caux Round Table *Principles for Business* in that it explicitly describes the type of relationships it seeks with its stakeholders: customers, employees, business partners, shareholders, and global society and local communities. Thus, in Toyota's case, there is a richer supply of detailed information to help leaders do their work. In addition, Toyota's key documents have undergone only small changes over the last several decades (Basu, 1999).



Source: Toyota (2003)

Note: The Japanese words *Genchi Genbutsu* mean "go to the source", in the context of fact-finding to understanding the true nature of problems and making correct decisions (Toyota, 2003)

Figure 6.
Toyota Motor Corporation's top-level representation of "The Toyota Way"

Rather than create from scratch the second element of standardized work for executives to perform their work, it would be sensible to simply use the Caux Round Table *Principles for Business* as the standardized description of business principles.

The third element of standardized work is a standard skill set to keep business processes operating smoothly. This formulation of skill set differs from how the term is typically applied to factory or office worker activities. In this case, the term "skill set" would be a bit broader and consist of a short list of mindsets, behaviors, and skills that will help keep business processes operating smoothly. It is as follows:

- *Customer first* – Recognizing the importance of the customer to business continuity and satisfying their ever-changing needs.
- *Process and results* – Avoiding the dysfunctional "results are the only thing that matter" view that is often prevalent among senior managers.
- *Developing people* – Commitment to developing associates and to create future leaders through significant cross-functional work experience.
- *Quantitative plus qualitative* – Balance quantitative and qualitative information to make correct decisions, rather than focusing almost exclusively on the numbers.
- *Go see/get hands dirty* – Willingness to go to the source; to engage people in a non-blaming, non-judgmental way; comfortable doing front-line value-adding work periodically as a way to learn and improve.
- *PDCA cycle* – Uses Plan-Do-Check-Act cycle for continuous improvement.
- *Root cause analysis* – Uses simple root cause analysis tools to better understand the source of problems and identify countermeasures.
- *Time consciousness* – Responsiveness to problems and knowing when to respond to opportunities.
- *Stakeholders as resources, not costs* – Possesses positive view that stakeholders are resources to the enterprise.
- *Technology to help people* – Understands role of technology to help people and support business processes, not as a means to replace people.
- *Sharing* – Shares wealth among various stakeholders to create new opportunities and drive business growth.

Thus, establishing the precise framework for each leader's work in business processes, based on three elements, is as follows:

(1) *Definition of leadership that satisfies the needs of internal and external customers:*
   - Beliefs, behaviors, and competencies that demonstrate respect for people, motivate people, improve business conditions, minimize or eliminate organizational politics, ensure effective utilization of resources, and eliminate confusion and rework.

(2) *A precise description of business principles that leaders use to perform their work:*
   - Caux Round Table *Principles for Business* (Caux, 1994).

(3) *A standard skill set to keep business processes operating smoothly:*
- customer first;
- process and results;
- developing people;
- quantitative plus qualitative;
- go see/get hands dirty;
- PDCA cycle;
- root cause analysis;
- time consciousness;
- stakeholders as resources,
- not costs; and
- technology to help people;
- Sharing

Standardized work, once established, is the object of continuous improvement through kaizen.

The benefits of this approach should be similar to that found among organizations that practice standardized work very well, such as Toyota Motor Corporation:

- documentation of current leadership processes;
- reduction in variability (fewer errors) in leadership activities;
- simplify training of new leaders and flexibility in staffing; and
- establish baseline for improvement.

Empirical evidence from corporations such as GE, HP, and Toyota indicate that their descriptions of "The Way" can be beneficial in helping leaders achieve long-term success, though HP has stumbled recently (Rivlin, 2005). It is expected that the proposed standardized work for executives could yield better long-term results because it is more specific and comprehensive, yet remains relatively simple and concise. Daily use of standardized work should improve the efficiency of leadership decision-making and develop leadership capabilities much in the same way that daily practice improves a musician's efficiency and capabilities.

Once standardized work is established, the next step is to perform the work to the standard, measure the results, and make corrections. In the case of executive leadership, it is reasonable to use financial and non-financial performance metrics and feedback processes that are likely already in place. While it best to have metrics few in number, as simple as possible, and also timely (Fiume and Cunningham, 2003), it would be helpful to create a new metric, as shown in Figure 3. This would give leaders a broad view of how their work and decisions are interpreted by key stakeholders. Appropriate rewards would have to be established for executives who adhere to standardized work and meaningful corrections devised by the leadership team in advance for those who do not.

Summary

The need for consistent leadership and business performance is well recognized among senior managers and other internal and external stakeholders. However, the means for achieving consistent performance can be elusive as illustrated by the many types of serious errors commonly made by executives. These errors were shown in order to establish the need for improvement in how business leaders perform their work and make decisions.

A model of standardized work was developed for executives based upon the existing formulation of standardized work used by some in industry for labor and knowledge worker activities. Its design is intended to reduce or eliminate the common errors that senior managers make, as well as for improving their overall leadership capabilities and effectiveness for the long-term. This is achieved by providing a new standardized definition of leadership, a standardized description of business principles (Caux, 1994), and identifying a standardized skill set for executives.

This framework has not yet been validated in actual business conditions and may be subject to further improvement, particularly with regard to the standardized skill set as needs change. However, similar concepts have been in effect in some large corporations for decades with different degrees of success. Ultimately, the test of effectiveness depends upon whether or not leaders in organizations will individually and collectively contribute to ensuring the survival of standardized work over generations of leaders, similar to how Toyota Motor Corporation's leaders have kept the "Toyota Way" alive since the 1890s. This could be a key responsibility of boards of directors.

Finally, the proposed framework for executive-level standardized work offers a rich avenue for future empirical research into the effectiveness of this approach in reducing errors and improving leadership capabilities.

Note

1. Standardized work is not the same as work standards. Work standards are imposed on workers by managers as part of a financial effort to create standard unit costs used in absorption accounting systems. Standardized work is the creation of the best known method of work at a given point in time that yields the highest quality, least amount of waste, and lowest total cost. Work standards focus on the worker, are thought by managers to be the one best way the work can be performed, and are used as a carrot or stick against employees. In contrast, standardized work focuses on the process and is used to establish a baseline for continuous improvement in which workers and managers participate (Liker and Meier, 2006).

References

Barnard, C. (1938), *The Functions of the Executive*, Harvard University Press, Cambridge, MA.

Basu, S. (1999), *Corporate Purpose: Why it Matters More than Strategy*, Garland Publishing, New York, NY.

Bennis, W. (1989), *On Becoming a Leader*, Addison-Wesley Publishing, Reading, MA.

Bennis, W. (2003), *Leaders: Strategies for Taking Charge*, HarperCollins Publishers, New York, NY, p. 78.

Bounds, G. (1996), "Toyota supplier development", in Bounds, G. (Ed.), *Cases in Quality*, Irwin, Chicago, IL, pp. 3-25.

Cassidy, J. (2002), "The greed cycle", *The New Yorker*, 23 September, pp. 64-77.

Caux (1994), "Caux Round Table: Principles for Business", Caux Round Table, available at: www.cauxroundtable.org/documents/Principles%20for%20Business.PDF (accessed 4 January, 2007).

Covey, S. (1992), *Principle Centered Leadership*, Fireside/Simon & Schuster, New York, NY.

Creswell, J. and Barbaro, M. (2007), "Home depot ousts highly paid chief", *The New York Times*, 4 January.

Dash, E. (2006), "Report estimates the costs of a stock options scandal", *The New York Times*, 6 September.

Dash, E. (2006a), "Executive pay: off to the races again, leaving many behind", *The New York Times*, 9 April.

Deutsch, C.H. (2001), "At G.E., whither the house that Jack built?", *The New York Times*, 6 September.

Deutsch, C.H. (2007), "G.E. magic can fade, after GE", *The New York Times*, 4 January.

Dyer, J. and Nobeoka, K. (2000), "Creating and managing a high-performance knowledge sharing network: the Toyota case", *Strategic Management Journal*, Vol. 21, pp. 345-67.

Emiliani, M.L. (2004), "Is management education beneficial to society?", *Management Decision*, Vol. 42 Nos 3/4, pp. 481-98.

Emiliani, M.L. (2006), "Improving management education", *Quality Assurance in Education*, Vol. 14 No. 4, pp. 363-84.

Emiliani, B., Stec, D., Grasso, L. and Stodder, J. (2007), *Better Thinking, Better Results: Case Study and Analysis of an Enterprise-Wide Lean Transformation*, 2nd ed., The CLBM, LLC, Kensington, CT.

Fabrikant, G. (2006), "US-style pay deals for chiefs become all the rage in Europe", *The New York Times*, 16 June.

Fiume, O. and Cunningham, J. (2003), *Real Numbers*, Managing Times Press, Durham, NC.

GE (2000), *Annual Report: GE Values*, General Electric Corporation, Fairfield, CT, available at: www.ge.com/annual00/values/index.html (accessed 5 January, 2007).

GE (2007), *General Electric Values*, General Electric Corporation, Fairfield, CT, available at: www.ge.com/files/usa/en/company/companyinfo/valuesandactions.pdf and www.ge.com/en/company/companyinfo/at_a_glance/ge_values.htm (accessed 4 January, 2007).

Going, C. (1911), *Principles of Industrial Engineering*, McGraw-Hill, New York, NY, pp. 26-31.

HP (2007a), *HP Timeline – 1950's (1957)*, Hewlett-Packard Company, Palo Alto, CA, available at: www.hp.com/hpinfo/abouthp/histnfacts/timeline/hist_50s.html?jumpid = reg_R1002_USEN (accessed 4 January, 2007).

HP (2007b), *Our Shared Values: The Way We Get Things Done*, Hewlett-Packard Company, Palo Alto, CA, available at: www.hp.com/hpinfo/abouthp/diversity/sharedvalues.html (accessed 4 January, 2007).

Hay, A. and Hodgkinson, M. (2006), "Rethinking leadership: a way forward for teaching leadership?", *Leadership & Organizational Development Journal*, Vol. 27 No. 2, pp. 144-58.

Hesselbein, F., Goldsmith, M. and Beckhard, R. (Eds.) (1996), *The Leader of the Future*, Jossey-Bass, New York NY, p. ii.

Imai, M. (1986), *Kaizen: The Key to Japan's Competitive Success*, McGraw-Hill, New York, NY, p. 74.

Kimball, D. (1913), *Principles of Industrial Organization*, McGraw-Hill, New York, NY, p. 245.

LEI (2006), *Lean Lexicon*, 3rd ed., Lean Enterprise Institute, Cambridge, MA, p. 85, version 3.0.

Liker, J. (2004), *The Toyota Way*, McGraw-Hill, New York, NY.

Liker, J. and Meier, D. (2006), *The Toyota Way Fieldbook*, McGraw-Hill, New York, NY, Ch. 6.

Liker, J. and Morgan, J. (2006), "The Toyota way in services: the case of lean product development", *Academy of Management Perspectives*, Vol. 20 No. 2, pp. 5-20.

McCartney, W. and Campbell, C. (2006), "Leadership, management, and derailment: a model of individual success and failure", *Leadership & Organization Development Journal*, Vol. 27 No. 3, pp. 190-202.

Maxwell, J.C. (1998), *21 Irrefutable Laws of Leadership*, Thomas Nelson, Nashville, TN.

Monden, Y. (1993), *Toyota Management System: Linking the Seven Key Functional Areas*, Productivity Press, Portland, OR.

Monden, Y. (1998), *Toyota Production System: An Integrated Approach to Just-In-Time*, 3rd ed., Industrial Engineering and Management Press, Norcross, GA, pp. 85-98.

Morgenson, G. (2006), "Group think; peer pressure: inflating executive pay", *The New York Times*, 26 November.

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Parayitam, S., White, M. and Hough, J. (2002), "Juxtaposition of Chester I. Barnard and Frederick W. Taylor: forerunners of management", *Management Decision*, Vol. 40 No. 10, pp. 1003-12.

Pfeffer, J. and Fong, C. (2002), "The end of business schools? Less success than meets the eye", *Academy of Management Learning and Education*, Vol. 1 No. 1, pp. 78-95.

Rivlin, G. (2005), "Shake-up at Hewlett: Hewlett's Board forces Chief out after rocky stay", *The New York Times*, 10 February.

Schell, E. (1926), *The Technique of Executive Control*, McGraw-Hill, New York, NY.

Shingijutsu (1992), *How to Implement Kaizen in Manufacturing*, Shingijutsu, Gifu, Japan, p. 17.

Slater, R. (1999), *Jack Welch and the GE Way*, McGraw Hill, New York, NY.

Spear, S. and Bowen, K. (1999), "Decoding the DNA of the Toyota production system", *Harvard Business Review*, Vol. 77 No. 5, pp. 96-106.

Tead, O. (1935), *The Art of Leadership*, McGraw-Hill, New York, NY.

Toyota (1988), *Toyota: A History of the First 50 Years*, Toyota Motor Corporation, Toyota City, Japan, p. 37.

Toyota (1998), *The Toyota Production System*, Toyota Motor Corporation, Toyota City (Nagoya), Japan, p. 32 and 34.

Toyota (2001), *The Toyota Way 2001*, Toyota Motor Corporation, Toyota City (Nagoya), Japan, internal document, April.

Toyota (2003), *Toyota Environmental and Social Report 2003*, Toyota Motor Corporation, Toyota City, Japan, available at: www.toyota.co.jp/en/environmental_rep/03/pdf/E_kankyouohoukoku2003.pdf (accessed 4 January, 2007).

Toyota (2007), *Vision and Philosophy*, Toyota Motor Corporation, Toyota City, Japan, available at: www.toyota.co.jp/en/vision/index.html (accessed 4 January, 2007).

University of Exeter (2007), *Leadership Definitions*, Center for Leadership Studies, University of Exeter, Exeter, available at: www.leadership-studies.com/lsw/definitions.htm (accessed 5 January, 2007).

Womack, J., Jones, D. and Roos, D. (1990), *The Machine That Changed the World*, Rawson Associates, New York, NY, pp. 139-68.

Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Appendix. Caux Round Table *Principles for Business* (Caux, 1994)

Introduction

The Caux Round Table believes that the world business community should play an important role in improving economic and social conditions. As a statement of aspirations, this document aims to express a world standard against which business behavior can be measured. We seek to begin a process that identifies shared values, reconciles differing values, and thereby develops a shared perspective on business behavior acceptable to and honored by all.

These principles are rooted in two basic ethical ideals: kyosei and human dignity. The Japanese concept of kyosei means living and working together for the common good enabling cooperation and mutual prosperity to coexist with healthy and fair competition. "Human dignity" refers to the sacredness or value of each person as an end, not simply as a mean to the fulfillment of others' purposes or even majority prescription.

The General Principles in Section 2 seek to clarify the spirit of kyosei and "human dignity", while the specific Stakeholder Principles in Section 3 are concerned with their practical application.

In its language and form, the document owes a substantial debt to The Minnesota Principles, a statement of business behavior developed by the Minnesota Center for Corporate Responsibility. The Center hosted and chaired the drafting committee, which included Japanese, European, and United States representatives.

Business behavior can affect relationships among nations and the prosperity and well-being of us all. Business is often the first contact between nations and, by the way in which it causes social and economic changes, has a significant impact on the level of fear or confidence felt by people worldwide. Members of the Caux Round Table place their first emphasis on putting one's own house in order, and on seeking to establish what is right rather than who is right.

Section 1. Preamble. The mobility of employment, capital, products and technology is making business increasingly global in its transactions and its effects.

Law and market forces are necessary but insufficient guides for conduct.

Responsibility for the policies and actions of business and respect for the dignity and interests of its stakeholders are fundamental.

Shared values, including a commitment to shared prosperity, are as important for a global community as for communities of smaller scale.

For these reasons, and because business can be a powerful agent of positive social change, we offer the following principles as a foundation for dialogue and action by business leaders in search of business responsibility. In so doing, we affirm the necessity for moral values in business decision making. Without them, stable business relationships and a sustainable world community are impossible.

Section 2. General principles

- *Principle 1. The responsibilities of businesses:* beyond shareholders toward stakeholders. The value of a business to society is the wealth and employment it creates and the marketable products and services it provides to consumers at a reasonable price commensurate with quality. To create such value, a business must maintain its own economic health and viability, but survival is not a sufficient goal.

  Businesses have a role to play in improving the lives of all their customers, employees, and shareholders by sharing with them the wealth they have created. Suppliers and competitors as well should expect businesses to honor their obligations in a spirit of honesty and fairness. As responsible citizens of the local, national, regional and global communities in which they operate, businesses share a part in shaping the future of those communities.

- *Principle 2. The economic and social impact of business:* toward innovation, justice and World community. Businesses established in foreign countries to develop, produce or sell should also contribute to the social advancement of those countries by creating productive

employment and helping to raise the purchasing power of their citizens. Businesses also should contribute to human rights, education, welfare, and vitalization of the countries in which they operate.

Businesses should contribute to economic and social development not only in the countries in which they operate, but also in the world community at large, through effective and prudent use of resources, free and fair competition, and emphasis upon innovation in technology, production methods, marketing and communications.

- *Principle 3. Business behavior:* beyond the letter of law toward a spirit of trust While accepting the legitimacy of trade secrets, businesses should recognize that sincerity, candor, truthfulness, the keeping of promises, and transparency contribute not only to their own credibility and stability but also to the smoothness and efficiency of business transactions, particularly on the international level.
- *Principle 4. Respect for rules.* To avoid trade frictions and to promote freer trade, equal conditions for competition, and fair and equitable treatment for all participants, businesses should respect international and domestic rules. In addition, they should recognize that some behavior, although legal, may still have adverse consequences.
- *Principle 5. Support for multilateral trade.* Businesses should support the multilateral trade systems of the GATT/World Trade Organization and similar international agreements. They should cooperate in efforts to promote the progressive and judicious liberalization of trade and to relax those domestic measures that unreasonably hinder global commerce, while giving due respect to national policy objectives.
- *Principle 6. Respect for the environment.* A business should protect and, where possible, improve the environment, promote sustainable development, and prevent the wasteful use of natural resources.
- *Principle 7. Avoidance of illicit operations.* A business should not participate in or condone bribery, money laundering, or other corrupt practices: indeed, it should seek cooperation with others to eliminate them. It should not trade in arms or other materials used for terrorist activities, drug traffic or other organized crime.

Section 3. Stakeholder principles

(1) *Customers.* We believe in treating all customers with dignity, irrespective of whether they purchase our products and services directly from us or otherwise acquire them in the market. We therefore have a responsibility to:

- provide our customers with the highest quality products and services consistent with their requirements;
- treat our customers fairly in all aspects of our business transactions, including a high level of service and remedies for their dissatisfaction;
- make every effort to ensure that the health and safety of our customers, as well as the quality of their environment, will be sustained or enhanced by our products and services; and
- assure respect for human dignity in products offered, marketing, and advertising; and respect the integrity of the culture of our customers.

(2) *Employees.* We believe in the dignity of every employee and in taking employee interests seriously. We therefore have a responsibility to:

- provide jobs and compensation that improve workers' living conditions;
- provide working conditions that respect each employee's health and dignity;
- be honest in communications with employees and open in sharing information, limited only by legal and competitive constraints;

- listen to and, where possible, act on employee suggestions, ideas, requests and complaints;
- engage in good faith negotiations when conflict arises;
- avoid discriminatory practices and guarantee equal treatment and opportunity in areas such as gender, age, race, and religion;
- promote in the business itself the employment of differently able people in places of work where they can be genuinely useful;
- protect employees from avoidable injury and illness in the workplace;
- encourage and assist employees in developing relevant and transferable skills and knowledge; and
- be sensitive to the serious unemployment problems frequently associated with business decisions, and work with governments, employee groups, other agencies and each other in addressing these dislocations.

(3) *Owners/investors*. We believe in honoring the trust our investors place in us. We therefore have a responsibility to:

- apply professional and diligent management in order to secure a fair and competitive return on our owners' investment;
- disclose relevant information to owners/investors subject to legal requirements and competitive constraints;
- conserve, protect, and increase the owners/investors' assets; and
- respect owners/investors' requests, suggestions, complaints, and formal resolutions.

(4) *Suppliers*. Our relationship with suppliers and subcontractors must be based on mutual respect. We therefore have a responsibility to:

- seek fairness and truthfulness in all our activities, including pricing, licensing, and rights to sell;
- ensure that our business activities are free from coercion and unnecessary litigation;
- foster long-term stability in the supplier relationship in return for value, quality, competitiveness and reliability;
- share information with suppliers and integrate them into our planning processes;
- pay suppliers on time and in accordance with agreed terms of trade; and
- seek, encourage and prefer suppliers and subcontractors whose employment practices respect human dignity.

(5) *Competitors*. We believe that fair economic competition is one of the basic requirements for increasing the wealth of nations and ultimately for making possible the just distribution of goods and services. We therefore have a responsibility to:

- foster open markets for trade and investment;
- promote competitive behavior that is socially and environmentally beneficial and demonstrates mutual respect among competitors;
- refrain from either seeking or participating in questionable payments or favors to secure competitive advantages;
- respect both tangible and intellectual property rights; and
- refuse to acquire commercial information by dishonest or unethical means, such as industrial espionage.

(6) *Communities.* We believe that as global corporate citizens we can contribute to such forces of reform and human rights as are at work in the communities in which we operate. We therefore have a responsibility in those communities to:

- respect human rights and democratic institutions, and promote them wherever practicable;
- recognize government's legitimate obligation to the society at large and support public policies and practices that promote human development through harmonious relations between business and other segments of society;
- collaborate with those forces in the community dedicated to raising standards of health, education, workplace safety and economic well-being;
- promote and stimulate sustainable development and play a leading role in preserving and enhancing the physical environment and conserving the earth's resources;
- support peace, security, diversity and social integration;
- respect the integrity of local cultures; and
- be a good corporate citizen through charitable donations, educational and cultural contributions, and employee participation in community and civic affairs.

About the author

Prior to joining academia, M.L. Emiliani (Bob) worked in industry for 15 years and had management responsibility in engineering (R&D, new product development) and operations (manufacturing and supply chain). He had responsibility for implementing Lean principles and practices in both manufacturing and supply networks at Pratt & Whitney. He is internationally recognized for his work in Lean management and his groundbreaking work on Lean leadership. Bob is the principal author of the book *Better Thinking, Better Results: Case Study and Analysis of an Enterprise-Wide Lean Transformation*. It is a detailed examination of The Wiremold Company's (West Hartford, CT) Lean transformation from 1991 to 2001. The book won a Shingo Research Prize in 2003 as the first book to describe an enterprise-wide Lean transformation in a real company where both principles of Lean management – "Continuous Improvement" and "Respect for People" – were applied. Bob has authored or co-authored over 30 peer-reviewed management papers on Lean leadership and supply chain management. Overall, five of his papers have won awards for excellence from Emerald Publishing. He has also written ten peer-reviewed papers on materials science and engineering and over 40 technical reports, papers, and management articles. Bob's papers have been published in diverse journals such as *Management Decision*, *Supply Chain Management: An International Journal*, *Journal of Management History*, *TQM Magazine*, *Journal of Workplace Learning*, *Quality Assurance in Education*, *Leadership & Organizational Development*, and *Industrial Marketing Management*. Bob is a member of the editorial review boards of *Leadership & Organization Development Journal*, *Management Decision*, *Industrial Marketing Management*, *Supply Chain Management: An International Journal*, and an *ad hoc* reviewer for several other journals. He was North American Regional Editor of S*upply Chain Management: An International Journal* from 2005-2007. He can be contacted at: emiliani@mail.ccsu.edu

Frank George Woollard: forgotten pioneer of flow production

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Abstract

Purpose – The purpose of this paper is to introduce management historians to the long-forgotten work of Frank George Woollard (1883-1957), who in the mid-1920s established flow production in the British motor industry, and its remarkable similarity to current-day production principles and practices used by Toyota Motor Corporation, also known as lean production.

Design/methodology/approach – Overview of Frank Woollard's life and work obtained from newly discovered journal papers, his 1954 book, *Principles of Mass and Flow Production*, newly discovered archives, and new first-hand testimony from a close friend and from a long-time family friend.

Findings – Frank Woollard was a pioneer in the establishment of flow production in the British motor industry in the mid-1920s and the principal developer of automatic transfer machinery. His accomplishments are comparable to Taiichi Ohno, regarded as the architect of Toyota's production system.

Research limitations/implications – Woollard's accomplishments in flow production are a fruitful area for future research given the speed and completeness with which flow production was established at Morris Motors Ltd, Engines Branch. Newly discovered papers describing his flow production system have yet to be studied in detail by academics.

Practical implications – Woollard's application of flow production beginning in 1923 means that timelines for discoveries and attributions of key accomplishments in lean management must be reexamined and revised.

Originality/value – Woollard's work fills important gaps in the literature on the history of flow production generally and in the British motor industry in particular. His work constitutes an early application of current-day lean principles and practices, and is therefore noteworthy and relevant to management historians and the operations and production management community. It is hoped that this paper will inspire management historians to study Woollard's work and place him in the context of other early twentieth-century pioneers in industrial management and flow production.

Keywords United Kingdom, Automotive industry, Flow production, Lean production, Economic history

Paper type Research paper

Introduction

> The ideal arrangement for flow production should resemble a watershed; the river being the main assembly track, fed by tributaries in the shape of sub-assembly lines which, in turn, would be supplied by streams representing the machine lines fed by brooks typifying the material conveyors. Each part should flow continuously forward. There should be few bends, no eddies, no dams, no storms, no freezing should impede the inevitable flow to estuarine waters – the dealers – and ultimately to the sea – the customers (Woollard, 1954b, p. 48).

Frank George Woollard (1883-1957, Plate 1) is a man that few management historians or current-day management practitioners have ever heard of. He was the General Manager of Morris Engines Ltd, Coventry, a member of the Morris group of companies, makers of

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Source: Wood (1998)

Plate 1.
Frank George Woollard,
circa 1928

the famous Morris Motor cars (Jarman and Barraclough, 1965, 1976; Edwards, 1983). He became a Director of Morris Motors Ltd and was a principal participant in the development of the British motor industry between 1910 and 1931. The reasons for Woollard having fallen into obscurity are not entirely clear. He wrote numerous papers in the mid-1920s describing his pioneering flow production methods, and most were published in international journals that general managers and production engineers, especially those in the emerging global automotive industry, would have likely read. His accomplishments in the fields of flow production, industrial automation, and progressive management, aided by strong support from his boss William Richard Morris (ennobled as Lord Nuffield in 1934 (Andrews and Brunner, 1955)), are as impressive as other great industrial pioneers (Williams *et al.*, 1994).

One of Woollard's distinctive contributions was to prove that achieving flow for engineered goods in low volume production (compared to Ford in the USA) resulted in costs that were as low or lower than that which could be achieved by large-scale mass production. Thus, a small- or medium-sized automaker producing a few thousand or tens of thousands of automobiles annually could compete against large foreign auto companies that produced much greater volumes of automobiles and who relied on economies of scale to reduce costs (Maxcy and Silberston, 1959). Woollard's work reversed the commonly held view that flow was only useful as a production method when the volume of goods was very large, such as in the production of Ford Model T cars.

The founder of Toyota Motor Corporation, Kiichiro Toyoda (Ohno, 1988; Toyota, 1988), would have these same insights about flow in 1937, some 12 years after Woollard reduced it to practice, but it would be 1955 before Toyota was able to achieve flow in its engine shop (Shimokawa and Fujimoto, 2009, p. 79). In addition, it took the legendary Taiichi Ohno (1912-1990), the principal architect of Toyota Motor Corporation's production system (Ohno, 1988), six years to do what Woollard did in less than two years, and at half the engine volume of Morris – 22,786 engines at Toyota in 1955

(Toyota, 1988, p. 461) compared to 55,582 engines at Morris in 1925 (Andrews and Brunner, 1955, p. 112). Woollard's contribution to progressive manufacturing management practices is substantial and comparable to Mr Ohno's work.

Curiously, reference to Woollard is found mainly in economics and labor relations literature (Maxcy and Silberston, 1959; Lewchuk, 1987; Williams *et al.*, 1994; Foreman-Peck *et al.*, 1995; Tolliday, 1998; Tiratsoo, 2003), as well as in works by historians of the British motor industry (Andrews and Brunner, 1955; Overy, 1976; Wood, 1988; Hounshell, 1995, 2000a, b; Seymour, 1999; Zeitlin, 2000). Woollard's work is completely missing from current-day lean management literature (Sugimori *et al.*, 1977; Shingo, 1981; Monden, 1983; Ohno, 1988; Womack *et al.*, 1990; Kimoto, 1991; Togo and Wartman, 1993; Womack and Jones, 1996; Kawahara, 1998; Fujimoto, 1999; Liker, 2004; Shimokawa and Fujimoto, 2009).

The significance of Woollard's work is his association with the introduction of a basic flow production line to assemble steel railroad coach bodies in 1904, his introduction of flow production in automobile parts manufacture E.G. Wrigley and Company, Ltd, *ca.* 1916, and his pioneering introduction of advanced flow production coupled with the development and use of innovative automatic transfer machinery (Morris Engines *et al.*, 1924) for automobile engine manufacturing at Morris Motors beginning in January 1923 (Woollard, 1925; Woollard and Morris, 1925).

The history of modern progressive operations and production management practices generally begins with the work of Frederick Winslow Taylor starting in the late 1880s (Taylor, 1903, 1911, 1947), Frank Gilbreth at around the same time (Gilbreth, 1911), and Henry Ford in the 1910s and 1920s (Ford and Crowther, 1922, 1926; Sorensen and Williamson, 1956), then jumping to the development of Toyota's production system following Second World War through the 1970s (Ohno, 1988; Toyoda, 1985; Toyota, 1988; Womack *et al.*, 1990; Shimokawa and Fujimoto, 2009).

Henry Ford is often cited by Toyota managers and others as a principal source of influence for the development of the Toyota Production System (TPS), also known as lean production (Ohno, 1988; Womack *et al.*, 1990; Womack and Jones, 1996; Liker, 2004). This attribution, however, may have been more out of respect, admiration, and desire for future business relationships rather than actual direct influence on production methods (Woollard and Emiliani, 2009, pp. E12-E13), because the scale of Ford's operations was much too large to be of use to Toyota executives (Sato, 2008). In addition, acknowledgement of Ford may have had to do more with his overall business and management philosophy (Ford and Crowther, 1926; Ohno, 1988, p. 97).

There is little mention of Taylor's influence on TPS, which was significant (Tsutsui, 1998), and there is never any mention of the British automaker Morris Motors Ltd or the pioneering work of Frank G. Woollard as possible influences on Toyota Motor Corporation, particularly in its formative years (1933-1950). This is important because Woollard achieved flow in the mid-1920s using what we today recognize as distinctive characteristics of Toyota's production system: work cells, part families, standardized work, just in time, supermarkets, autonomation (jidoka), takt/cycle time, quick change-over, multi-skilled workers, arranging the equipment in the sequence in which value is added, etc.

In addition, Woollard understood the idea and practice of continuous improvement in a flow environment, saying that the need for modifications to the flow line "should cause no anxiety, but rather should be a matter for rejoicing [. . .] the virtue of flow production

lies in the fact that it brings all inconsistencies into the light of day and so provides the opportunity for correcting them," and "[the] high visibility conferred on the company's activities by flow production will lead to unceasing and continuous improvement" (Woollard, 1954b, p. 87). To that end, Woollard gave some control to workers. They had the freedom to move between jobs (Woollard, 1925, p. 451) and to solve their own problems (Woollard, 1925, p. 463). Thus, Woollard did not see workers as brainless cogs. He realized that they were part of the system, not separate from it, and their knowledge and participation in daily problem solving was necessary to maintain and improve flow. However, Woollard's engagement of workers in daily problem solving, while perhaps innovative for its time, was rudimentary and more limited compared to Toyota's systematic development of workers capabilities post-Second World War (Yasuda, 1991; Toyota, 2001; Liker, 2004; Liker and Hoseus, 2008).

Woollard also recognized that flow production will not work properly if it is used by management in a zero-sum (win-lose) manner;, e.g. where the company benefits from process improvements but employees who are made redundant by process improvements are laid off to reduce labor costs. He recognized that in order for flow to exist, the interests of key stakeholders must not be marginalized. Flow must cause no harm; if it does, then material and information will not flow. This is particularly insightful and a distinctive aspect of Woollard's progressive management practice. He understood the importance of what is today called the "Respect for People" principle in lean management (Toyota, 2001; Emiliani *et al.*, 2007; Emiliani, 2008), and the record indicates he was a warm-hearted person, a humane manager, liked by workers, and an inspiring leader (Woollard, 1954b, Chapter 16, 1955b; Cole, 1976; Bramley, 2010a, b). His 18th and final principle of flow production states: "The system of production must benefit everyone – consumers, workers, and owners" (Woollard, 1954b, p. 51) – and today, we would also include suppliers and communities. In other words, flow cannot exist when senior managers are committed to a zero-sum mindset.

Woollard's groundbreaking work is of great importance because it significantly expands our understanding of progressive management practices in the British motor industry in the mid- to late-1920s, and also informs us of new contributions that may have helped shape today's practice of lean management. Woollard's remarkable work in flow production and his prescient innovations in industrial automation deserve a prominent place in the history of industrial management, production engineering, and automation. In addition, his work is clearly congruent with today's lean management principles and practices.

This paper seeks to present an overview of Frank Woollard's life and work based upon:

- Newly discovered papers that describe engine production methods both before (Hotchkiss, 1922a, b, c, d, e) and after Woollard's arrival at the Morris Engines Ltd (Woollard and Morris, 1925).
- Newly discovered archives obtained from The Institution of Mechanical Engineers (IME, 2009), Birmingham Central Library (BCL, 2009), and David Bramley (Bramley, 2010a).
- New first-hand testimony from a close friend, David Bramley, age 96 (Bramley, 2009a, b, 2010a, b), and from a long-time family friend Murdoch Matthew (Matthew, 2009).

- Extensive discussions with leading British motor industry historians (Barraclough, 2009; Wood, 2009, 2010).

In addition, this paper seeks to place Woollard's work in the broader context of the evolution of lean principles and practices. It is hoped that this will inspire academics to mine the references contained in this paper and conduct additional research on Woollard's life and innovative work. It is also hoped that management practitioners will gain greater insights into the history and evolution of progressive operations and production management practices.

The life of Frank G. Woollard

Frank Woollard was born in London on 22 September 1883, the son of George and Emily Woollard. His father was a first footman and butler to grand households in London, while his mother was a kitchen maid. Later his father was general steward – head butler, cook, and domestic staff manager – to C. Hoare & Co., England's oldest private bank, located on Fleet Street in London, and earned £86 per year in the early 1900s (Hoare, 2009; Hunter, 2009).

Woollard was educated at City of London School in the mid-to-late 1890s (Woollard, 1955a). In 1899, he began a five-year apprenticeship to noted Steam Locomotive Designer and Builder Dugald Drummond, Chief Mechanical Engineer at London and South Western Railway in Eastleigh, working on rail cars. His father, George, paid £50 to the railway in fall of 1899 for his son's apprenticeship (Drummond, 1899). Woollard participated in the design and development of the Clarkson steam omnibus, a steam-powered city bus. In 1904, London and South Western Railway introduced a simple flow production line to assemble steel railroad coach bodies, which is where Woollard first-gained experience with flow production. Subsequent to that he worked in the design office at Weigel Motors Ltd, London, and then in 1910 joined E.G. Wrigley and Company, Ltd, Birmingham, a maker of gearboxes, axles, and steering components to various automobile companies, as Chief Draftsman (Jarman and Barraclough, 1965, p. 21).

In 1911, Woollard married Catherine Elizabeth Richards (born in 1878), a talented pianist and singer, music teacher, and public speaking coach, daughter of Henry Richards, an engraver. Their first child, a son named Peter, was born in 1912 but died in 1914. A daughter, Joan Elizabeth was born in 1916 (Granelli, 2000).

Woollard first met William Richard Morris in 1912 while working at E.G. Wrigley and Company, Ltd (Woollard, 1925, p. 449). Their initial meetings concerned the design and supply of axle and steering components to W.R.M. Motors Ltd, the forerunner of Morris Motors Ltd, for the "Bullnose" Morris Oxford motorcar. The two would meet frequently over the next few years to discuss details of auto parts design and production, and built a close personal relationship. In 1914, Woollard assumed responsibilities as a production engineer and experimented with improving machine shop layout. He reorganized production from batch to a simple form of flow to meet an increase in orders for automobile components. Woollard became a member of The Institution of Automobile Engineers, London, in 1915 and enlisted in His Majesty's Army (reserve) on 10 December at the age 32 to support armament production during the war. Around 1917, Woollard become a Director and Chief Engineer, then Assistant Managing Director in 1918 of E.G. Wrigley and Company, Ltd.

Woollard received a Member of the Order of the British Empire Award in 1918 for his work on improving the design and production of tank gearboxes, which had previously been the bottleneck in tank production at E.G. Wrigley and Company, Ltd This civil award for service in connection with the war effort was recommended to the Monarch by Winston Churchill, Minister of Munitions. Woollard left E.G. Wrigley and Company, Ltd in late 1922, as the company had encountered financial difficulties.

After First World War, the French firm of Hotchkiss et Cie, who had a factory in Gosford Street, Coventry, agreed to make engines and gearboxes for Morris Motors Ltd These engines were copies of American designs produced by The Continental Motors Corporation of Detroit, Michigan (Seymour, 1999, pp. 35-6; Jarman and Barraclough, 1965, pp. 57-63). William Morris became interested in purchasing the Hotchkiss factory in the fall of 1922 because its management would not commit to supplying the larger quantity of engines and gearboxes that Morris needed. Morris asked Woollard to inspect the facility in early November 1922 and inform him of his assessment. Woollard's overall appraisal of the machines and supporting production equipment was favorable (Woollard, 1922), and in January 1923 William Morris bought the Hotchkiss et Cie engine plant, which then became Morris Engines Ltd, and known later as Morris Motors Ltd, Engines Branch.

Morris recognized Woollard's creative design skills, innovative flow production ideas, and management capabilities, and named him General Manager of Morris Engines Ltd starting in January 1923. With Morris's strong encouragement and financial support, Woollard immediately led the reorganization of engine production from batch to flow, increasing output from less than 300 units per week in January 1923 to 600 units per week by December 1923, and to 1,200 units by December 1924 (Woollard, 1925, 1955c). The major changes in production system design – work schedule, factory layout, facilities upgrades, and the purchase and installation of innovative new machinery – took place remarkably quickly, over a period of less than two years.

Flow production was initially facilitated by the use of manual transfer of material between machining operations and hand clamping, produced in collaboration with Herbert Taylor, Chief Engineer, and Leonard Lord, Machine Tool Engineer (and the future chairman of both the Austin Motor Company, Ltd and British Motor Corporation Ltd). Soon thereafter, Woollard, Taylor, and Lord designed the first automatic transfer machines for producing gearbox cases and flywheels (Morris Engines *et al.*, 1924), with the support of engineers from the machine tool builders James Archdale & Company, Ltd, Birmingham, and Wm. Asquith, Ltd, Halifax. However, being in advance of their time, reliability problems with the electrical, pneumatic, and hydraulic systems, forced a return to manual transfer and hand clamping in late 1925 (Woollard, 1953a).

Woollard's success in increasing engine output, which had been the bottleneck in automobile production, earned him, in 1926, the post of Director of Morris Motors (1926) Ltd when this company acquired both Morris Motors Ltd and Morris Engines Ltd, the latter business being renamed as Morris Motors Ltd, Engines Branch (Andrews and Brunner, 1955, p. 175). From this position, he was a principal participant in the growth of Morris Motors Ltd, which achieved a commanding 34 percent market share in 1930 (Andrews and Brunner, 1955, p. 185). Morris Motors Ltd was the premier UK automaker at the start of the 1930s. Management was proud of its achievements in automobile production and particularly in engine production.

During his visit to the Morris Engines Ltd, ca. 1925, the then Chief Production Engineer of Ford Motor Company said that the automatic transfer machines were 20 years ahead of their time (Anonymous, 1957). Woollard's engine plant was a model for British industry and open to the public (Seymour, 1999, p. 38) and to representatives from other automakers for tours (Andrews and Brunner, 1955, p. 188*n*). In addition, Woollard wrote numerous papers published in widely read journals that presented the details of Morris Motors' flow production methods (Woollard, 1924, 1925; Woollard and Morris, 1925; Woollard and Emiliani, 2009).

On 15 June 1931, soon after the onset of the Great Depression in the UK, Woollard resigned from Morris Motors Ltd, Engines Branch (Woollard, 1931a, b, c, d, e). The precise reason(s) for Woollard's resignation have remained a closely guarded secret for nearly 80 years. His personal secretary, Mrs T.C. Daubney (Cole, 1976), daughter Joan, colleagues, and family friends were unwilling to say why a man so successful as Woollard would resign his prestigious position, leading to speculation that it was due to a personal indiscretion (Andrews and Brunner, 1955, p. 196).

Woollard's archives reveal that his resignation was dictated by William Morris's deputy, Edgar Blake, in accordance with William Morris's wishes (BCL, 2009). The reason for his forced resignation, however, is unclear, but likely due to a combination of several factors including:

- conflicts over labor policies;
- increases in production costs;
- manufacturing difficulties, service problems, and high guarantee claim costs with the troublesome new 14.9 horsepower (hp) (RAC) model L.A. side valve six-cylinder engine for the 1930 model year Oxford Six motor car;
- rivalries with colleagues W. Peach (Engines Branch superintendent) and Arthur Rowse (General Manager of Cowley Works);
- unauthorized research and development projects;
- "'Lavish' office equipment" and "alleged dissatisfaction of the staff" (Woollard, 1931b);
- a difference of personal opinion between Woollard and Morris; and
- a change in reporting relationship, loss of access to Morris, and loss of influence.

According to Woollard's long-time friend, David H. Bramely (Bramley, 2009a, b), Woollard was forced to resign due to service problems and costs associated with the new L.A. engine, a compact six-cylinder engine. The fact that Arthur Pendrell, Chief Engine Designer who reported to Woollard (Cole, 1976), was sacked at exactly the same time as Woollard (1931d) suggests that this was indeed the cause. However, the archival record surrounding Woollard's resignation is complex, and Woollard himself never revealed in his letters exactly why he was forced to resign (BCL, 2009). Extensive conversations with British motor industry historians (Barraclough, 2009; Wood, 2009, 2010) indicate more than one factor was likely in play.

William Morris was known to have greatly valued loyalty among his staff. He said in a radio interview:

> When thinking over any man for an executive position, the first thing I want is a loyal face. If a man isn't going to be loyal, neither of us will get on together (BBC, 1977).

While Woollard indeed had a loyal face, it is possible that he did one or more things, perhaps in concert with Arthur Pendrell, that Morris judged to be disloyal.

Woollard was highly creative and innovative. He liked to take risks, among them undertaking projects without William Morris's knowledge, and perhaps did something that he thought was within his duties at a General Manager of the Engines Branch and as a Morris Director, but turned out to be problematic in some significant way and which upset William Morris. Woollard was blindsided by his dismissal, saying in a letter, "The blow was like a thunderbolt from the blue sky [. . .]" (Woollard, 1931a). As a result of his resignation, Woollard was unable to continue what "I had come to regard as my mission in life [industrial management and flow production]" (Woollard, 1931a), and his nearly 20-year friendship with William Morris abruptly ended.

Woollard struggled to find work after leaving Morris Motors Ltd, likely due to poor employment prospects during the Great Depression. In addition, Woollard's salary while employed by Morris Motors was nearly £3,500 per year in 1930-1931, equal to about £660,000 in 2009 (MW, 2009), and likely 5-10 percent greater in the years before the Great Depression as a substantial portion of his salary was based on production output. Apparently, other employers were unwilling to match that salary. Finally, Woollard's reputation was likely severely damaged by having been forced to resign.

In 1932, Woollard became Managing Director of Rudge-Whitworth Ltd, Coventry, a failing motorcycle manufacturer that Woollard was unable to help turn around in the four years he worked there. Motorcycle production ceased in 1939. Woollard accepted an appointment in 1936 to join Birmid Industries, Ltd as Director of Birmingham Aluminum Castings Co., Ltd, Birmingham, and Midland Motor Cylinder Co., Ltd, Smethwick. On 5 March 1941, Woollard's wife Catherine died of cancer, age 63, and was laid to rest in the churchyard cemetery of St. Peter's Church, Wootten Wawen, Warwickshire, UK.

Woollard became President of The Institution of Automobile Engineers, London, in 1945, a post he held until 1947 when he led the merger between The Institution of Automobile Engineers and The IME, London. He then became the first chairman of the Automobile Division of The Institute of Mechanical Engineers, London. He was also a founding member of the British Institute of Management in 1947, whose name was changed to Chartered Management Institute in 2002 (CMI, 2009).

Woollard was Chairman of the Executive Committee of the Aluminum Development Association from 1949 to 1952 and Chairman of the Council for the Zinc Alloy Die Casters Association from 1952 to 1956. He also served as a Consultant to Austin Motor Company, Ltd on the use of light alloys for automotive applications. Woollard retired from active business in August 1947 but worked as a consultant to British industry on flow production and automation, writer, and lecturer at Birmingham area universities. His interests in retirement included "studies in advanced methods of flow production and in the human factor in industrial relations [. . .] and education for industrial administration" (Woollard, 1955a).

In early 1951, Woollard was hired by David Bramley, head of the recently formed (1947) Department of Industrial Administration at Birmingham Central Technical College, Birmingham UK (now Aston Business School, Aston University), to deliver a six-part course on the principles of flow production. Woollard's course, "A short lecture-discussion course for senior industrial executives on basic principles of flow production," was delivered for the first time between April and June 1951 and was

attended by 72 managers from 42 companies representing a wide range of UK industries (Woollard, 1951).

Bramley, born on 19 November 1913 and raised in London, held various production control and management positions in the British rail, auto, and aircraft industries before entering academia. Bramley first met Woollard in the summer of 1930 when, as a 16-year-old an indentured engineering apprentice (Bramley, 1978), he attended a lecture given by Woollard at an Institution of Automobile Engineers meeting in London and later toured Woollard engine manufacturing facility in Coventry (Bramley, 2010a, b). Despite a 30-year age difference, he and Woollard became close friends and they attended concerts and the theatre together (Bramley, 2009b). Bramley's production engineering and management career was mentored by Woollard, and he held Woollard in the highest regard for, among other things, his mentoring and support of young engineers and his ability to organize people with differing agendas and bring them together to achieve common goals (Bramley, 2010a, b). Bramley was Co-Executor of Woollard's estate, along with Woollard's daughter Joan, an artist (HMCS, 1957; Granelli, 2000).

At the urging of David Bramley, T.U. Matthew (Head of Department of Engineering Production, University of Birmingham), and others, Woollard wrote a series of articles based on the six-part lecture-discussion course which were published in the journal *Mechanical Handling* (Woollard, 1952a, b, c, d, e, f, 1953a, b, c, d). These articles became the basis for his 1954 book, *Principles of Mass and Flow Production* (Woollard, 1954b), followed by a short monograph highlighting Woollard's 18 principles of flow production (Woollard, 1954a).

Woollard wrote extensively on flow production, industrial automation, and related topics, having authored no less than 27 papers in national periodicals, conference proceedings, and international journals between 1924 and 1956, 11 of them published between 1924 and 1925. (Woollard and Emiliani, 2009). These papers, published with William Morris's explicit approval, clearly indicate a strong desire to share the details of their innovative continuous flow production processes with others and also to showcase British industrial prowess. In addition, Woollard held 13 UK patents and one US patent. Thus, Woollard's great creativity and innovativeness is demonstrated across a wide range of activities, from part design, production system design, machine tool design and industrial automation, and progressive industrial management.

In 1956, Woollard was introduced to economist Aubrey Silberston by David Bramley, who was conducting research for a book on the economic history of the British motor industry from its inception to 1957 (Maxcy and Silberston, 1959). According to Silberston, Woollard was very eager to talk about flow production (Silberston, 2009). Thus, Woollard remained an enthusiastic proponent of flow production until the end of his life.

Frank George Woollard died on Sunday, 22 December 1957 at the age of 74, and was buried next to his wife Catherine in St. Peter's Church, Wootten Wawen, Warwickshire, UK. His obituaries recognized him as one of the fathers of the British motor industry (Anonymous, 1957, 1958). He was survived by his daughter Joan (Granelli, 2000), who passed away on 30 January 2008 at the age of 92 and was buried in the same churchyard cemetery near her father and mother (Mortimer, 1999).

Flow production at Morris Motors

Newly discovered papers published in the spring and summer of 1922 describe the engine and gearbox production methods used at Hotchkiss et Cie (Hotchkiss, 1922a, b, c, d, e).

A 1922 conference proceeding paper authored by Herbert E. Taylor, Chief Engineer at Hotchkiss, provides similar information on the methods of production, but also speculates in the last few pages of the paper that an entire factory could be conceived of "as a colossal automatic machine" (Taylor, 1922, p. 250), which would utilize manual and mechanical conveyance devices and result in a much more compact "cubic" factory – an idea which Woollard found inspiring and complimentary to his own ideas on flow production. These papers provide detailed information on the methods of production approximately one year before William Morris bought and took control of Hotchkiss et Cie in January 1923 and establish the initial condition of the factory prior to the purchase being finalized in May 1923. It therefore puts into context the significance of the changes made by Woollard beginning in January 1923 to achieve flow production.

The manufacturing method used at the Hotchkiss et Cie factory *ca.* 1921-1922 was unambiguously batch-and-queue (Hotchkiss, 1922a, b, c, d, e). The descriptions of manufacturing processes focus on the workpiece, equipment, and tooling as stand-alone operations. A diagram showing the arrangement of the plant shows process villages characteristic of separately positioned batch processing. The processing times for each operation show large cycle-time mismatches, with cycle times ranging from 2 to 35 minutes, and no discussion of efforts to balance cycle times. A 25-minute cylinder block milling operation was performed using two machines, while a 7-minute drilling operation was performed using two machines, for example.

There is only passing mention of the methods used for material handling. The "progress board," a visual record of the amount of raw material and finished goods stock held for each engine component, shows considerable variation between these two types of inventory for individual components, i.e. large amount of raw material and small quantity of finished goods, or vice versa. The quantity of finished components varied considerably, with shortages of 50 percent for some parts and surpluses of 200 percent for other parts, as is typical in batch-and-queue processing.

Factory output under these conditions was 100 units per week (11.9 hp engine and gearbox), with plans to increase output to 200 per week. Recall that William Morris wanted Hotchkiss management to produce 500-600 engines and gearboxes per week, but they would commit to only 300 per week (Andrews and Brunner, 1955, pp. 127-8). Given the method of production, it is no surprise that Hotchkiss management was reluctant to double output. They would have had cost problems due to the increases in raw material and finished goods inventories.

In summary, the Hotchkiss factory utilized the batch-and-queue production method, and there was no evidence of flow production having been established by Henry Ainsworth, General Manager, Herbert Taylor, or Leonard Lord. However, Taylor and Lord, who by April 1922 was Assistant Chief Engineer (Seymour, 2006, p. 170), were principal participants in Woollard's efforts to establish flow at the Morris Engines Ltd Woollard, who replaced Henry Ainsworth, promoted Lord to the position of Machine Tool Engineer, responsible for the design and purchase of new machinery that would facilitate flow production (Seymour, 2006, p. 170), manual and automatic transfer machines (Morris Engines *et al.*, 1924).

The focus of Woollard's work was on achieving flow in processes upstream of final automobile assembly, principally to reduce queue time and to produce a greater output from a fixed quantity of resources, to support the rapid sales growth of Morris Motors Ltd He also wanted to reduce the costs associated with raw material and finished goods

inventories to help achieve Mr Morris's goal of frequent price reductions for his cars, while at the same time improving their specification annually. For example, according to Morris sales catalogs, the price of a Morris Cowley two-seater was reduced from £278 in 1923, the year that Woollard joined Morris Engines Ltd, to £160 in 1930. Lower cost engines (Woollard, 1931e) helped achieve these price reductions which not only greatly extended the reach of Morris's vehicles to lower income customers but also gave Morris a substantial market share as many of his competitors were unable to match the prices of his cars. Flow production offered numerous benefits with respect to helping to achieve broader business objectives of meeting customer demand, reducing capital intensity, and improving labor relations (Woollard, 1925, 1954b).

Woollard clearly recognized the limitations of batch-and-queue processing, as well as the differences between Ford's Model T high volume flow production system and the new lower volume flow production system that Woollard sought to create. As might be expected, Woollard was very aware of the production methods used by US automakers and the machines made by American machine tool makers. He cites their influence and that of the American technical press (Woollard, 1925, p. 419) for providing useful information which surely shaped his ideas for flow production (Arnold and Faurote, 1919). However, Woollard is careful to point out that he and his staff developed their flow production system without ever visiting automakers in the USA, as most others had done. He proudly notes that his low volume flow production system and associated automatic transfer machinery were entirely British efforts borne of British ingenuity (Woollard, 1925, p. 419). It helped greatly that William Morris, as owner of the company, was an enthusiastic supporter of new production methods and a financier of new machine technologies.

Woollard also understood that Ford's production system was the result of unique circumstances; a very large home market and robust sales that permitted an incredible level of vertically integrated production activities. Ford's approach to large-scale production could not be replicated by Morris Motors due to practical considerations such as limited capital, smaller markets, and diverse consumer needs (Tolliday, 1998). Instead, Woollard sought to go beyond large-scale mass production (as did Toyota two decades later) by adapting Ford's production system to achieve flow production without extensive vertical integration and within the context of their respective domestic markets – much lower sales volumes than Ford and more diverse customer needs. Note that Morris Motors Ltd produced over 55,000 vehicles in 1925 (Andrews and Brunner, 1955, p. 112), while in the same year Ford Motor Company produced 1.9 million Model Ts (Houston, 1927). In contrast, Toyota Motor Corporation would not produce more than 55,000 vehicles in a single year until 1957 (Toyota, 1988, p. 461).

Woollard knew that flow had to be achieved in sub-component assembly and parts manufacturing, and even into raw material production, to support flow in single-model or mixed-model final automobile assembly lines. Woollard's awareness in 1925 that all processes must be connected "from the design [...] up to and even beyond the sales stage" (Woollard, 1925, p. 420), illustrates a depth of understanding of flow that was unique for its time – though this condition was not fully achieved across the Morris Motors enterprise. This is an aspect that managers who attempt to establish flow today typically do not understand, mistakenly thinking that achieving flow in operations is sufficient (i.e. operational excellence).

Academics who cite Woollard's work in flow production make reference principally to his 1925 conference proceeding paper, "Some notes on British methods of continuous

production" (Woollard, 1925) or his 1954 book, *Principles of Mass and Flow Production* (Woollard, 1954b). The series of papers authored by both Woollard and Morris have yet to be studied by academics (Woollard and Morris, 1925). These new papers provide additional details of their flow production system, and include a diagram of the Morris Engines Ltd factory layout which has been clearly redesigned for flow. While factory floor space more than tripled to accommodate increased production, the floor space per unit decreased by 70 percent.

The papers "Morris production methods" (Woollard and Morris, 1925), along with Woollard's 1925 paper "Some notes on British methods of continuous production" (Woollard, 1925), reveal that most of the components of today's lean production practices were in place. While readers are referred to those papers for the details, some of the pertinent features of Woollard's production system are summarized here.

Unlike the Hotchkiss batch-and-queue production system, Woollard descriptions of the manufacturing process focuses on achieving continuous flow and connected or integrated operations. The arrangement of the plant has been thoroughly reorganized to facilitate flow for component manufacturing and assembly. According to Woollard, "The whole of the plant is organized round the cylinder block [. . .] and all other components, sub-assemblies, and major assemblies flow towards this" (Woollard and Morris, 1925, p. 776).

Woollard was very concerned about cycle time mismatches and made all operations equal in duration. The cycle time for machining in the automatic transfer machinery was four minutes. It is not clear how this figure was arrived at, but it was likely a response to robust automobile sales, which more than doubled between 1923 and 1925 (Andrews and Brunner, 1955, p. 112). Woollard notes that "Four minutes is the standard time-cycle to-day, but it may be altered as required" (Woollard, 1925, p. 463). This indicates the use of cycle time as a takt time.

With regard to material deliveries, Woollard says that they "must be delivered to time so that there shall be no shortage or glut" (Woollard, 1925, p. 422). The phrase "delivered to time" obviously has similar, if not the same, meaning as "just-in-time," by which Kiichiro Toyoda meant: "Just make what is needed in time, but don't make too much" (Toyoda, p. 58). In addition, Woollard used a supermarket-type system to store engine blocks and limit inventory to a four-day supply, just as Toyota would do more than two decades later (Ohno, 1988, pp. 25-7). He made these and other improvements, such as milk runs, to control inventories and reduce capital outlays.

The main features of Woollard's flow production practice include (using contemporary names and characterizations):

- part families;
- U-shaped work cells;
- multi-skilled workers;
- standard materials, products, and machine tools;
- work to a takt time (cycle time in this case);
- standardized work;
- just-in-time;
- supermarkets;

- autonomation;
- visual controls; and
- quick changeover.

These practices, of course, are typical of that found in lean production. Woollard's pioneering work in low volume production suggests that to achieve flow, managers must discover these innovations by themselves or through the pioneering work of others. Flow is the common denominator that drives every manager to the same principles and set of practices.

Notably absent was a pull system using kanban (instruction) cards (Monden, 1983, 1998; Ohno, 1988), which appears to have been a Toyota innovation (Sugimori *et al.*, 1977). Autonomation (jidoka), developed by Toyota in 1924 (Toyota, 1988, p. 34), was probably discovered independently, as may have been the idea for supermarkets from Ohno (1988, p. 26). Just-in-time, however, was practiced in the USA (Schwartz and Fish, 1998) and UK (Woollard, 1925) auto industry prior to Kiichiro Toyoda having thought of it in 1937 (Toyota, 1988, p. 69).

Woollard's work in flow production in the mid-to-late 1920s pre-dates Kiichiro Toyoda's interest in flow production by almost 15 years. An important question obviously arises: "Was Kiichiro Toyoda influenced by the work of Frank Woollard and by Morris Motors?" A close examination of the published record, corporate histories, timing of events, and a visit by Kiichiro Toyoda to the UK in early 1930 suggest that he may have known about Woollard's work and that it could have influenced him and other Toyota managers, such as Eiji Toyoda or Taiichi Ohno, in their quest to develop their own flow production system (Woollard and Emiliani, 2009, pp. E-7 to E-18). The evidence for this, while circumstantial, is very strong.

Woollard believed that machinery had an important role to play in facilitating flow production. He thought that automatic transfer machines were the logical extension of manual transfer devices and that they would further enable and improve continuous flow if applied judiciously. This proved to be correct, as automatic transfer machines became common in the global automobile industry starting in the late-1940s and early 1950s (Daito, 2000; Hounshell, 2000a, b; Zeitlin, 2000).

Woollard, however, advised caution when it came to the use of automatic transfer machines in factories, saying: "The machines are only incidental to the whole organization of the factory" (Woollard, 1925, p. 441) and that "it must not be imagined that I suggest special machines as the essential method of attacking the continuous production problem" (Woollard, 1925, p. 462). Later he warned people "against that dangerous hobby of falling in love with mechanism for its own sake" (Woollard, 1954b, p. 14). Thus, machines can enable flow, but are not fundamentally necessary for the objective of achieving flow.

Overtime, Woollard developed a set of principles for mass and flow production, numbering 18 items in the end, as shown in Table I (Woollard, 1954b, p. 51). Each principle relates directly to our current day understanding of lean production. However, Woollard's expression of the 18 principles of flow production would today be characterized as a combination of the two lean principles, "Continuous Improvement" and "Respect for People," and various technical lean practices whose origins most of which are attributable to Frederick Taylor (Taylor, 1903, 1911; Emerson and Naehring, 1988; Shimokawa and Fujimoto, 2009, p. 133).

1.	(a) Mass production demands mass consumption (b) Flow production requires continuity of demand
2.	The products of the system must be specialized
3.	The products of the system must be standardized
4.	The products of the system must be simplified in general and in detail
5.	All material supplies must conform to specification
6.	All supplies must be delivered to strict timetable
7.	The machines must be continually fed with sound material
8.	Processing must be progressive and continuous
9.	A time cycle must be set and maintained
10.	Operations must be based on motion study and time study
11.	Accuracy of work must be strictly maintained
12.	Long-term planning, based on precise knowledge, is essential
13.	Maintenance must be by anticipation – never by default
14.	Every mechanical aid must be adopted for man and machine
15.	Every activity must be studied for the economic application of power
16.	Information on costs must be promptly available
17.	Machines should be designed to suit the tasks they perform
18.	The system of production must benefit everyone – consumers, workers, and owners

Table I.
Woollard's principles

Woollard expands on the importance of principle 18 by saying:

> Unless the eighteenth principle is satisfied the [flow production] system cannot reach full stature and, if it does not, the equipment and appurtenances necessary for flow production will not be utilized to the full. They might even, in some instances, become an embarrassment. This principle of "benefit for all" is not based on altruistic ideals – much as these are to be admired – but upon the hard facts of business efficiency (Woollard, 1954b, p. 180).

Woollard is warning managers that flow production will not function properly if it is used in a zero-sum manner. In the current-day practice of lean management, principle 18 is called the "Respect for People" principle. It delivers the same message; that managers should not blindly pursue the use of lean tools to achieve company objectives at someone else's expense. The uniqueness of lean management, and of flow production, compared to conventional batch-and-queue management, is that it must be operated as a non-zero-sum management system. Failing to recognize this as a critical factor, most managers struggle in their efforts to create continuous flow and are ultimately unsuccessful.

The British motorcar industry continued to prosper until the onset of Second World War when it and other industries were converted to the manufacture of products to support the war effort. The post-Second World War material supply situation caused restrictions in the production of automobiles until the early 1950s. While sales and production eventually increased to pre-war levels, the post-1950s British automotive industry began a protracted period of decline, reorganization, and bankruptcy.

Unfortunately, innovations in production methods and machinery are not sufficient to ensure long-term company survival, as was the case with Morris Motors Ltd, which eventually ceased to exist (Maxcy and Silberston, 1959; Wood, 1988; Williams *et al.*, 1994; Foreman-Peck *et al.*, 1995). Companies – their managers and employees – must excel at many other business processes including responding to the voice of the customer with new designs, short cycle-time product development, improving auto parts durability, introducing new automotive technologies, updating established products

frequently, distribution, sales and marketing, and aftermarket service. The production system alone will not make a company successful.

Summary

Frank George Woollard successfully established flow production at Morris Engines Ltd between January 1923 and late 1925, and continued to improve and operate the system until mid-1931. The methods used to achieve flow production are remarkably similar to Toyota's production system, also known as lean production, inclusive of innovative materials handling machinery. While Woollard's work has long been forgotten, it is possible that in his day there may have been widespread recognition of his flow production method within and outside of the automobile industry. Other companies may have adopted his methods, likely without attribution, which might explain why his work fell into obscurity post-1957.

It seems that Woollard thought his flow production method was more-or-less complete in its design and operation (Woollard, 1954b). One could view his method as a logical next step in the evolution of what we today call lean production. In that sense, the system design and operation may have indeed been complete, and that it would be up to others, based on Woollard's work or independently, to develop improvements such as kanban to further facilitate flow. However, as Toyota's 2008-2009 inventory glut has taught us the use of kanban does not automatically guarantee responsiveness to changes in customer demand. Instead it can be used as part of a push production system.

Woollard's practice of continuous improvement appears to be non-specific, meaning that the process for improvement-lacked clear definition. Improvement was probably rooted in Taylorist industrial engineering techniques, as is modern-day kaizen (Imai, 1986, 1988, 1997), but the specific process for its application remains unknown. The opportunity to systematize continuous improvement activities would apparently be left to others (Huntzinger, 2005; Imai, 1986).

Woollard's forced resignation leaves open the question of whether or not he and his colleagues would have developed innovations such as kanban or systematized continuous improvement. Had his career not been cut short, it would have been interesting to know how or if his flow production system would have evolved and whether he would fall victim to backsliding as is so common. In most cases, flow production reverts to batch-and-queue, or a hybrid of batch-and-queue and lean, within two to ten years after the innovator leaves the company (Emiliani *et al.*, 2007). The specific production techniques in use at Morris Motors post-Woollard are unclear, partly because the new managers were not prolific writers as Woollard was and they had essentially no innovations in production management to write about.

When people discuss the origins of lean management, the conversation always includes Ford Motor Company and its leaders Henry Ford and Charles Sorensen, and Toyota Motor Corporation and its leaders Kiichiro Toyoda and Taiichi Ohno. Largely unknown to management historians and practitioners post-1957, the work of Morris Motors and its leaders William Morris (Lord Nuffield) and Frank Woollard, done between the work of Ford and Toyota, fills an important gap in the literature on the history of flow production and of the British motor industry. The authors suggest that the timelines for discoveries and attributions of key accomplishment in lean management must be revised (see timeline in Ohno, 1988, for example).

References

Andrews, P. and Brunner, E. (1955), *The Life of Lord Nuffield: A Study in Enterprise and Benevolence*, Basil Blackwell, Oxford.

Anonymous (1957), "'Mr F.G. Woollard,' obituary", *The Times*, 28 December.

Anonymous (1958), "Obituary: Frank G. Woollard, M.B.E.", *The Journal of The Institution of Production Engineers*, Vol. 33 No. 3, pp. 204-5.

Arnold, H. and Faurote, F. (1919), *Ford Methods and the Ford Shops*, The Engineering Magazine Co., New York, NY, The series of articles was originally published in *The Engineering Magazine* in 1915.

Barraclough, R. (2009), personal communications with Robin Barraclough via e-mail.

BBC (1977), British Broadcasting Corporation Radio 4 Programme, "Morris: motors and millions," presented by Peter Hobday, celebrating the centenary of Lord Nuffield's birth (10 October 1877), 10 October.

BCL (2009), F.G. Woollard Archive MS 2386, Accession No. 2001/123. This archive of Woollard's papers were donated to Birmingham Central Library by Aston University on 15 June 2001, Birmingham Central Library, Birmingham.

Bramley, D. (1978), David Bramley curriculum vitae, 5 December.

Bramley, D. (2009a), As of July 2009, David Bramley was 95 years old and lived in a care home. His niece, Gesche Cox, asked Mr Bramley, on behalf of the first author (Emiliani), if he knew why Woollard was forced to resign from Morris Motors. He responded that it was due to the costs associated with a troublesome new engine made by Morris Motors Ltd, Engines Branch. Personal communication with Gesche Cox, 26 July.

Bramley, D. (2009b), personal communication with Gesche Cox, niece of Mr Bramley, 26 July.

Bramley, D. (2010a), F.G. Woollard Archive, private collection of David Bramley, viewed at the home of Gesche Cox, 18 March. Mr Bramley died in his sleep in the early hours of Saturday, 31 July 2010, at Prestwood House Care Home, Prestwood, Stourbridge. He was 96.

Bramley, D. (2010b), personal communication with David Bramley, Prestwood House Care Home, Prestwood, Stourbridge, 18 March.

CMI (2009), Chartered Management Institute, available at: www.managers.org.uk (accessed 13 August).

Cole, D. (1976), "Woollard & Pendrell: success at Coventry, 1923-1932", *The Journal of the Morris Register*, Vol. 8 No. 2, pp. 30-2.

Daito, E. (2000), "Automation and the organization of production in the Japanese Automobile Industry: Nissan and Toyota in the 1950s", *Enterprise & Society*, Vol. 1 No. 1, pp. 139-78.

Drummond, D. (1899), Letters from Dugald Drummond to George Woollard dated 26 September and 1 November. The Institution of Mechanical Engineers (London, UK) archive "Frank George Woollard career records 1899-1964," IMS 491/2, 491/3, and 491/11.

Edwards, H. (1983), *The Morris Motor Car: 1913-1983*, Moorland, Derbyshire.

Emerson, H. and Naehring, D. (1988), *Origins of Industrial Engineering: The Early Years of a Profession*, Industrial Engineering and Management Press, Norcross, GA.

Emiliani, B. (2008), *Practical Lean Leadership*, The CLBM, LLC, Wethersfield, CT.

Emiliani, B., Stec, D., Grasso, L. and Stodder, J. (2007), *Better Thinking, Better Results: Case Study and Analysis of an Enterprise-Wide Lean Transformation*, 2nd ed., The CLBM, LLC, Wethersfield, CT.

Ford, H. and Crowther, S. (1922), *My Life and Work*, Garden City Publishing, Garden City, NY.

Ford, H. and Crowther, S. (1926), *Today and Tomorrow*, Doubleday, Page & Co., New York, NY.

Foreman-Peck, J., Bowden, S. and McKinlay, A. (1995), *The British Motor Industry*, Manchester University Press, Manchester.

Fujimoto, T. (1999), *The Evolution of a Manufacturing System at Toyota*, Oxford University Press, New York, NY.

Gilbreth, F.B. (1911), *Motion Study: A Method for Increasing the Efficiency of the Workman*, D. Van Nostrand Company, New York, NY.

Granelli, R. (2000), "Joan Woollard: painter, sculptor, ceramicist, embroiderer. A biography", unpublished work.

HMCS (1957), Estate of Frank G. Woollard, Last Will of Frank George Woollard. Her Majesty's Courts Service, 18 June 1957.

Hoare (2009), Biographical details of George and Emily Woollard were obtained from Pamela Hunter, Archivist, C. Hoare & Co., London, UK, on 9 February. The details are contained in a letter written by George Woollard to Charles Hoare seeking employment with C. Hoare & Co., dated 18 March 1891. C. Hoare & Co. archive number HB/9/A/2/7, available at: www.hoaresbank.co.uk

Hotchkiss (1922a), "Manufacturing practice on light motor-car power units", *Machinery*, Vol. 19 No. 493, pp. 685-8.

Hotchkiss (1922b), "Manufacturing practice on light motor-car power units", *Machinery*, Vol. 19 No. 494, pp. 723-31.

Hotchkiss (1922c), "Manufacturing practice on light motor-car power units", *Machinery*, Vol. 19 No. 496, pp. 781-7.

Hotchkiss (1922d), "Manufacturing practice on light motor-car power units", *Machinery*, Vol. 20 No. 512, pp. 473-7.

Hotchkiss (1922e), "Tooling equipment for producing light motor-car gear boxes", *Machinery*, Vol. 20 No. 505, pp. 254-61.

Hounshell, D. (1995), "Ford automates: technology and organization in theory and practice", *Business and Economic History*, Vol. 24 No. 1, pp. 59-71.

Hounshell, D. (2000a), "Americanizing British engineering? Strategic debate, selective adaptation, and hybrid innovation in post-war reconstruction, 1945-1960", in Zeitlin, J. and Herrigel, G. (Eds), *Americanization and Its Limits*, Oxford University Press, Oxford, pp. 148-50 (Ch. 4).

Hounshell, D. (2000b), "Automation, transfer machinery, and mass production in the US Automobile Industry in the post-World War II Era", *Enterprise & Society*, Vol. 1 No. 1, pp. 100-38.

Houston, R.E. (1927), "Ford Model T Production, 1909-1927", Ford Production Department, 3 August, Ford Model T Club of America, available at: www.mtfca.com/encyclo/fdprod.htm (accessed 26 July 2009).

Hunter, P. (2009), personal communication with Pamela Hunter, Archivist, C. Hoare & Co., London, 9 February.

Huntzinger, J. (2005), "The roots of lean. Training within industry: the origin of Japanese management and kaizen", June 2005, available at: www.trainingwithinindustry.net/Roots%20of%20Lean%20Updated.pdf (accessed 11 August 2009).

Imai, M. (1986), *Kaizen: The Key to Japan's Competitive Success*, Random House, New York, NY.

Imai, M. (1988), "JIT/Toyota Production System Seminar" and "Basics of Kaizen® Seminar,", Training presentations handout materials, The Kaizen® Institute of America, Camarillo, CA, unpublished collective work by Imai and several other authors.

Imai, M. (1997), *Gemba Kaizen*, McGraw-Hill, New York, NY.

IME (2009), Biographical details of Frank G. Woollard were also obtained from Laura Gardner, Librarian/Archivist, The Institution of Mechanical Engineers, London, UK, on 3 February. IME archive "Frank George Woollard career records 1899-1964," IMS 491, pp. 1-14ii, available at: www.imeche.org

Jarman, L. and Barraclough, R. (1965), *The Bullnose Morris*, Macdonald, London.

Jarman, L. and Barraclough, R. (1976), *The Bullnose and Flatnose Morris*, David & Charles, Devon.

Kawahara, A. (1998), *The Origin of Competitive Strength*, Springer, Tokyo.

Kimoto, S. (1991), *Quest for the Dawn*, The Dougherty Company, Milwaukee.

Lewchuk, W. (1987), *American Technology and the British Vehicle Industry*, Cambridge University Press, Cambridge.

Liker, J. (2004), *The Toyota Way*, McGraw-Hill, New York, NY.

Liker, J. and Hoseus, M. (2008), *Toyota Culture*, McGraw-Hill, New York, NY.

Matthew, M. (2009), personal communication with Murdoch Matthew, 4 August.

Maxcy, G. and Silberston, A. (1959), *The Motor Industry*, George Allen & Unwin, London.

Monden, Y. (1983), *Toyota Production System*, 1st ed., Engineering and Management Press, Norcross, GA.

Monden, Y. (1998), *Toyota Production System*, 3rd ed., Engineering and Management Press, Norcross, GA.

Morris Engines, Woollard, F.G. and Taylor, H.E. (1924), "Improvements in metal cutting machine tools and associated plant", British Patent Number GB219428 (A), application date May 11 1923, published July 31.

Mortimer, L. (1999), The grave sites of Frank, Catherine, and Joan Woollard were identified for Emiliani and Seymour thanks to the help of Canon Lawrence Mortimer, the Vicar of St Peter's Church, Wootten Wawen, Warwickshire, UK, 22 May 2009.

MW (2009), "Measuring worth: five ways to compute the relative value of a UK pound amount, 1830 to present", Worth was calculated using "average earnings" method, available at: www.measuringworth.com/ukcompare (accessed 10 August 2009).

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Overy, R. (1976), *William Morris, Viscount Nuffield*, Europa, London.

Sato, M. (2008), *The Toyota Leaders*, Vertical, New York, NY, pp. 132-3.

Schwartz, M. and Fish, A. (1998), "Just-in-time inventories in old Detroit", *Business History*, Vol. 40 No. 3, pp. 48-71.

Seymour, P. (1999), *Morris Light Vans: 1924-1934*, P&B Publishing, East Sussex.

Seymour, P. (2006), *Wolseley Radial Aero Engines: Lord Nuffield's Thwarted Venture*, Tempus Publishing, Gloucestershire.

Shimokawa, K. and Fujimoto, T. (2009), *The Birth of Lean*, The Lean Enterprise Institute, Cambridge, MA, Note: This book, *The Birth of Lean*, is improperly titled because the birth of lean production pre-dates Toyota Motor Corporation. The book should have instead been titled: *The Birth of Toyota's Production System*.

Shingo, S. (1981), *Study of Toyota Production System from Industrial Engineering Viewpoint*, Japan Management Association, Tokyo, Distributed in the USA by Productivity Press.

Silberston, A. (2009), personal communication, Oxford and Cambridge Club, London, 19 May.

Sorensen, C. and Williamson, S. (1956), *My Forty Years With Ford*, W.W. Norton & Company, New York, NY.

Sugimori, Y., Kusunoki, K., Cho, F. and Uchikawa, S. (1977), "Toyota production system and kanban system – materialization of just-in-time and respect-for-human system", *International Journal of Production Research*, Vol. 15 No. 6, pp. 553-64.

Taylor, F.W. (1903), "Shop management", *Transactions of The American Society of Mechanical Engineers*, Vol. XXIV No. 1003, pp. 1337-456.

Taylor, F.W. (1911), *The Principles of Scientific Management*, Harper & Brothers, New York, NY.

Taylor, F.W. (1947), *Scientific Management: Comprising Shop Management, Principles of Scientific Management, Testimony Before the House Committee*, foreword by Harlow S. Person, Harper & Brothers, New York, NY.

Taylor, H.E. (1922), "Factory planning", *Proceedings of the Institution of Production Engineers, Session 1922-1923*, The Institution of Production Engineers, London, Vol. II, pp. 254-257.

Tiratsoo, N. (2003), "Materials handling in British industry, 1945-c1975: the anatomy of a manufacturing fundamental", *Business History*, Vol. 45 No. 4, pp. 52-72.

Togo, Y. and Wartman, W. (1993), *Against All Odds: The Story of Toyota Motor Corporation and The Family that Created It*, St Martin's Press, New York, NY.

Tolliday, S. (1998), "The diffusion and transformation of Fordism: Britain and Japan compared", in Boyer, R., Charron, E., Jürgens, U. and Tolliday, S. (Eds), *Between Imitation and Innovation*, Oxford University Press, New York, NY, pp. 57-95.

Toyoda, E. (1985), *Toyota: Fifty Years in Motion*, Kodansha International, New York, NY.

Toyota (1988), *Toyota: A History of the First 50 Years*, Toyota Motor Corporation, Toyota City (Nagoya).

Toyota (2001), *The Toyota Way 2001*, Toyota Motor Corporation, Toyota City (Nagoya) (internal document).

Tsutsui, W. (1998), *Manufacturing Ideology: Scientific Management in Twentieth-century Japan*, Princeton University Press, Princeton, NJ.

Williams, K., Haslam, C., Johal, S. and Williams, J. (1994), *Cars: Analysis, History, Cases*, Berghahn Books, Oxford, pp. 134-65.

Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY.

Wood, J. (1988), *Wheels of Misfortune: The Rise and Fall of the British Motor Industry*, Sidgwick & Jackson, London.

Wood, J. (1998), *MG from A to Z*, Motor Racing Publications, Croydon, p. 185 (photo used with permission).

Wood, J. (2009), personal communications with Jonathan Wood via e-mail and in Shropshire, Ludlow, 22 May.

Wood, J. (2010), personal communications with Jonathan Wood, via e-mail and in Shropshire, Ludlow, 18-19 March.

Woollard, F.G. (1922), Letter to William Morris dated 2 November 1922. Birmingham Central Library (Birmingham, UK), F.G. Woollard Archive MS 2386, Accession No. 2001/123.

Woollard, F.G. (1924), "Morris production methods: machines and methods used by Morris Engines, Ltd., Coventry, in grinding spline shafts and gears for automobile gear boxes", *Machinery*, Vol. 24 No. 602, pp. 33-8.

Woollard, F.G. (1925), "Some notes on British methods of continuous production", *Proceedings of The Institution of Automobile Engineers, Session 1924-1925*, Vol. XIX, The Institution of Automobile Engineers, London, pp. 419-474, 885-890, and Plates XVI to XXXII (Figures 1-26).

Woollard, F.G. (1931a), Letter to A. Walsh, William Morris's attorney, announcing his resignation, dated 15 June 1931. Birmingham Central Library (Birmingham, UK), F.G. Woollard Archive MS 2386, Accession No. 2001/123.

Woollard, F.G. (1931b), Letter to A. Walsh, William Morris's attorney, describing his exit interview with William R. Morris, dated 14 August 1931. Birmingham Central Library (Birmingham, UK), F.G. Woollard Archive MS 2386, Accession No. 2001/123.

Woollard, F.G. (1931c), Letter to Edgar Blake, Managing Director of Morris Motors Ltd. (William Morris's deputy), announcing his resignation, dated 15 June 1931. Birmingham Central Library (Birmingham, UK), F.G. Woollard Archive MS 2386, Accession No. 2001/123.

Woollard, F.G. (1931d), Letter to Edgar Blake, Managing Director of Morris Motors Ltd. (William Morris's deputy), containing Woollard's formal resignation letter and that of Mr Pendrell, dated 16 June 1931. Birmingham Central Library (Birmingham, UK), F.G. Woollard Archive MS 2386, Accession No. 2001/123.

Woollard, F.G. (1931e), Letter to William Morris's auditor, R.W. Thornton, dated 21 May 1931, "Balance sheet and accounts for the year ended 31st December 1930," Library of Nuffield College, University of Oxford, Oxford, UK, File No. N5/1/1-10.

Woollard, F.G. (1951), "A short lecture-discussion course for senior industrial executives on basic principles of flow production", Course announcement flyer, lecture notes, and list of attendees. Birmingham Central Library (Birmingham, UK), F.G. Woollard Archive MS 2386, Accession No. 2001/123.

Woollard, F.G. (1952a), "The basic principles of mass and flow production: first instalment", *Mechanical Handling*, Vol. 39 No. 4, pp. 150-4.

Woollard, F.G. (1952b), "The basic principles of mass and flow production: second instalment", *Mechanical Handling*, Vol. 39 No. 5, pp. 207-15.

Woollard, F.G. (1952c), "The basic principles of mass and flow production: third instalment", *Mechanical Handling*, Vol. 39 No. 6, pp. 277-83.

Woollard, F.G. (1952d), "The basic principles of mass and flow production: fourth instalment", *Mechanical Handling*, Vol. 39 No. 7, pp. 363-9.

Woollard, F.G. (1952e), "The basic principles of mass and flow production: fifth instalment", *Mechanical Handling*, Vol. 39 No. 8, pp. 398-403.

Woollard, F.G. (1952f), "The basic principles of mass and flow production: sixth instalment", *Mechanical Handling*, Vol. 39 No. 10, pp. 478-83.

Woollard, F.G. (1953a), "The advent of automatic transfer machines and mechanisms", *The Institution of Production Engineers Journal*, Vol. 32 No. 1, pp. 18-34.

Woollard, F.G. (1953b), "The basic principles of mass and flow production: seventh instalment", *Mechanical Handling*, Vol. 40 No. 1, pp. 33-9.

Woollard, F.G. (1953c), "The basic principles of mass and flow production: eighth instalment", *Mechanical Handling*, Vol. 40 No. 2, pp. 62-7.

Woollard, F.G. (1953d), "The basic principles of mass and flow production: final instalment", *Mechanical Handling*, Vol. 40 No. 3, pp. 125-33.

Woollard, F.G. (1954a), *Flow Production and Automation: Eighteen Axioms*, Industrial Administration Group, College of Technology, Birmingham (now Aston Business School, Aston University, Birmingham), UK, with foreword by David Bramley, Department of Industrial Administration, College of Technology (22 pp.).

Woollard, F.G. (1954b), *Principles of Mass and Flow Production*, Iliffe & Sons, London, This book was published in the USA one year later: Woollard, F.G. (1955) *Principles of Mass and Flow Production*, Philosophical Library, New York, NY.

Woollard, F.G. (1955a), *Frank G. Woollard M.B.E. – Brief Particulars of Career*, Birmingham Central Library, Birmingham, F.G. Woollard Archive MS 2386, Accession No. 2001/123. Other sources of biographical information for Mr Woollard include: Andrews, P. and Brunner, E. (1955) *The Life of Lord Nuffield: A Study in Enterprise and Benevolence*. Basil Blackwell, Oxford; Georgano, G. (2000) *The Beaulieu Encyclopedia of the Automobile*, Taylor & Francis, Oxford, p. 1072; Lewchuk, W. (1986) "Frank G. Woollard", In Jeremy, D. and Shaw, C. (Eds), *Dictionary of Business Biography*, Vol. 5, Butterworths, London, pp. 888-891; Overy, R. (1976) *William Morris, Viscount Nuffield*, Europa, London; Seymour, P. (2008) personal communications, October; Wood, J. (1998) *MG from A to Z*, Motor Racing, Croydon, pp. 184-185; Woollard, F.G. (1954) *Principles of Mass and Flow Production*, Iliffe & Sons, London, p. 11; Woollard, F.G. (1955) "Machines in the service of man", *The Automatic Factory: What Does it Mean?* Report of the Conference held at Margate 16 to 19 June, The Report of the Margate Conference of The Institution of Production Engineers, E.&F.N. Spon, London, pp. 198-206.

Woollard, F.G. (1955b), "Machines in the service of man", *The Automatic Factory: What Does it Mean?*, Report of the Conference Held at Margate 16 to 19 June, The Report of the Margate Conference of The Institution of Production Engineers, E.&F.N. Spon, London, pp. 198-206.

Woollard, F.G. (1955c), "The Lords of Longbridge: Sir Leonard Lord, K.B.E.", *The Motor*, July, pp. 883-5.

Woollard, F.G. and Emiliani, B. (2009), *Principles of Mass and Flow Production*, The CLBM, LLC, Wethersfield, CT, 55th Anniversary special reprint edition.

Woollard, F.G. and Morris, W.R. (1925), "Morris production methods: system of continuous flow as applied to mechanical manufacture by Morris Engines (Coventry), Ltd", *Machinery*, The Machinery Publication Co., Brighton, "I – Operations up to and including those on cylinder block machine", Vol. 25 No. 651, pp. 773-803; "II – Composite machine for machining engine details," Vol. 25 No. 652, pp. 827-836; "III – Semiautomatic continuous machines for production of flywheels and gear-box cases," Vol. 26 No. 654, pp. 34-40; "IV – Semi-automatic continuous machines for production of flywheels and gear box cases", Vol. 26 No. 655, pp. 65-72; "V – Manufacture of Morris radiators; methods employed by Osberton Radiators, Oxford", Vol. 26 No. 656, pp. 115-120; "VI. – Details of chassis assembly", Vol. 26 No. 658, pp. 161-166.

Yasuda, Y. (1991), *40 Years, 20 Million Ideas: The Toyota Suggestion System*, Productivity Press, Cambridge, MA.

Zeitlin, J. (2000), "Reconciling automation and flexibility? Technology and production in the postwar British motor vehicle industry", *Enterprise & Society*, Vol. 1 No. 1, pp. 9-62.

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Music as a framework to better understand Lean leadership

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Abstract

Purpose – The purpose of this paper is to explain why most senior managers have great difficulty comprehending and correctly practising the Lean management system, thereby handicapping their ability to lead enterprise-wide Lean transformations; to describe the depth and richness of relationships between the Lean management system and music; to help improve practitioners' understanding of Lean management and how to learn it; and to help senior managers recognize the need to personally apply Lean principles and practices daily to become capable Lean leaders.

Design/methodology/approach – The paper uses a qualitative examination of various characteristics of the Lean management system and music, based in part on the authors' experience implementing Lean in manufacturing and service businesses, and also in learning to play music over a nine-year period.

Findings – The Lean management system and music share numerous similarities, including the difficulty most people encounter learning each discipline. The paper highlights the importance of daily practice by senior managers to learn and understand Lean management in order to capably lead enterprise-wide Lean transformations, and to recognize and correct problems in Lean thinking and practice among themselves and others.

Research limitations/implications – Elucidation of the deep similarities between Lean and music does not answer the fundamental question of how to increase the number of senior managers who are interested in becoming capable Lean leaders.

Practical implications – The paper provides an answer to the question of why it is so difficult for senior managers, and others, to correctly understand and practise the Lean management system. It clarifies the deep level of personal understanding, leadership involvement, and daily routines required to have greater success with Lean management.

Social implications – Management practitioners who improve their understanding of Lean leadership will avoid common errors that undermine leadership credibility and morale among followers, and which impair the achievement of successful Lean transformations.

Originality/value – The paper presents a novel approach to understanding the Lean management system by using music as the framework. It shows how effective Lean leadership is more the result of daily practice than it is of the personal attributes normally associated with capable leadership. The deep similarities between Lean management and music have not been previously described in the literature.

Keywords Flow, Leadership, Lean, Music

Paper type Research paper

Introduction

Modern progressive management began over 130 years ago with the work of Frederick Winslow Taylor and his associates (Taylor, 1903, 1911, 1947), along with Frank Gilbreth (1911) and others (Emerson and Naehring, 1988). These pioneers established the fields of industrial engineering and management, and created what would become known as "Scientific Management." Scientific Management evolved over time into a comprehensive system of management and is now widely known as "Lean management" (Arnold and Faurote, 1919; Woollard, 1954; Sorensen, 1956; Womack *et al.*, 1990; Schwartz and Fish,

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1998; Tsutsui, 1998; Shimokawa and Fujimoto, 2009; Woollard and Emiliani, 2009). Two fundamental ideas behind progressive management include process improvement and the elimination of queues to improve flow. If done consistently and correctly, the result is significant improvement in quality and throughput, lower costs, and dramatically reduced lead-times – which typically benefits customers and helps improve the value proposition. The Lean management system (hereafter, Lean management) can be used wherever information is processed and exchanged, regardless of the form of the information (i.e. a physical part or a report), and thus is applicable to any organization: manufacturing, service, government, non-governmental organizations, etc.

Since its inception, it has been difficult for management practitioners to understand (Taylor, 1947 (1912 testimony to Congress)) and correctly apply the principles of progressive management (Taylor, 1911; Woollard, 1954; Toyota, 2001), as well as its practices and methods (Monden, 1983, 1998). As a result, flow is rarely achieved and even more difficult to sustain, despite having made some improvements in efficiency through the limited use of selected tools and methods (Roth, 2010). In the Foreword to the 1947 edition of *Scientific Management*, Frederick Taylor's colleague Harlow S. Person wrote (Taylor, 1947, p. xii):

> In the course of his testimony before the House committee Taylor was asked how many concerns used his system in its entirety. His reply was: "In its entirety – none. Not one." […] Were Mr. Taylor alive to respond to the same question in 1947 – thirty-five years later – his reply would have to be essentially the same.

This quote illustrates the propensity for senior managers to take shortcuts rather than learn and practice what they need to in order to understand the system of progressive management in its entirety. Despite Taylor's great influence, and more recently that of Toyota Motor Corporation (Shingo, 1981; Monden, 1983; Ohno, 1988; Womack *et al.*, 1990; Womack and Jones, 1996; Fujimoto, 1999; Liker, 2004; Liker and Hoseus, 2008; Shimokawa and Fujimoto, 2009), management practitioners – especially the leaders of organizations – have found it very difficult to convert from batch-and-queue material and information processing to flow. Rare is the organization that practices Lean management with distinction to achieve flow (Emiliani *et al.*, 2007) throughout the enterprise, inclusive of its two principles, known today as "continuous improvement" and "respect for people" (Taylor, 1947 (1912 testimony to Congress); Woollard, 1954; Sugimori *et al.*, 1977; Toyota, 2001; Emiliani, 2008a, d). Instead, it is far more common to find senior managers who terribly misunderstand and misapply Lean principles and practices (Jargon, 2009; Roth, 2010; Aeppel, 2011; Carter *et al.*, 2011), or who view Lean as something workers should do but not senior managers (Elkind *et al.*, 2011; Voreacos *et al.*, 2011) – and which often results in layoffs after productivity gains have been realized.

The question, then, is why is it so difficult for senior managers, and others, to correctly understand and practice progressive Lean management? After more than 100 years of effort, it remains common to find organizations that selectively apply certain Lean tools to achieve short-term improvements in operating results (Schmidt, 2007; Roth, 2010), often accompanied by backslide into classic batch-and-queue processing caused by changes in management or changes in ownership (Emiliani *et al.*, 2007). Application of the system in its entirety, inclusive of both principles and all related methods and practices, remains elusive (e.g. Davis, 2001; Bhuiyan *et al.*, 2006; Roth, 2010; Aeppel, 2011). This suggests Lean management is far more difficult to understand and practice than is indicated by popular writings on the topic (e.g. Imai, 1986; Womack *et al.*, 1990; Liker, 2004).

Lean management, while conceptually simple (Womack and Jones, 1996), requires significant hands-on involvement to learn and understand (Monden, 1983; Ohno, 1988; Imai, 1997; Emiliani *et al.*, 2007). In addition, it contains dozens of important nuances and details that are impossible to grasp without daily practice (Emiliani, 2011). This explains why most senior managers seeking to adopt Lean management fail to understand it, as they have for decades been engaged in daily routines and habits that are non-Lean and very difficult to break. It also suggests that Lean management is more closely connected to activities requiring highly developed skills acquired through long-term capability building, such as music. To become a capable musician means to learn a new language, which requires years of study and practice (Levitin, 2006), much like learning the new language of flow.

This paper uses music as a framework for understanding why Lean management, as well as its antecedent, Scientific Management, has been so difficult for senior managers to understand and practice, as well as to lead its practice in organizations. The music framework serves as a creative and accurate reference for exploring this long-standing problem. The numerous similarities between Lean management and music reveal a depth of association that has not been previously reported in the literature. This paper seeks to improve practitioners' understanding of Lean management, how to learn Lean management, and help management practitioners clearly recognize the need for their own personal daily application of Lean principles and practices.

While operations and operations management are used in this paper to aid in the explanation of the association between Lean management and music, the overarching perspective in this paper is of Lean management in the general sense. This reflects the long-wave trend of Lean management moving beyond operations into all functions and all processes in an enterprise (Emiliani *et al.*, 2007; Kenney, 2011). With respect to the music framework, the context in which it is used is not specific to any music genre. Rather, it too is the general case, where the main point of comparison made is between music that flows and that which does not flow. We emphasize the importance of daily practice to become an effective Lean leader. This should not suggest that senior managers need to have been operators to practice Lean management correctly, just as leaders need not have been accountants to be proficient in an organization's costs.

Finally, in the context of Lean management, a definition of leadership must pertain to leaders' ability to enable information flow between people and in processes. In addition, a definition of leadership must reflect an outward-looking servant leader role because that is much better aligned with the Lean principles, "continuous improvement" and "respect for people" (Toyota, 2001). Thus, Lean leadership has been defined as (Emiliani, 2008a): "Beliefs, behaviors, and competencies that demonstrate respect for people, motivate people, improve business conditions, minimize or eliminate organizational politics, ensure effective utilization of resources, and eliminate confusion and rework." This definition is practical, specific, and actionable with respect to improving information flow by eliminating waste, unevenness, and unreasonableness.

Lean and music – simple associations

> To me, it was like looking at a symphony. Everybody knew their instruments and their music. They knew when to come in and when not to come in.

This is a description of manufacturing given by Gary Convis when he first visited Toyota Motor Corporation's Takaoka plant in 1983 (Collier, 2006). Convis, who would later rise to become chairman of Toyota Motor Manufacturing Kentucky, immediately

recognized the precise timing and synchronization apparent in a highly developed flow production system. This general characterization is a common one to people both experienced and inexperienced in operations (Hopkins, 1994).

A more specific characterization of the association between Lean and music is related to takt time, which is the rate of customer demand. Takt, is a German word for "beat," while takt time signifies the number of beats per unit time (LEI, 2008). Takt time is important because it connects the production activity on the shop floor to actual marketplace demand, and is calculated by dividing the production time available per day by the customer demand per day. For example, 450 minutes available production time divided by a demand of 900 units per day means one item must be produced every 30 seconds. Takt time is similar to the time signature in a music score, which tells musicians the beats per measure.

These two examples are normally the extent to which the association between Lean management and music are made.

Lean and music – advanced associations

Table I lists numerous similarities between learning and practicing music compared to learning and practicing Lean management. Anyone who has had experience with learning both music and Lean should easily recognize the accuracy of each item. The significance of Table I is that it indicates learning Lean management is a task of similar magnitude to a student who is serious about learning music. Both require one to think differently and do things differently than one would normally do. While many people experience music education in their youth, few actually persist and learn to play music well. Likewise, while many senior managers experience Lean in classroom education, few actually persist and therefore do not learn Lean management well enough to lead their organizations forward.

Only about 6 percent of the US population plays a musical instrument two or more times a week (USCB, 2011), while the population of senior managers (standard occupational classification (SOC) codes 11-1011 and 11-1021) in the USA is 0.7 percent (Bureau of Labor Statistics, US Department of Labor, 2011). If levels of management down to line supervisor are included, then the total population of people in management positions is likely around 2 or 3 percent. This figure is comparable to the 3-4 percent of large- and mid-size companies practice Lean management with distinction. In most of these cases, senior managers are personally participating in the daily application of Lean principles and practices. In contrast, the majority of companies claiming to practice Lean management have extensive senior management support (e.g. Davis, 2001; Bhuiyan *et al.*, 2006; Roth, 2010), but little or no actual participation by senior management. Instead, senior managers typically delegate the use of Lean tools and methods to lower-level people. Table I suggests many specific reasons for the widespread lack of senior management knowledge and involvement with Lean management (e.g. lack of fine thinking skills, lack of a sensei, etc.).

Table II shows the structure of the information that is processed in music (Ashley, 2005) and in Lean. Notice how one exactly parallels the other. As shall be shown later, this is because both music and Lean (flow) are rooted in physics (Hopp and Spearman, 2001; Monden, 2008). The term "part" in the Lean column refers to a physical part that is processed in manufacturing operations, but it can also be a discrete item of information that is processed in service operations. There is no fundamental reason for there to be any distinction; the term "part" is used solely for convenience.

Music	Lean
Requires development of fine motor skills	Requires development of fine thinking skills
Most people need a teacher to learn music	Most people need a sensei (teacher) to learn Lean
Cannot play song correctly if you cannot remember the notes	Cannot practice Lean correctly if you cannot remember the principles (especially the nuances and details)
Must practice every day	Must apply Lean principles and practices every day
Requires a great deal of personal motivation and discipline	Requires a great deal of personal motivation and discipline
Follows strict rules for timing, sequence, and synchronization with other people (instruments)	Follows strict rules for timing, sequence, and synchronization with other people, departments, and organizations
Cannot just play music (do). Musician must think and do	Cannot just "do" Lean. Managers must think and do
Errors are broken down into minute parts, investigated thoroughly, and corrected	Problems are broken down into minute parts, investigated thoroughly, and corrected
Typically a small group activity, and requires real teamwork	Typically a small group activity, and requires real teamwork
Establish the basic chords and fingering, then work out the problems one-by-one over time	Establish the process, then work out remaining problems one-by-one over time
Must adhere to standardized work (sheet music)	Must adhere to standardized work (combination sheet)
Must know both your part (the detail) and the whole song (broad view)	Must know both your part (the detail) and the whole process (broad view)
Symbols and notation have precise meaning	Symbols and notation have precise meaning
Music has rules	Lean management has rules
Nuances and details are important	Nuances and details are important
Players must play just-in-time	Material and information must be just-in-time
Learn music mostly on-the-job (practice and performance)	Learn Lean management mostly on-the-job (practice and performance)
Sees overproduction (notes), movement (physical), defects (mistakes), waiting (for performance), and transportation as waste (to and from performance)	Recognize existence of seven wastes (Ohno, 1988), plus behavioral waste (Emiliani, 1998)
Some room for adaptation and interpretation.	Some room for adaptation and interpretation
You are never done; always more to learn	You are never done; always more to learn
Get complacent? Music sounds bad	Get complacent? Make many costly mistakes
Keep trying; never give up	Keep trying; never give up

Table I.
Similarity between learning music and learning lean

Music	Lean
Note (duration and pitch)	A part (part number or SKU)
Pitch (frequency of a note)	Pitch (frequency of a part or container of like parts)
Melody (sequence of single notes)	Sequence of parts (level AABAABC, not batch AAAAAA BBBB CCC)
Harmony (group of two or more notes)	Parts in an assembly
Rhythm (pattern of notes in time)	Pattern of parts in time
Tempo (speed of the notes)	Speed of the parts (takt time)

Table II.
Comparison of basic structure of music and lean

An orchestra and its various instrument sections can serve as a metaphor for a company, whereby each instrument section must work together to create harmony (musically). Likewise, the departments in a company must work together (teamwork) to create harmony. However, poor teamwork in a company is common, resulting in disharmony. In Lean as in music, discord occurs when the frequency of notes (parts) are off, meaning, items "A" and "B" are needed but items "A" and "C" appear instead. This causes delays or re-work.

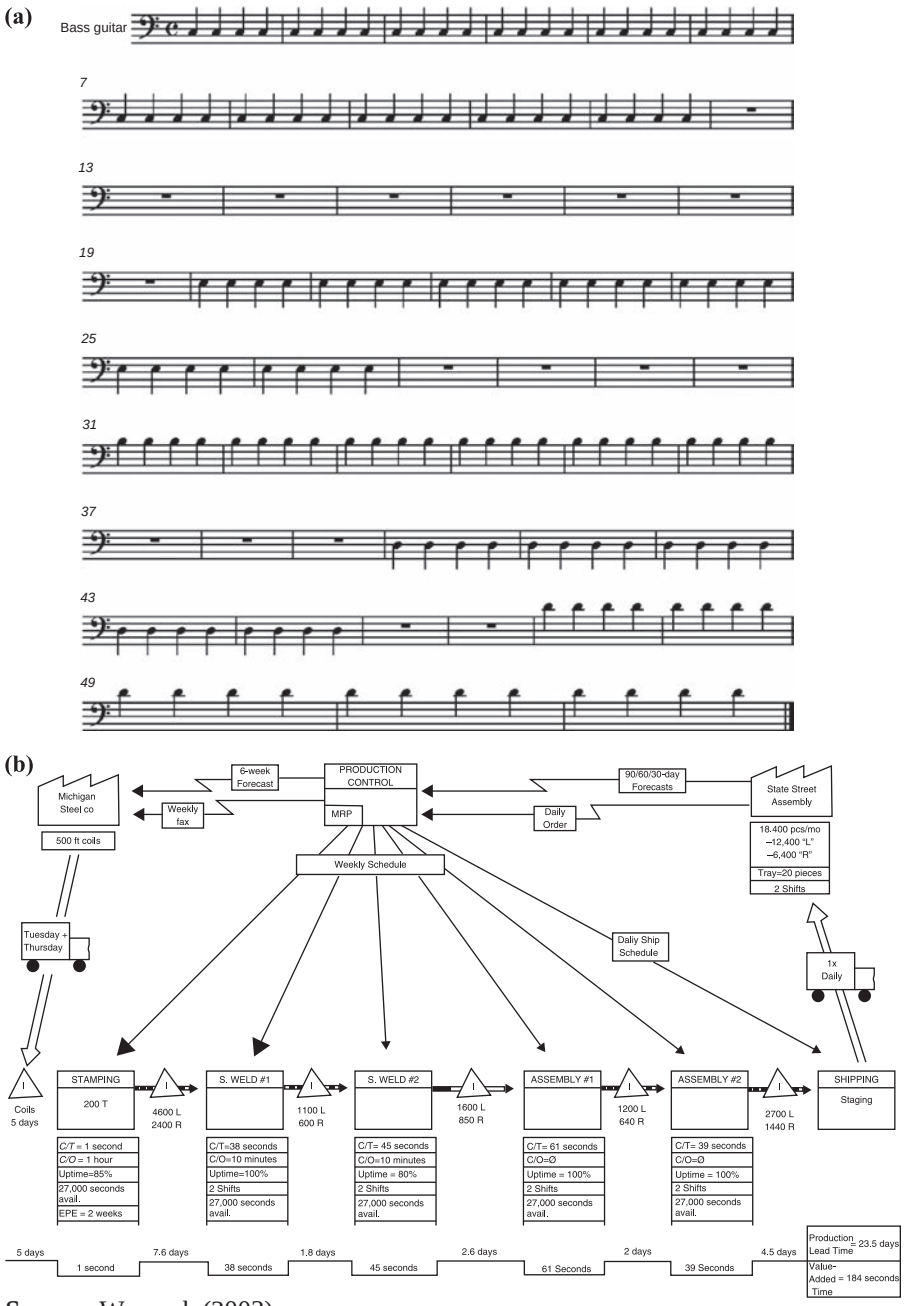
Material and information processing in organizations is normally batch-and-queue, resulting in long lead-times, quality problems, and high costs. While some parts of a business may process material and information in ways that resemble flow, they are generally either an efficient batch-and-queue or hybrid batch-and-queue/flow processing method. Batch-and-queue material and information processing is prevalent in business, but rare in music. What does batch-and-queue processing look like in music? Figure 1a shows the musical equivalent of batch-and-queue processing.

In this music score, we see the same note played for varying numbers of measures (batches) followed by rests of varying durations (queues). This score would quickly frustrate listeners because they hear the same note repeated followed by silence of arbitrary duration, followed by a different note played repeatedly and another rest of arbitrary duration, and so on. People would not listen to or purchase this type of music because it does not flow. Interestingly, some avant-garde music seeks to deconstruct and disrupt flow in music, to make it more batch-and-queue. While perhaps technically interesting, such music sells only to a narrow audience. People's conception of music is sounds (and silence) that flow.

Imagine someone who purchased a music instrument, such as a bass guitar, went home and began playing it for the first time. If you were a listener, Figure 1a is what you would likely hear. You would hear noise, which is why listeners prefer to be elsewhere when someone first learns to play music. The "music" sounds bad. If one practices diligently every day, then one will gain a better understanding of the instrument and the music, and the noise will soon become more listenable and sound like music (flow of notes in time). If one does not practice, or practice is infrequent, then the learning process is arrested and Figure 1a is about all that the player will ever be able to do. This skill level is the lowest it can be, which is convenient for the player but highly inconvenient for the listener.

Figure 1b is a current state value stream map depicting batch-and-queue material and information processing. This is how senior managers in most companies organize resources to perform value-creating work. Unfortunately, this push production system contains vast amounts of waste, unevenness, and unreasonableness (Ohno, 1988; Monden, 1998; Liker, 2004; Emiliani, 2008a), which results in long lead-times, high costs, and low quality. Organizing processes in this way requires little in the way of skill and is convenient for management because it is easy to do. However, it is highly inconvenient for customers, who will eventually look elsewhere to have their needs satisfied if they have a choice of suppliers. Thus, batch-and-queue processing may be acceptable for sellers' markets, where customers have no choice, but it is unacceptable for companies that operate in competitive buyers' markets. Unfortunately, few senior managers have realized this over the last 130 years.

It is critical to comprehend the meaning of Figure 1a and b. Like the beginner bass player processing notes (making noise) in Figure 1a and b represents how the beginner manager processes parts. But it is worse than that, because Figure 1b also represents how experienced senior managers process parts (meaning, as the ultimate process



Source: Womack (2003)

Figure 1.
(a) A batch-and-queue music score (51 measures, $c = 4/4$ time); (b) current state value stream map depicting batch-and-queue processing

owners), usually with significant effort made to optimize each individual process in isolation of the other processes. Optimizing batch-and-queue processing is akin to going from not knowing how to play a song (Figure 1a) to knowing, for decades, how to play only a few simple songs. Learning and development have stopped. Frederick Taylor and others subsequent to him established principles, practices, and methods to move batch-and-queue processing forward toward flow. It means to go from knowing a few simple songs to knowing how to play any song. That is what the pioneers of progressive management wanted senior managers to learn how to do, yet few have risen to the challenge.

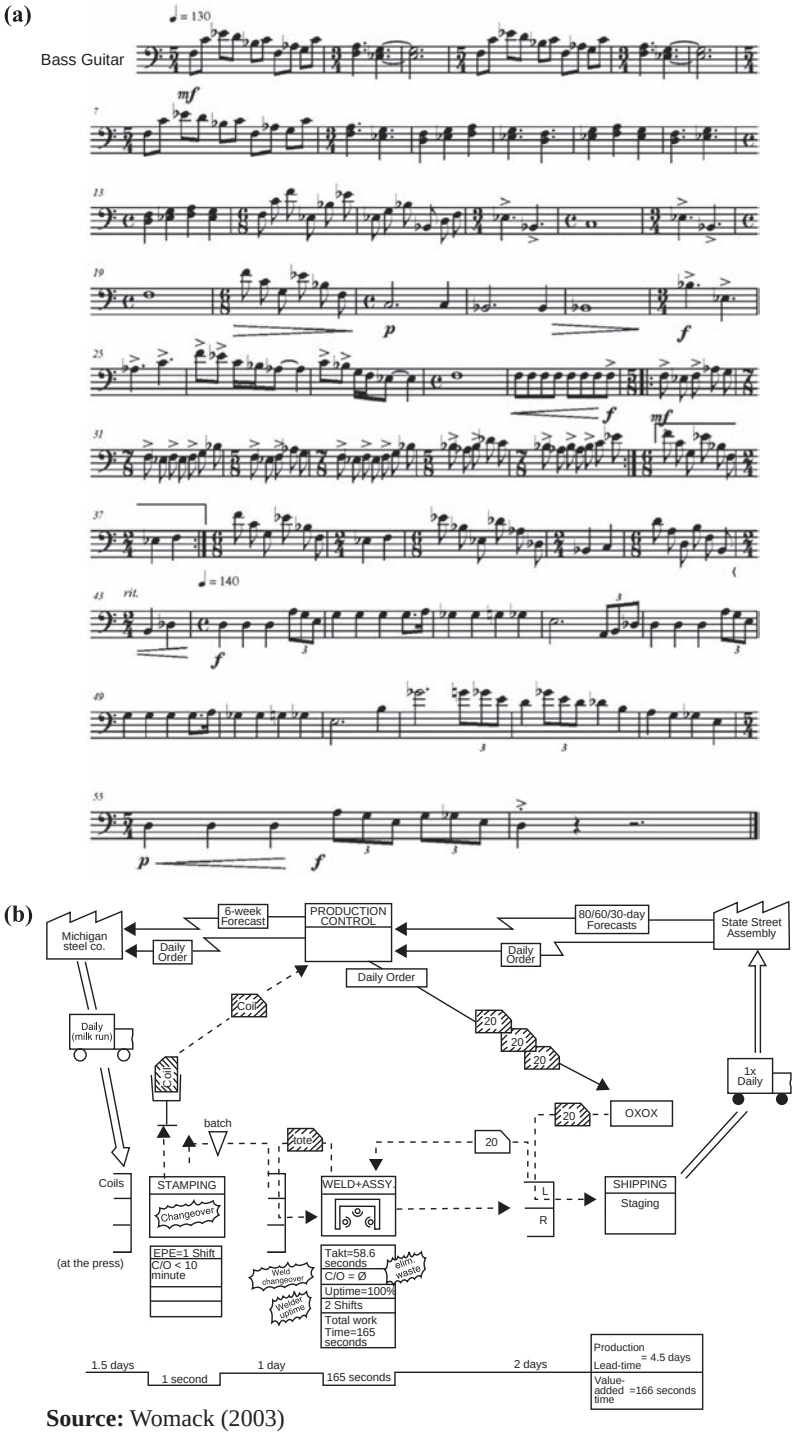
Figure 2a shows the musical equivalent of flow processing. In this music score, we do not see the same note played for varying numbers of measures followed by rests of varying durations. We instead see notes played in combination with short rests that fit appropriately to maintain the flow of music. This would make listeners happy because they hear music, not noise.

The person who can play Figure 2a well does so because of years of experience studying and playing music. They were once a beginner, but dedicated themselves to moving far beyond that to develop capabilities that few people possess. They learned the new language and associated skills, which was difficult and inconvenient for the musician, but is convenient for the listener. Music that flows sells much better than music that does not flow, and the former requires real skill and reflects what customers value while the latter do not.

This pull production system is more responsive to buyers' markets and contains far less waste, unevenness, and unreasonableness which results in shorter lead-times, lower costs, and higher quality. Organizing processes in this way requires great skill and is very inconvenient for management because they must study and practice new things. However, it is highly convenient for customers, particularly if they have a choice of suppliers. Flow processing should be the norm in sellers' markets as well because sellers' markets do not last forever, and also because batch-and-queue processing develops bad habits in senior managers that are difficult to break when the need for flow eventually arises due to increased competition. Unfortunately, few senior managers have realized this as well over the last 130 years, and thus experience great difficulty transitioning from batch-and-queue to flow.

Once again, it is critical to comprehend the meaning of Figure 2a and b. Like the advanced bass player processing notes (making music) in Figure 2a and b represents how the advanced senior manager would process parts. They have gone from knowing only a few simple songs to knowing how to play any song. That is why experienced sensei (kaizen teachers) can help any organization in any industry achieve flow, regardless of the product or service produced. They can play any song. Unfortunately, few senior managers have risen to this challenge. To them, it is sufficient to know, at most, a few simple songs. It also explains why, for so many years, Lean has remained stuck in operations, while its principles and practices apply to all processes in an organization.

Table III lists additional similarities between Lean and music. Teamwork in organizations is often forced and ineffective, which is no surprise when processing is batch-and-queue because processes operate in isolation. In order for material and information to flow, the level of teamwork must be far greater because processes are connected instead of independent of one another. Sharing is also a common characteristic in both music and Lean; the former centering upon performance time and sonic space, while the latter pertains to sharing ideas (Yasuda, 1991), profits



Source: Womack (2003)

Figure 2.
(a) A music score that flows (56 measures, time signature varies); (b) future state value stream map depicting a pull production system

Music	Lean
Teamwork (band, orchestra)	Teamwork (intra- and inter-departmental/ organizational)
Sharing ideas and sonic space	Sharing ideas, rewards, and benefits
Creativity to innovate and improve (jam session)	Creativity to innovate and improve (kaizen)
Time and counting (time signature, tempo)	Time and counting (takt time, cycle time)
Balance (melody and harmony)	Balance (percent loading, heijunka, job rotation, etc.)
Observation (mainly by ear)	Observation (mainly by eye)
Patterns and relations (circle of fifths)	Patterns and relations (part families, heijunka, milk runs, etc.)
Steps (music scales)	Steps (continuous improvement)
Must be in tune (sound, e.g. A440 Hz)	Must be in tune (with marketplace, e.g. takt time)
Standardized work (sheet music)	Standardized work (standard work and SWCS)
Visual controls (sheet music, conductor)	Visual controls (andon light, production display board)
Audio signals (the music itself)	Audio signals (music and tones used as signals)
Continuous flow (notes and rests)	Continuous flow (material and information)
Non-zero-sum (good for both musician and listener)	Non-zero-sum (win-win outcomes among key stakeholders)

Table III.
Additional similarities between music and lean

(Emiliani *et al.*, 2007), etc., among key stakeholders (employees, suppliers, customers, investors, and communities). Both music and Lean are creative activities, while batch-and-queue processing is not. Time and counting are extremely important for both music and Lean, as is the concept of balance. Observation is of great importance as a means of identifying abnormal conditions to initiate problem solving, as are patterns and relations.

Musical pitches can be arranged into various scales, major or minor, for example. A scale is a collection of notes with designated pitches that, when arranged a certain way, provide the foundation for a desired harmony or melody. Each scale is composed of a series of small steps called intervals, which is the distance between one note and another. Lean also advances in small steps (continuous improvement). The music must be in tune, and Lean, through takt time, heijunka (level loading), standardized work, visual management, and total productive maintenance, ensures production is in tune with the marketplace. Finally, activities must be performed according to standardized work, continuous flow is the goal, and outcomes must be non-zero-sum.

Physics of sound and lean

The common denominator between music and Lean is time, which means the two share even deeper similarities than those presented thus far. Note, in contrast, that there is essentially no time relationship between music and batch-and-queue processing because of large cycle time mismatches and huge variations in queue time (hours to months or years) between operations. The decoupling of processing and time makes senior managers insensitive to time (Figure 1b) despite their exhortations to reduce lead-times, for example, which usually only results in speeding up the workers doing value-creating work – which Taylor (1947) explicitly warned against (1912 testimony to Congress) – and leaving queue times largely untouched.

Figure 3 shows the basic time functions in music and in Lean, which will be used to illustrate their relationship for a few production activities. In music, wavelength is reduced by half for each doubling in frequency, as shown in Table IV and Figure 4.

Domain	TIme function	Measure
Music	$\text{time} = \frac{1}{\text{frequency}}$	seconds / cycle
	$\text{frequency} = \frac{1}{\text{time}}$	cycles / second (Hz)
Music		beats / measure
Lean	$\text{cycle time} = \frac{1}{\text{frequency}}$	seconds / operation
	$\text{frequency} = \frac{1}{\text{cycle time}}$	operations / second
Lean	$\text{takt time} = \frac{\text{available operating time}}{\text{customer demand per day}}$	seconds / unit
	$\text{frequency} = \frac{1}{\text{takt time}}$	units / second

Figure 3.
Basic time functions in music and in Lean management

Thus, proceeding from middle C (C4) to the next higher octave (C5) results in a doubling of the frequency and a wavelength that is shorter by half, with no change in amplitude (A), and so on, as illustrated in Figure 4.

Time signature is a music notation that specifies the number of beats per measure, as well as the specific note value (e.g. eighth, quarter, whole) that constitutes one beat. Music is performed at a specified velocity, termed the tempo, measured in beats per minute, while part of the music score is often cyclic whereby all or part of the song repeats at various points (by same or other instruments) while still maintaining flow.

In Lean, the person or persons operating a production cell must cycle through their series of operations in some period of time, *T*. Their work performed through each cycle can be drawn as a sinusoid, phase shifted to eliminate negative values which

Note	Frequency (Hz)	Wavelength (cm)
C4	262	132
C#	277	124
D	294	117
D#	311	111
E	330	105
F	349	99
F#	370	93
G	392	88
G#	415	83
A	440	78
A#	466	74
B	494	70
C5	523	66

Table IV.
One octave range staring at middle C

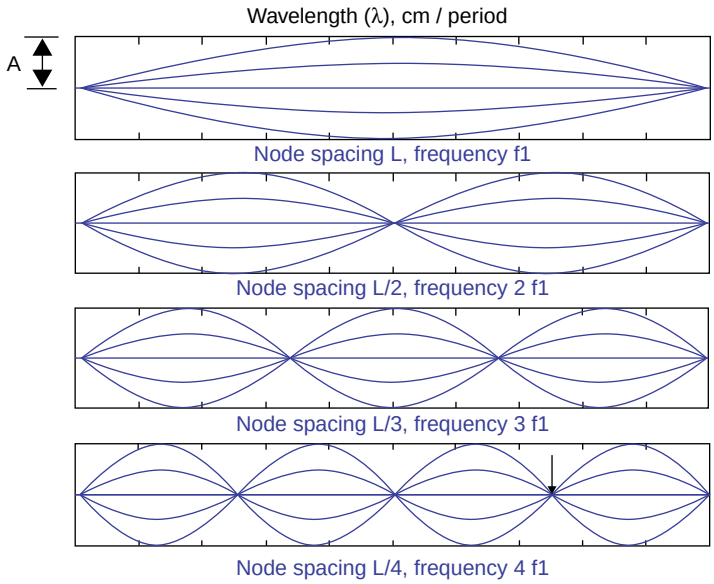


Figure 4.
Relationship between wavelength and frequency

Source: Peterson (2011)

would represent delays. In a moving assembly line, the floor typically has markings to signify the beginning and end of the cycle by which an operator must complete an operation, with additional markings between these to indicate the duration of specific tasks. This wavelength is a form of visual control to inform the worker of activities that have been completed and those that remain to be completed within the cycle time.

The velocity, v, of the assembly line is described by the equation, $v = f\,\lambda$, where f is the frequency and λ is the wavelength. A takt time of 56 seconds per unit yields a frequency of 0.0179 units per second. For a wavelength of 5.6 meters, the assembly line velocity is 0.1 meters per second, which is typical for an automobile assembly line. Thus, there is a direct analog between the speed of music (tempo) and the speed of a moving assembly line.

All businesses are subject to the macroeconomic business cycle – peak, recession, trough, expansion – every five to six years (NBER, 2012). Despite these ups and downs, healthy macro-economies typically grow at an average rate of 3 or 4 percent per year. The fluctuations in ordering patterns by customers within the business cycle can be represented by a sine wave whose amplitude is determined by the diameter of the circle that traces the sine wave. A circle whose diameter changes continuously over time (order fluctuation) is not good because it makes it very difficult to achieve consistently favorable results in operations; e.g. on-time delivery, low cost, and high quality. The purpose of takt time is to dampen the wave amplitude for a period of time – day, week, or month – using a simple averaging function to avoid over- and under-production. So instead of experiencing large peak-to-valley fluctuations in customer's ordering patterns, takt time helps create low rolling waves representing customer demand. This, coupled with heijunka, standardized work, visual management, and total productive maintenance, helps assure basic stability, which enables Lean companies to succeed on a more consistent basis.

Kanban in Lean management is a signaling system that tells people what to make, when to make it, how many to make, and where to deliver their product in a pull system. There are different types of kanbans (Monden, 1998), but the production kanban illustrates the cyclic nature of replenishment under steady state conditions created by using takt time, heijunka, etc. The kanban cycle time is expressed as (Monden, 1998, p. 284):

$$K_{\mathrm{ct}} = \frac{CN}{D} - L_T S_{\mathrm{P}}$$

where C is the order cycle, N is the number of kanban, D is the daily demand, L_T is the lead-time, and S_{P} is the safety period.

These simple examples illustrate the reason why Gary Convis and others describe what they see in a precisely timed and synchronized flow production system as musical. It flows – unlike batch-and-queue or hybrid batch-and-queue/flow processing where all or most of the queues remain, thereby preventing flow.

Discussion

Let us return to the question posed earlier: why is it so difficult for senior managers, and others, to correctly understand and practice progressive Lean management? Using music as an analogy for Lean management helps one better understand the magnitude of the challenge. Music takes years to understand, as does the Lean management system and, in particular, its two principles: "continuous improvement" and "respect for people." Learning, in both cases, is achieved by a combination of thinking (studying) and doing (practice), sustained over time by personal motivation and commitment (Emiliani, 2005).

The implications for management practice are profound in that effective Lean leadership is the result of long-term daily application of Lean principles and practice by managers at all levels. Empirically, we find that the organizations that experience the greatest success with Lean management are those where leaders at all levels engage in the daily application of Lean principles and practices (Person, 1929; Ohno, 1988; Emiliani *et al.*, 2007; Kenney, 2011). They engage in specific daily routines to develop their knowledge and capabilities of Lean principles and practices (Emiliani, 2008b; Rother, 2010). These leaders are able to lead their organization's practice of Lean management because they know Lean, just as conductors are able to lead musicians because they know music.

In contrast, we find that the organizations that experience the least success with Lean management are those whose leaders do nothing more than support Lean management (Schmidt, 2007; Roth, 2010; Aeppel, 2011; Carter *et al.*, 2011). This is often accompanied by a belief that knowing about something (Lean) is a viable substitute for actually doing it (Pfeffer and Sutton, 2000). Leaders continue their conventional management routines, which further entrenches batch-and-queue information processing and renders it impossible to achieve flow throughout the enterprise.

To further elaborate on the importance of doing in order to know Lean management, let us associate the "continuous improvement" principle to the treble clef and the "respect for people" principle to the bass clef of the grand staff of music for piano (Figure 5). Senior managers who want to "play" Lean must use both their right and left hands. Playing with their right hand alone, the "continuous improvement" principle, is not sufficient.

The "continuous improvement" principle may seem easy enough to master, but it is not. Most senior managers seek short-term improvements that have direct bottom-line

impact (Roth, 2010; Carter *et al.*, 2011). To achieve this outcome they take shortcuts. They, or their delegate (often, a consultant), will cherry-pick Lean tools and methods (Emiliani *et al.*, 2007; Johnson, 2008; Jargon, 2009; Carter *et al.*, 2011), invariably without understanding their purpose – either individually or how they relate to each other. The organization then receives a top-down directive to use Lean tools to improve the work done at lower levels, while senior managers continue working as they always have. One group of people is required to use certain Lean tools and methods every day, while the other – senior managers – is not. Short, classroom-based executive training programs on the use of Lean methods and tools lead managers to become overconfident in their knowledge of them, which results in misunderstandings and incorrect application (Roth, 2010).

As a result, senior managers cannot lead a Lean transformation because they do not know the subject matter well enough to lead. It is like asking a person who loves listening to piano, but who knows nothing about playing a piano, to teach others to play piano. Senior managers like "hearing" Lean "played" by others (usually right hand only), but are in no position to teach it because they do not know it (due to the absence of study and practice). In most cases, senior managers cannot even play a few easy notes with their right hand, but they can always hum the tune – i.e., say the buzzwords and feign support for Lean.

In their rush to cut costs, most senior managers lay off workers as a result of process improvement. This action reflects a fundamental misunderstanding of Lean management, whose actual purpose is to grow and improve a business operating in competitive markets (Taylor, 1947 (1912 testimony to Congress); Ohno, 1988; Basu, 1999; Emiliani *et al.*, 2007). Further, senior managers commonly treat as optional the "respect for people" principle. This principle is an expression of the requirement that management decisions and outcomes among key business stakeholders must be non-zero-sum (win-win), not zero-sum (win-lose). In this context, non-zero-sum does not mean perfect win-win outcomes. It means that stakeholders may not win as much as they would like, but they will not lose as much as they could. In other words, it is critical that management consistently achieves balanced outcomes.

Continuous improvement will rapidly degenerate into discontinuous improvement if people are harmed. This was well-known long ago by progressive management's pioneers (Cooke-Taylor, 1891; Person, 1929; Taylor, 1947 (1912 testimony to Congress); Woollard, 1954; Ohno, 1988). This cause-and-effect should be obvious to senior managers but it normally is not. Thus, a company winning at its employees' or suppliers' expense reflects a senior management that is unaware of or does not care about the "respect for people" principle. The left hand, therefore, is not even used, thus assuring management decisions and outcomes are always zero-sum. One must use both hands to play piano and to practice Lean management.

The absence of the "respect for people" principle means that senior managers are not actually practicing Lean management. Instead they are continuing their long-

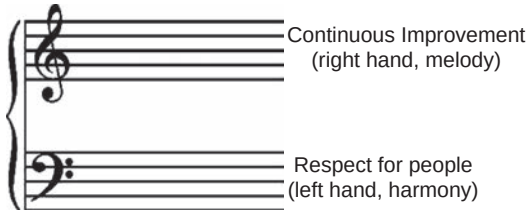


Figure 5.
Grand staff of a music score for piano

established conventional management practices with the addition of selected Lean tools and methods. This has been dubbed "fake Lean" (Emiliani, 2001) or "imitation Lean" (Emiliani, 2005), and "L.A.M.E." (Lean as misguidedly executed) (Graban, 2007), to distinguish it from those who make sincere efforts to understand and correctly practice Lean management. The widespread existence of "fake Lean" in organizations causes great confusion, and may also explain why there has been little in the way of new Lean practices since the early 1980s (Emiliani, 1998, 2004).

The fact that the "respect for people" principle is widely ignored by senior managers is a weakness in need of correction. Most people are right handed and have at least some level of capability in applying the "continuous improvement" principle, faulty though it may be. The left hand, representing the "respect for people" principle, is clearly weak and needs work. So how do you correct weaknesses? When a serious musician recognizes a weakness, they immediately correct it by breaking down the problem into its component parts and studying the problem carefully. Weaknesses are corrected one-by-one as part of one's daily music practice, and include specific exercises to improve performance. Practice, in this context, is deliberate in order to achieve an objective such as improved technical playing ability. Practice is not haphazard in the hope of improving one's technical playing ability, as nuances and details in music cannot be mastered in this way. Likewise, managers must deliberately practice specific numerous aspects of Lean to steadily improve their leadership and management capabilities.

Serious musicians will practice some 10,000 hours over the course of many years to become credible and proficient (Levitin, 2006, p. 197). Senior managers must do the same. They too must practice Lean management, both principles simultaneously, for 10,000 hours (Emiliani, 2008b, c) – not each principle as a separate activity. They must do this as an integral part of their daily work, and emphasize the "respect for people" principle because that is their primary weakness. If they do this, then senior managers will become credible and somewhat proficient in four to five years (Emiliani *et al.*, 2007; Liker and Hoseus, 2008, p. 19), and will have accomplished many positive things along the way. In addition to the "respect for people" principle, most senior managers have weaknesses related to specific practices in Lean management including: observation, root cause analysis, "go see," kaizen participation, visual workplace, teaching others, and making fact-based decisions (Liker, 2004; Emiliani, 2008a).

While the expectation for all classical pianists is to possess virtuoso capabilities (Tommasini, 2011), it is not a realistic expectation for all senior managers to become virtuoso Lean management practitioners. While many will hopefully become that, we should expect at least a very high level of understanding and capability among the men and women whose chosen profession is management. They should, at minimum, develop progressive Lean management capabilities that are at least equal to that of serious amateur musicians.

Unlike piano virtuosos who compete on the basis of sound – both technical and artistic capabilities – senior managers of publicly owned corporations often compete against each other on the basis of stock price appreciation during their tenure. This is akin to professional musicians competing on the basis of income rather than on making good music. Were senior managers to instead compete on the basis of management capabilities, practitioners of progressive management would no doubt put great pressure on practitioners of conventional management to improve their performance. Efforts to improve the value proposition for customers, improve processes, etc., would almost surely be followed by the increases in stock price that senior managers and investors covet (Maskell and Baggaley, 2003; Johnson, 2008).

It is difficult to characterize senior managers as professionals if they do not continuously improve their capabilities and compete on the fundamental basis of their profession: management. Continued use of the grim, unchallenging, and worn-out playbook of laying off people, closing plants and offices, squeezing suppliers' profit margin, etc., as methods for improvement illustrates how far management has yet to go to become a profession. Unfortunately, in most cases, management today more closely resembles Figure 1a and b, just as it did over 100 years ago.

Summary

This paper has shown the existence of many similarities between Lean management and music at depths ranging from shallow to deep. It compares the challenge of learning Lean management to the challenge of learning music and illustrates how Lean is a more precise way to manage (objective and scientific) compared to conventional management (subjective and artistic). It helps explain why so few companies possess a high-functioning Lean management system, inclusive of both the "continuous improvement" and "respect for people" principles, in the same way that few people can play music well. The daily practice that is required to achieve competency in music is typically missing in the practice of Lean management. This suggests that senior managers, unlike serious musicians, lack the motivation to persevere and learn Lean management over the course of many years – despite its potential for greatly improving customer satisfaction and achieving business objectives (Liker, 2004; Emiliani *et al.*, 2007).

This also suggests that it is very difficult for senior managers to recognize their own weaknesses in management practice, even when they are explicitly pointed out to them. It is common to hear senior managers with little actual Lean experience say "I'm beyond that" in reference to some aspect pertaining to Lean. For example, many senior managers will say they know all about 5S (sort, sweep, straighten, shine, and sustain), yet they have no idea how 5S relates to Lean principles, other Lean tools and methods, the interests of each stakeholder, and to financial performance (income statement and balance sheet). Most senior managers are vastly overconfident and confuse superficial knowledge with the deep knowledge that comes from daily practice. In contrast, weaknesses in one's understanding of music and playing skills would generally be obvious to a musician. Further, few musicians would be so bold as to say "I'm beyond that," knowing well that their knowledge of music and playing skills quickly erode when daily practice becomes infrequent or ceases.

It seems that the demands of both music and Lean management weed out the uninterested, the unwilling, the incapable, and the incompetent. Both disciplines seek people who are curious, studious, practical, motivated, and committed. Fortunately, one need not be an engineer to experience success with Lean. Exceptional Lean leaders have begun their career with backgrounds far removed from engineering, such as finance, accounting, economics, law, and science. The question, then, is what, if anything, can be done to increase the number of senior managers who are interested in becoming capable Lean leaders?

The comparison made in this paper between music and Lean management is meant, above all, to highlight the importance of daily practice by senior managers to learn and understand Lean management, to capably lead Lean transformations, and to recognize and correct problems in Lean thinking and practice among themselves and others. It also hopes to inspire current and future senior managers to personally engage in advancing the practice of management, which for over 100 years has largely remained the same.

Finally, while music and Lean management are similar in many ways, they do not share one important characteristic: Bad music does not harm people, while harm does come to people (stakeholders) when senior managers misunderstand and misapply Lean management. Therefore, it is important for managers to know what they are doing. In Taylor's 1912 testimony before the Special House Committee of Congress, in which he defended Scientific Management, he said (Taylor, 1947, p. 191):

> It ceases to be scientific management the moment it is used for bad.

The same is true for Lean management today. Do no harm.

Future research

The findings of this paper suggest different paths for future research with respect to the challenges that leaders face when confronted with the need to develop new daily practice routines. One possible line of future research includes interviewing leaders skilled in the practice of Lean management to determine the type and duration of daily practice, as well as the specific motivations and routines that enabled successful outcomes. These results can be compared to organizations whose leadership opted-out of daily practice and instead delegated continuous improvement efforts to lower levels. While comparison of economic outcomes between such organizations is tempting, it is not a good basis for comparison because financial metrics can be easily manipulated to show success. A better basis for comparison is the social outcomes in organizations among both leaders and followers. This can include employee engagement, employee satisfaction, learning, innovation, motivation, morale, employee suggestions, efficacy of problem solving, etc. Another possible line of research could be to determine the ways in which the "respect for people" principle is recognized and applied by leaders in organizations whose Lean transformation has been successful compared to those who have not, and specific practice routines that enabled successful outcomes.

References

Aeppel, T. (2011), "For lean factories, no buffer", *The Wall Street Journal*, April 29.

Arnold, H. and Faurote, F. (1919), *Ford Methods and the Ford Shops*, The Engineering Magazine Co, New York, NY, Originally published in *The Engineering Magazine* in 1915.

Ashley, T. (2005), *Learn to Read Music in 10 Lessons*, Barnes & Noble, New York, NY.

Basu, S. (1999), *Corporate Purpose: Why it Matters More Than Strategy*, Routledge, New York, NY.

Bhuiyan, N., Baghel, A. and Wilson, J. (2006), "A sustainable continuous improvement methodology at an aerospace company", *International Journal of Productivity and Performance Management*, Vol. 55 No. 8, pp. 671-687.

Bureau of Labor Statistics, US Department of Labor (2011), *Occupational Outlook Handbook 2010-11 Edition*, BLS, Washington, DC, Top Executives, available at: www.bls.gov/oco/ocos012.htm (accessed August 19, 2011).

Carter, B., Danford, A., Howcroft, D., Richardson, H., Smith, A. and Taylor, P. (2011), "Lean and mean in the civil service: the case of processing in HMRC", *Public Money & Management*, Vol. 31 No. 2, pp. 115-122.

Collier, J. (2006), "Can toyota keep on truckin'?", *Detroit Free Press*, November 13.

Cooke-Taylor, R.W. (1891), *Modern Factory System*, Kegan Paul, Trench, Trubner & Co Ltd, London, pp. 459-461.

Davis, E. (2001), "ACE implementation at united technologies corporation: Otis elevator (A)", Darden Case No. UVA-OM-0905, Darden Business Publishing, University of Virginia, Darden School of Business, Charlottesville, VA.

Elkind, P., Reingold, J. and Burke, D. (2011), "Inside Pfizer's palace coup", *Fortune*, July 28, available at: http://features.blogs.fortune.cnn.com/2011/07/28/pfizer-jeff-kindler-shakeup/ (accessed August 15, 2011).

Emerson, H. and Naehring, D. (1988), *Origins of Industrial Engineering: The Early Years of a Profession*, Industrial Engineering and Management Press, Norcross, GA.

Emiliani, B. (2008a), *Practical Lean Leadership*, The CLBM, LLC, Wethersfield, CT.

Emiliani, B. (2008b), "Standardized work for executive leadership", *Leadership and Organizational Development Journal*, Vol. 29 No. 1, pp. 24-46.

Emiliani, B. (2011), *Moving Forward Faster*, The CLBM, LLC, Wethersfield, CT.

Emiliani, B., Stec, D., Grasso, L. and Stodder, J. (2007), *Better Thinking, Better Results: Case Study and Analysis of an Enterprise-Wide Lean Transformation*, 2nd ed., The CLBM, LLC, Wethersfield, CT.

Emiliani, M. (2008c), *Real Lean: Learning the Craft of Lean Management, Volume Four*, The CLBM, LLC, Wethersfield, CT.

Emiliani, M.L. (1998), "Lean behaviors", *Management Decision*, Vol. 36 No. 9, pp. 615-631.

Emiliani, M.L. (2001), "Lecture notes for the course 'Leadership and Organizational Improvement'", Rensselaer Polytechnic Institute, Hartford, CT.

Emiliani, M.L. (2004), "Using value stream maps to improve leadership", *Leadership and Organizational Development Journal*, Vol. 25 No. 8, pp. 622-645.

Emiliani, M.L. (2005), "Leaders lost in transformation", *Leadership and Organizational Development Journal*, Vol. 26 No. 5, pp. 370-387.

Emiliani, M.L. (2008d), "The equally important 'respect for people' principle", *REAL LEAN: The Keys to Sustaining Lean Management, Volume Three*, The CLBM, LLC, Wethersfield, CT, available at: www.bobemiliani.com/goodies/respect_for_people.pdf (accessed August 15, 2011).

Fujimoto, T. (1999), *The Evolution of a Manufacturing System at Toyota*, Oxford University Press Inc, New York, NY.

Gilbreth, F.B. (1911), *Motion Study: A Method for Increasing the Efficiency of the Workman*, D. Van Nostrand Company, New York, NY.

Graban, M. (2007), "Lean or LAME?", Leanblog.org blog, March 21, available at: www.leanblog.org/2007/03/lean-or-lame/ (accessed August 17, 2011).

Hopkins, F. (1994), *The Symphony of Manufacturing*, Oakland Consulting Group Press, Oakland, CA.

Hopp, W. and Spearman, M. (2001), *Factory Physics*, 2nd ed., McGraw-Hill, New York, NY.

Imai, M. (1986), *Kaizen: The Key to Japan's Competitive Success*, Random House, New York, NY.

Imai, M. (1997), *Gemba Kaizen*, McGraw-Hill, New York, NY.

Jargon, J. (2009), "Latest Starbucks buzzword: 'Lean' Japanese techniques", *The Wall Street Journal*, August 4.

Johnson, T. (2008), *Profit Beyond Measure*, Free Press New York, NY.

Kenney, C. (2011), *Transforming Healthcare: Virginia Mason Medical Venter's Pursuit of the Perfect Patient Experience*, Productivity Press, New York, NY.

LEI (2008), *Lean Lexicon*, 4th ed., Lean Enterprise Institute, Cambridge, MA, pp. 99-100.

Levitin, D. (2006), *This is Your Brain on Music*, Plume, New York, NY.

Liker, J. (2004), *The Toyota Way*, McGraw-Hill, New York, NY.

Liker, J. and Hoseus, M. (2008), *Toyota Culture*, McGraw-Hill, New York, NY.

Maskell, B. and Baggaley, B. (2003), *Practical Lean Accounting*, Productivity Press, New York, NY.

Monden, Y. (1983), *Toyota Production System*, 1st ed., Engineering and Management Press, Norcross, GA.

Monden, Y. (1998), *Toyota Production System*, 3rd ed., Engineering and Management Press, Norcross, GA.

Monden, Y. (2008), " 'Toyota Production System: Professor Monden (Part One),' Prof Monden's response to the interview question, 'What is your personal definition of the TPS?' ", available at: www.lean-manufacturing-japan.com/interviews/toyota-production-system-part1.html (accessed August 27, 2011).

NBER (2012), "US business cycle expansions and contractions", the National Bureau of Economic Research, available at: www.nber.org/cycles.html (accessed February 20, 2012).

Ohno, T. (1988), *Toyota Production System*, Productivity Press, Portland, OR.

Person, H.S. (1929), "Leadership in Scientific Management", in Person, H.S. (Ed.), *Scientific Management in American Industry*, The Taylor Society, Harper and Brothers Publishers, New York, NY, pp. 427-439.

Peterson, M. (2011), "The vibrating string", Lecture notes, Mount Holyoke College, South Hadley, MA, available at: www.mtholyoke.edu/~mpeterso/classes/galileo/interval.html (accessed July 17, 2011).

Pfeffer, J. and Sutton, R. (2000), *The Knowing-Doing Gap*, Harvard Business School Press, Boston, MA.

Roth, G. (2010), "United Technologies Corporation Achieving Competitive Excellence (ACE) operating system case study", Lean Advancement Initiative case study, Massachusetts Institute of Technology, Cambridge, MA, November 30.

Rother, M. (2010), *Toyota Kata*, McGraw-Hill, New York, NY.

Schmidt, M. (2007), "The lean challenge", MS degree, Central Connecticut State University, School of Engineering and Technology, New Britain, CT, December.

Schwartz, M. and Fish, A. (1998), "Just-in-time inventories in old Detroit", *Business History*, Vol. 40 No. 3, pp. 48-71.

Shimokawa, K. and Fujimoto, T. (2009), *The Birth of Lean*, The Lean Enterprise Institute, Cambridge, MA, This book, *The Birth of Lean*, is improperly titled because the birth of Lean (flow) production pre-dates Toyota Motor Corporation. The book should have instead been titled: *The Birth of Toyota's Production System*.

Shingo, S. (1981), *Study of Toyota Production System from Industrial Engineering Viewpoint*, Japan Management Association, Tokyo, Japan.

Sorensen, C., with and Williamson, S.T. (1956), *My Forty Years With Ford*, W.W. Norton & Company Inc, New York, NY.

Sugimori, Y., Kusunoki, K., Cho, F. and Uchikawa, S. (1977), "Toyota production system and Kanban system – materialization of just-in-time and respect-for-human system", *International Journal of Production Research*, Vol. 15 No. 6, pp. 553-564.

Taylor, F.W. (1903), "Shop management", *Transactions of The American Society of Mechanical Engineers*, Vol. XXIV No. 1003, pp. 1337-1456.

Taylor, F.W. (1911), *The Principles of Scientific Management*, Harper & Brothers Publishers, New York, NY.

Taylor, F.W. (1947), *Scientific Management: Comprising Shop Management, Principles of Scientific Management, Testimony before the House Committee*, Foreword by Harlow S. Person, Harper & Brothers Publishers, New York, NY.

Tommasini, A. (2011), "Virtuosos becoming a dime a dozen", *The New York Times*, August 12, p. AR1.

Toyota (2001), "The Toyota way 2001", internal document, Toyota Motor Corporation, Toyota City, Nagoya.

Tsutsui, W. (1998), *Manufacturing Ideology: Scientific Management in Twentieth-Century Japan*, Princeton University Press, Princeton, NJ.

USCB (2011), *US Census Bureau, Statistical Abstract of the United States: 2011*, Section 26: Arts, Recreation, and Travel, Table 1239 USCB, Washington, DC, 764pp., available at: www.census.gov/prod/2011pubs/11statab/arts.pdf (accessed August 19, 2011).

Voreacos, D., Nussbaum, A. and Farrell, G. (2011), "Johnson & Johnson's quality catastrophe", *Bloomberg BusinessWeek*, March 31, available at: www.businessweek.com/magazine/content/11_15/b4223064555570.htm (accessed August 15, 2011).

Womack, J. (2003), "In search of the perfect process", Lean Enterprise Institute, Monterrey, May 8, available at: www.lean.org/admin/km/documents/35326d85-8a5a-45d0-a505-a66caae07852-NewMonterreyMexico.pdf (accessed August 15, 2011).

Womack, J. and Jones, D. (1996), *Lean Thinking*, Simon & Schuster, New York, NY.

Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World*, Rawson Associates, New York, NY.

Woollard, F.G. (1954), *Principles of Mass and Flow Production*, Iliffe & Sons Ltd, London, OSC, Republished in USA as: Woollard, F.G. (1955), *Principles of Mass and Flow Production*, Philosophical Library Inc, New York, NY.

Woollard, F.G. and Emiliani, B. (2009), *Principles of Mass and Flow Production*, 55th Anniversary Special Reprint Edition The CLBM, LLC, Wethersfield, CT.

Yasuda, Y. (1991), *40 Years, 20 Million Ideas: The Toyota Suggestion System*, Productivity Press, Cambridge, MA.

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Engaging faculty in Lean teaching

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Introduction

The core value-creating activity in higher education is teaching, yet the basic methods used by the faculty to teach have undergone little change for many decades. Where improvements in teaching are made, such as “flipped classrooms” and “blended learning”, the specific improvement ideas or methods are derived principally from within the domain of adult learning theory and research. External challenges to current methods are rare and often quickly rejected.

Traditional and newer teaching pedagogies can have the appearance of effectiveness based on empirical evidence such as test scores or student feedback. However, these pedagogies may continue using assessment methods that limit or reduce student learning. For example, students who exhibit acceptable critical thinking skills in the classroom often fail to exhibit these skills post-graduation, leading to many problems in the workplace and society. Traditional and newer teaching pedagogies also lack any unifying framework or principles to assure focus on students and guide faculty’s improvement efforts and decision-making. For these reasons, the Lean teaching pedagogy is an attractive alternative to traditional and newer methods.

Lean teaching is the application of Lean principles and practices to teaching (Emiliani, 2013). Lean principles are “Continuous Improvement” and “Respect for People”, while Lean practices are the tools and methods commonly associated with the Toyota production system (Monden, 1983; Ohno, 1988; Womack *et al.*, 1990; Liker, 2004; Kato and Smalley, 2011). The purpose of Lean teaching parallels the purpose of Lean management[1][2], as used in organizations, which is to improve the value of goods and services (higher education) for end-use customers (students, payers, employers and society) (Womack and Jones, 2003). This is achieved, in part, by improving processes through eliminating waste, unevenness and unreasonableness (Ohno, 1988). The result is improved flow and quality, lower costs and higher throughput – all of which are relevant to higher education. Importantly, improvement must be made in non-zero-sum (win-win) ways, not only to gain support for improvement but also to assure that Lean does not harm any stakeholder.

A recent survey indicates that teaching processes contain many different types of errors that detract from students’ learning experience and their perceptions of quality and value (Emiliani, 2014a). Another survey identified what constitutes quality teaching from current and former students’ perspectives (Emiliani, 2014b). Combined, these survey results indicate that traditional teaching methods are unsatisfactory and that students view progressive teaching methods as significantly better.

The question, then, is who leads efforts to improve teaching? Is it the responsibility of individual faculty, department chairs, deans of schools, provosts or university presidents? It is, of course, a shared responsibility. However, getting diverse faculty and administrators to agree on a relatively unknown approach to improving teaching is a great challenge. Though it is a worthy challenge, the prospects for success are low if approached from the bottom-up, with faculty appealing to leadership. Empirical evidence indicates that leading organizational change from conventional management to Lean management requires leadership of a progressive type not commonly found in industry (Emiliani *et al.*, 2007; Kenney, 2011; Byrne, 2012), let alone in higher education.

Discussion

University leaders who are committed to Lean management across the enterprise, both in teaching and administration (Balzer, 2010), must devote themselves to learning Lean management through the daily application of its principles and practices (Emiliani, 2012). The fundamental premise is that leaders cannot lead people in something that they know nothing about, just as a physician cannot teach a medical student how to repair an injury if the physician has not done it many times before. Practical disciplines such as teaching require one to learn from others.

Top university leaders are not ready-made Lean leaders, which poses a challenge for both leaders and followers. Leaders with 30 or more years of experience in higher education may prefer traditional teaching methods and lack motivation to learn substantially new ways of thinking and doing things. Further, learning Lean principles and practices requires leaders to

participate in process improvement activities, thrusting them into a position of a non-expert. Most senior leaders find this very uncomfortable, so they seek to avoid participation and instead delegate process improvement to others. And, as a result of biases and misunderstandings, many leaders may view progressive Lean teaching as detrimental to students or the university.

Faculty may have no interest in Lean teaching because they have been successful without it, or, like university administrators, refuse to be put into a position of a non-expert. Other faculty will surely resist for its own sake, to establish one's own authority and autonomy in the classroom, or because of disdain for improvement methods that originated in industry and, thus, lack standing in relation to adult learning research.

However, faculty, being front-line workers, might embrace Lean teaching as a means to improve student learning outcomes and achieve substantial reductions in teaching errors. In other words, faculty may see an opportunity to better satisfy students and make their own jobs less complex and more enjoyable (Emiliani, 2004). Most people would like the opportunity to make their job easier, while, at the same time, produce a better result. Faculty are unlikely to be an exception.

Faculty who see opportunity in Lean teaching may want or expect leadership support for Lean teaching prior to making any commitment to it. Support generally comes in two forms: engaged leaders or limited casual (mostly verbal) support Emiliani, 2005). Or, there may be no support at all. The question then becomes, should individual faculty adopt Lean teaching in the absence of management support, even at the department level? What is the rationale for doing so, especially when there may be no extrinsic rewards? Is it worth the effort to do anything different from what one's peers are doing? Will doing so expose one to unnecessary, possibly career-damaging risks?

The answers to these questions are based on individual faculty's interests and motivations. Many will remain in conformity with tradition, deferring until the benefits of Lean teaching are proven to them, in every way conceivable, or until pressure to change becomes inescapable. Such faculty, however, should consider their responsibilities to the profession, which includes advancing one's capabilities, influencing others to improve (students and peers) and achieve demonstrable improvements in teaching over time.

Professional responsibilities suggest a bias for immediate action, not long-term inaction. That means to begin now and not wait for others to "get on board" – whether peers or top university leaders. If one begins Lean teaching now, then that will have an immediate positive impact on one's students – perhaps hundreds of students per year. Yes, it would be nice if students could learn and retain as much in other courses as they did in yours, but at least they learned and retained a lot in your course. That outcome is good enough for now, but it is certainly not good enough for ever. One faculty engaged in Lean teaching is a good starting point from which to gain experience and build upon. From that comes the needed story-telling that helps other faculty overcome their biases and concerns.

It is human nature to strive for a bigger impact. The goal should indeed be multiple faculty that embrace Lean teaching – in a department, school or the entire university – along with enthusiastic support from engaged administrators. However, it is wise to be pragmatic and recognize this as a building process, from one person, to two persons, to three persons, to a team of faculty, and that this will occur over time. The logic and benefits of Lean teaching that are so clear to one may be utter nonsense to another. Difficulties found on an individual basis multiply on a group basis. Therefore, different strategies must be developed and applied to close these large gaps. Again, this is where leadership matters the most (Byrne, 2012).

It is also human nature to strive to achieve a lasting impact. The history of progressive management informs us well. We know with certainty that changes in leadership (Emiliani *et al.*, 2007) are a primary cause of backslide or abandonment of Lean management. A lasting impact can only be achieved if new leadership shares a constancy of purpose (educating students), method (pedagogy) and management practice (Lean). Universities will have to develop internal training programs for both faculty and administrators, and be committed to the training. Top leaders must never say "this costs too much" or "we can stop now because Lean teaching is in our DNA". Lasting impact comes from lasting effort.

Conclusion

The core value-creating activity in higher education is teaching. To that end, much is known about students', parents' and employers' dissatisfaction with higher education:

- its cost;
- academic and administrative processes;
- teaching, learning outcomes; and
- workplace preparedness.

The typical forms of remediation undertaken by faculty and administrators in recent decades have proven to be inadequate. The future challenges facing both students and higher education demands fundamental yet practical reforms. Educators can continue to reject improvement methods born in industry, or they can begin the process of scholarly inquiry, for which they are well equipped, to understand the principles and practices of Lean management and how to apply them to improve teaching – for the benefit of all.

While the benefits of Lean teaching may be greatest if all faculty in a department, school or university practice it, with support from engaged leadership, this desired future state will be difficult to achieve. Yet, the current state calls for immediate improvement in teaching (Emiliani, 2014a, 2014b) by any faculty member who is interested in doing so, despite risks and likely zero extrinsic rewards. If we are to believe that "students matter most", then no impediment is too great to restrain even one faculty from taking the initiative.

To delay improvement until a more desirable environment presents itself is unreasonable, unwise and a disservice to students. Further, beginning immediately starts the process of daily practice that one needs to develop the skills and capabilities that deliver greater benefits[3]. If students experience the Lean teaching pedagogy only once in their curriculum, then they will have at least gained an awareness of the differences between traditional teaching and progressive Lean teaching. Perhaps they will take what they learned in that one course and apply it to the challenges they face as employees or future managers. If so, some good will have been done.

References

Balzer, W. (2010), *Lean Higher Education: Increasing the Value and Performance of University Processes*, CRC Press, Boca Raton, FL.

Byrne, A. (2012), *The Lean Turnaround: How Business Leaders Use Lean Principles to Create Value and Transform Their Company*, McGraw-Hill, New York, NY.

Emiliani, B. (2008), *Practical Lean Leadership: A Strategic Leadership Guide for Executives*, The CLBM, LLC, Wethersfield, CT, p. 10.

Emiliani, B. (2012), *We Can Do It! Improving the Relevancy and Value of Higher Education Using Lean Management*, The CLBM, LLC, Wethersfield, CT.

Emiliani, B. (2013), *The Lean Professor: Become a Better Teacher Using Lean Principles and Practices*, The CLBM, LLC, Wethersfield, CT.

Emiliani, B. (2014a), "Teaching survey's – interim results", The Lean Professor blog post, 5 January, available at: http://leanprofessor.com/blog/2014/01/05/teaching-surveys-interim-results/ (accessed 9 June 2014).

Emiliani, B. (2014b), "What is good quality teaching? – Survey results", The Lean Professor blog post, 13 February, available at: http://leanprofessor.com/blog/2014/02/13/good-quality-teaching-survey-results/ (accessed 9 June 2014).

Emiliani, B., Grasso, L., Stec, D. and Stodder, J. (2007), *Better Thinking, Better Results: Case Study and Analysis of an Enterprise-Wide Lean Transformation*, 2nd ed., The CLBM, LLC, Wethersfield, CT.

Emiliani, M.L. (2004), "Improving business school courses by applying lean principles and practices", *Quality Assurance in Education*, Vol. 12 No. 4, pp. 175-187.

Emiliani, M.L. (2005), "Using kaizen to improve graduate business school degree programs", *Quality Assurance in Education*, Vol. 13 No. 1, pp. 37-52.

Kato, I. and Smalley, A. (2011), *Toyota Kaizen Methods: Six Steps to Improvement*, CRC Press, Boca Raton, FL.

Kenney, C. (2011), *Transforming Health Care: Virginia Mason Medical Center's Pursuit of the Perfect Patient Experience*, CRC Press, Boca Raton, FL.

Liker, J. (2004), *The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer*, McGraw-Hill, New York, NY.

Monden, Y. (1983), *Toyota Production System: Practical Approach to Production Management*, Engineering and Management Press, Norcross, GA.

Ohno, T. (1988), *Toyota Production System – Beyond Large-Scale Production*, Productivity Press, Portland, OR.

Toyota (2001), "The Toyota way 2001", Internal document, Toyota Motor Corporation, Toyota.

Womack, J. and Jones, D. (2003), *Lean Thinking: Banish Waste and Create Wealth in Your Corporation*, 2nd ed., Free Press, New York, NY.

Womack, J., Jones, D. and Roos, D. (1990), *The Machine that Changed the World: The Story of Lean Production*, Rawson Associates, New York, NY.

Notes

1. The term "Lean management" can be considered as the sum of The Toyota Way, "Continuous Improvement" and "Respect for People" (Toyota, 2001) and the tools and methods of Toyota's production system (Monden, 1983; Ohno, 1988; Womack *et al.*, 1990; Liker, 2004; Kato and Smalley, 2011).
2. Lean management is defined as: a non-zero-sum principle-based management system focused on creating value for end-use customers and eliminating waste, unevenness and unreasonableness using the scientific method (Emiliani, 2008).
3. By way of analogy, you learn how to play an instrument before starting a band. It makes no sense to require a band be formed as a prerequisite to learning how to play an instrument.

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