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15. **"Supporting Small Businesses in their Transition to Lean Production,"** *Supply Chain Management: An International Journal*, Vol. 5, No. 2, 2000, pp. 66-70.
16. **"The Making of a Lean Aerospace Supply Chain,"** *Supply Chain Management: An International Journal*, Vol. 4, No. 3, 1999, pp. 135-144.

## 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

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.

- 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 absorbed 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.

## 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

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

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

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



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

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.

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## Insight from industry

# Business-to-business online auctions: key issues for purchasing process improvement

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### Keywords

Supply-chain management, Business-to-business marketing, Lean production, Auctions, Internet

### Abstract

Describes the process for conducting downward price business-to-business online auctions over the Internet for direct material purchasing and presents common issues, process improvement opportunities, and the interpretation of auction results. Comparisons are made between online auctions and traditional procurement process. Also discussed are stakeholder reactions and the organizational issues generated when online auctions are introduced to traditional purchasing organizations, as well as the benefits to buyers and sellers. The author proposes that online auctions will delay the adoption of modern supply chain management methods and the implementation of lean production that are needed by both buyers and suppliers in order to truly eliminate waste and reduce total costs.

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## Introduction

The traditional purchasing process leaves much to be desired, as it is neither efficient nor effective. For most large manufacturing companies, purchased materials and services can represent 55-75 per cent of their cost of goods sold (Monczka *et al.*, 1998). As a result, many companies have adopted strategic supply chain management practices that may include supplier development activities whose objective is to better align operating practices between buyer and seller (Lamming, 1996). If executed well, buyer and seller will share savings and enjoy improved quality and delivery performance, as well as opportunities to expand the relationship into other products and value-added services. However, supplier development requires a financial investment whose return can be difficult to quantify, and many executives in traditional manufacturing businesses believe that it is the responsibility of the supplier to improve without assistance from the buyer. In addition, it takes time to re-orient a business from traditional purchasing to effective supply chain management (Lamming, 1996). Such conditions favor the eventual failure of supply chain management initiatives and regression to traditional purchasing practices (Handfield *et al.*, 2000).

Large publicly held businesses that do not enjoy significant annual top line growth rely heavily upon cost reduction to achieve financial goals. The task of senior management then is to find ways of achieving cost reduction at an accelerated rate. Since purchased materials and services constitute such a large portion of the cost of goods sold, it is logical that they would apply continuous pressure to suppliers. Indeed, it is well known that suppliers are often forced to comply with a buyer's cost reduction target in order to continue receiving orders. It works, it's quick, it gets the job done, but nobody likes it and it does not generate an understanding of the root causes of poor performance. So what are the alternatives? How can a business not fully dedicated to supply chain management and supplier development (Nelson *et al.*, 1998; Bounds *et al.*, 1996; Bounds, 1996) reduce the cost of purchased materials at a faster rate

This paper is based largely on commercial experience gained by the author while employed as a commodity manager in the aerospace industry.

than is normally attainable by traditional purchasing methods?

For the last few decades, the purchasing process for direct material in most US companies has followed a well-worn traditional path (Monczka *et al.*, 1998). The total process cycle time typically ranges from weeks to several months depending upon the purchasing control system, product type, responsiveness of individual buyers, supplier location, electronic communication system, etc. This represents the essence of traditional competitive bidding and order fulfillment process.

The purchasing process for custom components tends to be elaborate, time-consuming, and transaction-intensive, so it is not unusual for senior executives to sponsor teams to undertake efforts to study and implement improvements. Certain activities can be automated using computer systems to reduce the number of people engaged in the process, from order taking to distributing information. They may also negotiate with suppliers to establish long-term agreements for specific parts. In addition, buyers may seek to reduce the number of suppliers and concentrate purchase volumes with fewer, more capable suppliers. Supplier rationalization can be an emotional event, as individual buyers tend to favor certain suppliers and may impose subtle barriers to rationalization.

One of the most time-intensive activities in the purchasing process is price negotiation, particularly for large volumes of spend such as in a multi-year long-term agreement. An agreement over quality and delivery performance targets is often easier to achieve since buyer and seller may be better aligned toward these goals. In the absence of threats, it can take months to reach agreement over the price, especially if production volumes are known to be erratic. Moreover, the supplier is generally left with the task of figuring out how best to achieve the savings, which can be a daunting task for small and mid-sized suppliers who often view themselves as having very limited resources. In recent years, business-to-business auctions over the Internet have emerged as one option to reduce purchasing costs.

### **Business-to-business online auctions**

Business-to-business online auctions are downward pricing, or reverse auctions

performed in real time over the Internet or through a private network (Vigoroso, 1999; Baatz, 1999). An intermediary accepts bids on behalf of a corporate purchaser for goods or services provided by current or new suppliers using proprietary software. The model for business-to-business online auctions of industrial parts, raw materials, and commodities was pioneered by a company called FreeMarkets Inc. in 1995. The business grew slowly for two years, then grew at an appreciably higher rate starting in 1998 as a result of major contracts with General Motors and United Technologies Corp., culminating in an initial public offering in December 1999 that raised \$172.8 million in capital (FreeMarkets, 1999; Hennessey, 1999).

Companies that compete in business-to-business online auction marketplace include Ariba, CommerceOne, EDS/AT Kearney, FreeMarkets Inc., and VerticalNet, (Web Sites, 2000). The service that these companies provide is called “market making”, while the company itself is often referred to as the “market maker” because they match buyers and sellers in electronic marketplaces. These intermediaries create well-defined rules of engagement for online auctions and also provide related value-added services such as market analysis, consultation, and bid analysis. The core skills of intermediaries are information technology, commodity management and an understanding of point-to-point buyer-seller interactions. Companies may specialize in business-to-business online auctions for indirect materials such as shop consumables, direct material such as custom-designed components, or commodities such as coal, raw materials, temporary staffing, computers, office supplies, transportation, etc.

Many large US corporations, including AlliedSignal, Caterpillar, Emerson Electric, Frigidaire, General Motors, Owens-Corning, PepsiCo, Proctor & Gamble, Quaker Oats, United Technologies Corporation, Westinghouse, and Whirlpool, as well as the Commonwealth of Pennsylvania, have utilized online auctions to procure goods and services. Major corporations in the EU are also discovering this purchasing method and many will surely give it a try. The potential market is vast and includes the Global 1000 corporations. Why? Because online auctions can achieve gross savings

ranging from 5-40 per cent (Tully, 2000), with an average of 15-20 per cent gross savings being more typical (Cohn, 2000). This is a significant reduction in the cost of purchased material, which in turn directly reduces the cost of goods sold. For a business earning 20 per cent gross margin, a US\$1 reduction in costs is the same as increasing the top line sales by US\$5. Many businesses have anemic top line growth or are not able to raise prices in competitive markets. This makes cost reduction a much more attractive alternative.

Online auctions work best where there are many suppliers with available capacity and the buyer has leverage or otherwise dominates the relationship. It is particularly effective for custom-designed machined parts, stampings, injection molded parts, and electronic components where gross savings of 15-20 per cent are typically achieved. But even 2 per cent savings can be significant if the spend is large enough. This is what happens in commodity markets with only a handful of producers. An electric generating plant that saves 2 per cent in the cost of coal over a one year period would appear to be quite successful at managing input costs. Companies that spend a large amount of money on ground transportation to distribute goods would do well to save 4 per cent. So how does it work?

### The business-to-business online auction process

Figure 1 shows a typical online auction process, from project start to bid day. The first four steps are classical commodity management activities. Most buyers are fully capable of performing this work with themselves. The intermediary adds value by:

- maintaining process discipline to ensure that key milestones are achieved;
- creating a thorough and accurate request for quote; and
- providing expertise in analyzing commodities and markets.

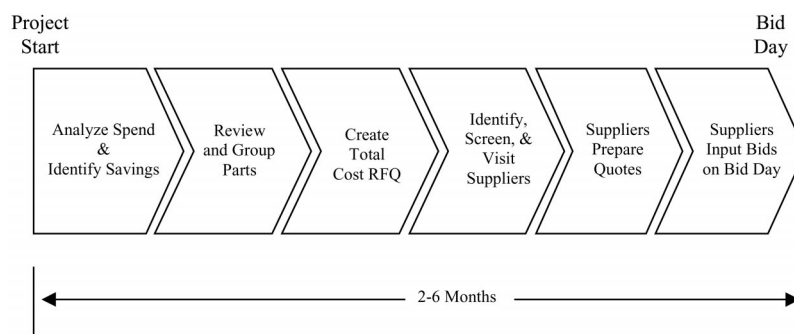
The RFQ is much better than what the buyer alone would typically prepare, thus enabling suppliers to calculate their prices more accurately.

The process begins with the formation of a cross-functional team whose responsibility is to analyze a commodity such as custom-designed machined components. The team consists of representatives from the buying organization as well as the market maker. They will gather many different types of data from existing sources to establish the current condition of the commodity, including:

- quality performance;
- delivery performance;
- spend data from accounts payable;
- production schedule;
- commodity codes;
- business impact;
- supply/market complexity;
- constraints;
- leverage opportunities.

This data will be used to help formulate sourcing strategies appropriate to the commodity. Spend data is analyzed using Pareto charts which will result in the formation of sourcing groups such as small, medium, and large machined parts. Blueprints and specifications are gathered and analyzed in order to create smaller sub-groups that contain parts with similar characteristics such as size range or configuration (i.e. flanges, pipe fittings, bushings, etc.). It is preferable if the sub-groups are categorized by the primary manufacturing processes such as mill, turn/mill, or turn/mill/drill. The

Figure 1 The business-to-business on-line auction process



sub-groups are then categorized into smaller groups called “lots”, typically 10-100 part numbers in size and comprising an annual spend of US\$100,000-1,000,000. The team will normally prepare 10-20 lots for bidding. It is critical that lotting be performed very well as it helps suppliers recognize which parts fit their core competencies and creates the foundation for successful online auctions.

The team then identifies suppliers that are capable of performing the work and prepares a bid list. The bid list typically consists of a mix of suppliers that currently do business with the buyer as well as new suppliers, and may contain up to 50 or 60 suppliers. Astute teams will be sure to include suppliers that practice lean production. Key team members will visit new suppliers to evaluate their management, quality system, delivery performance, capacity, production system, equipment, facilities, etc.

A comprehensive request for quote is then sent to suppliers, which includes blueprints, specifications, and other relevant documentation, contract terms and conditions, performance goals, service requirements, freight information, as well as instructions, bid date and time, etc. Every supplier receives exactly the same information and the same requirements at the same time. The field is thus leveled, which will result in a better comparison of prices that are posted on bid day. Suppliers are given 15-45 days to evaluate the request for quote and develop pricing, depending upon the number and complexity of parts. Missing technical data will slow down the process and likely result in poor auction results. It is at this point that some suppliers decline further participation. The reasons vary, but are typically due to other commitments that they must honor or the parts do not fit their core competency. At this point, the bid list may be down to 25-30 interested suppliers.

The team communicates with suppliers throughout the blueprint review process to ensure that parts were lotted correctly. Low volume lots or incorrectly lotted parts may be put aside and bid off-line at a later date. The team will also train the supplier in the software used to manage the online auction event, auction rules, tactics to avoid, etc. As bid day approaches, suppliers work to finalize part and lot pricing, and determine the price at which they will cease bidding. Suppliers should refrain from revising their final offer

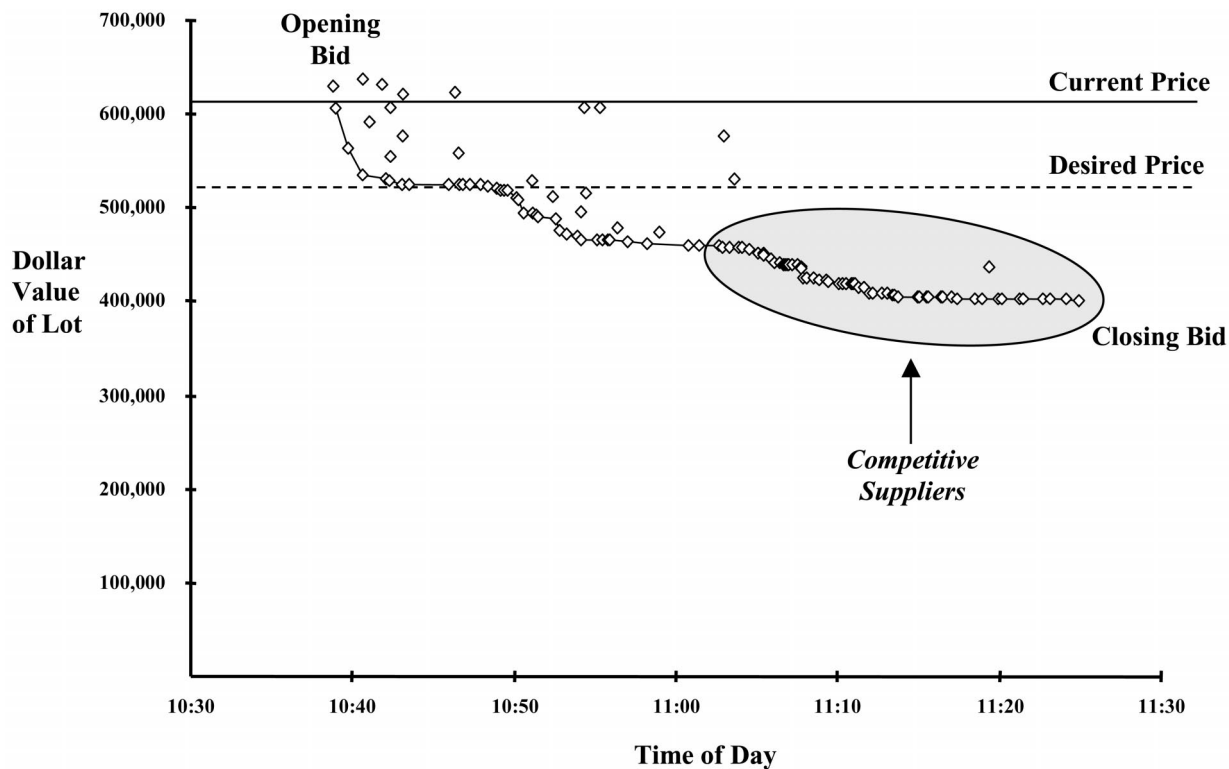
downward during the online auction since irrational decisions are not likely to serve the supplier’s interests. The bid list may now be down to 20-25 suppliers.

The suppliers are instructed to log onto the market maker’s network at a certain day and time. Bidding commences starting with lot one and continuing until all lots have been bid upon. Bidding for each lot ends at a specific time of day unless the level of activity near the end of the auction justifies extending the closing time. If there are more than ten lots, a second round of bidding will take place a day or two later. The actual number of suppliers that participate on bid day typically ranges from 10-20. It is characteristic that the supplier with the lowest bid will think that they have won the lot. But this is not necessarily true, as the buyer is not obligated to accept a bid, and many other factors affect the final award decision.

### Interpreting auction results

A record of bids is shown in Figure 2 for a selected group, or “lot”, of parts. The “current price”, also known as “historic” price, is the most recent price paid by the buyer for the parts contained within the lot. The “desired price”, also known as “reserve” price, is the price below which the lot must fall in order for the buyer to consider it worthwhile to source the parts to another supplier. The difference between current and desired price can thus represent switching costs. The auction is conducted in real-time, and each supplier witnesses anonymous bids as they are placed by competitors. The price transparency and dynamic bidding usually results in dramatically lower pricing than the buyer is able to achieve by traditional request for quote process. Suppliers judged to be competitive are shown in the shaded oval. Note that the market price is approximately US\$400,000. Supplier quality performance, delivery performance, or other factors may preclude the lowest bidder from winning the lot. Post-auction bid analysis and follow-up supplier visits are important parts of the total process.

It is important to note that the suppliers see different information than the buyer does during the online auction. Specifically, the suppliers do not know the current price, but they are aware of the desired price and

**Figure 2** An example of the bid record generated during an online auction for one lot of custom-designed machined parts

recognize that in order to be competitive their bids must be at or below this price. In addition, the buyer may elect to witness the bids as they come in from suppliers either anonymously, or by their exact name. The suppliers, in contrast, do not know the names of the other bidders.

Figure 2 is an example of a successful online auction in which the price of the lot fell well below the buyer's desired price. Bid records can take on a variety of shapes including less aggressive downward trends which fail to meet the desired price. In this case, the lot of material is unlikely to be awarded unless the buyer has an overriding interest to source parts in families despite having achieved a small amount of savings. The bid record may trend upward as well, though the intermediary typically builds rules into the software so that it will not accept bids greater than 5-10 per cent of the buyer's current price. The lowest bid represents the maximum gross savings achievable. The actual savings that will be realized are usually 10-50 per cent less due to various losses incurred during the detailed bid analysis process, as described below.

Upon completion of the auction, the buyer will evaluate the bid data. The buyer usually requests additional detailed information from

the market maker, including cost breakdown for certain parts, updated quality and delivery performance information, changes in supplier capacity, changes in management, etc. Evaluation of the bids and supplemental data can take several weeks and should include other functions such as quality, materials management, manufacturing engineering, etc. It is the job of the cross-functional team engaged in bid analysis to ensure that these considerations are taken into account. It is common for teams to establish criteria and associated weighting factors, which vary by commodity, to aid in the analysis of large amounts of data.

The lag in time between completion of the bid event and awarding the business can result in non-value added re-work. For example, a supplier may have won additional business from other sources and may not be able to perform the work that the buyer would like to award them. Some suppliers decide that they cannot or will not honor their bids, preferring instead to risk the loss of business or develop other customers in the same or different markets. Thus, the buyer may have to re-evaluate the data and award the business to the next best candidate. If favorable conditions cannot be achieved, then some lots may not be awarded as the buyer is under no



obligation to accept a bid. Instead, material will be procured from an incumbent supplier using traditional "off-line" purchasing processes.

Work is awarded as complete lots, "winner takes all". However, the buyer must make the decision whether to allow existing purchase orders to run out or cancel them. Either way there is a phase-in period that the buyer and winning supplier must agree upon. The phase-in period can take 12-18 months, which is significant if the long-term agreement is for three years. This can have an unfavorable financial impact upon the supplier in the first year or two of the long-term agreement because they typically price the lot assuming they would be manufacturing the entire production volume. Suppliers should be very cautious regarding this point.

The award agreement contains the pricing information, cost and delivery performance targets, and other relevant terms and conditions. The requisite signatures are obtained from the buyer and supplier, which now enable the supplier to begin work. If the supplier has made the parts before or has stock on hand, then they can immediately ship parts under the new pricing. The ability to immediately reduce prices gives an advantage to incumbent suppliers, and allows the buyer to avoid costs associated with moving parts from one supplier to another. It should be noted that a pattern of awarding work to incumbent suppliers would discourage other suppliers from participating in downward price online auctions.

If the part is new to the supplier, then they must first obtain updated prints and specification from the buyer, order raw material, design the process, fabricate tooling, etc., which can take two to four months. The buyer will not begin to accrue savings until it receives parts from the supplier. In addition, the total expected savings will not be realized until the buyer receives the total annualized quantity of parts, which can take more or less than one year depending upon market demand.

Figure 3 shows cycle time for the entire online auction process, from project start to the accrual of the total amount of savings, for a sourcing group or sub-group. The sourcing group or sub-group may, in turn, consist of 10-20 lots. The process will be repeated until all sourcing groups have been bid. The total

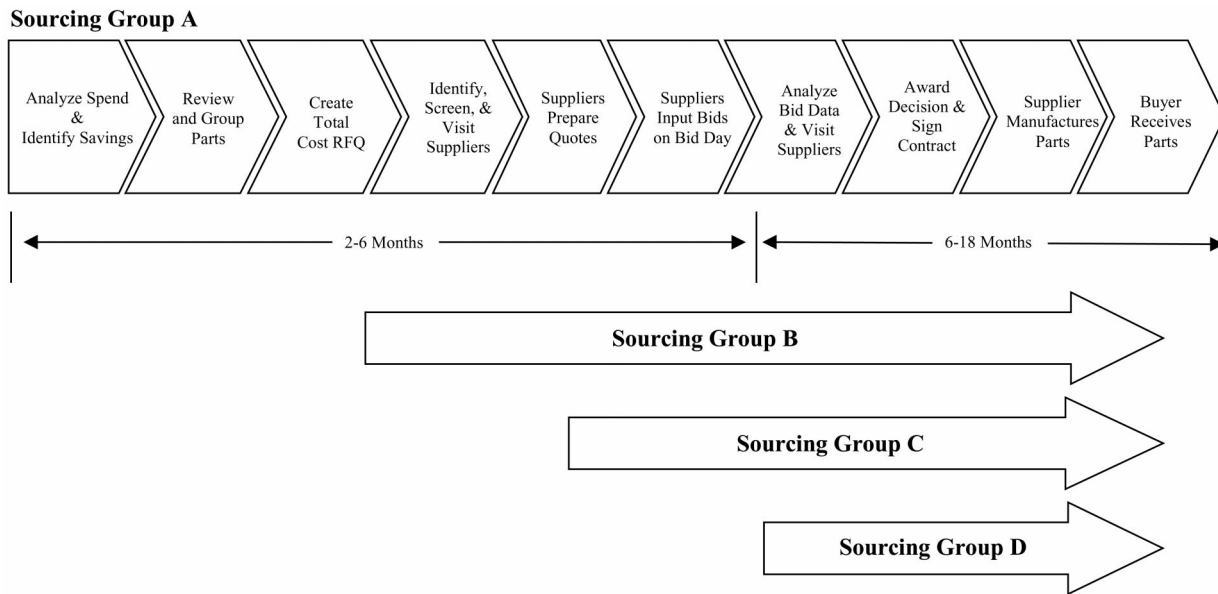
effort can take several years depending upon the number of parts, purchased volume, or rate at which parts are transferred to the winning supplier. Again, this example represents the situation of a buyer whose spend is highly fragmented among numerous suppliers and where components have been randomly sourced in the past.

It is apparent in this example that the time it takes to execute the entire online auction process can be similar to the time it takes to perform face-to-face negotiations for certain types of components. However, there are two substantial differences that are of great importance to the buyer and supplier. Firstly, prices are negotiated much more efficiently online, taking only one to two hours per lot. Secondly, parts are sourced in families, either by similarity in configuration or by similarity in process sequence, thus enabling the producer to minimize waste in production (Womack and Jones, 1996). It should be noted that the request for proposal cycle time is reduced by 50-80 per cent for less complex commodities.

### Buyer and seller benefits

Once again, assume that the commodity being purchased is custom-designed machined components. The buyer benefits in several ways. Firstly, the overall process is very disciplined, unlike what typically happens in tactical procurement. Purchasing organizations tend to be results-focused and will place orders with whichever supplier can meet aggressive delivery dates without compromising quality. Over time, a buying organization will likely be conducting business with many more suppliers than are actually needed, and similar types of parts will be scattered across numerous suppliers. Fragmented purchasing volumes virtually assure that the buying organization is paying a higher unit cost. In addition, the total costs to the business are also likely to be higher than necessary due to qualification and maintenance of a large number of suppliers, late parts from low volume suppliers, recurring defects, overproduction, etc.

The online auction process often includes the participation of manufacturing engineers from the buyer's organization to evaluate blueprints and categorize parts according to similar product features or, preferably,

**Figure 3** Schematic diagram showing the cycle time for the entire online auction process for custom-designed components

process flow. Thus, candidate suppliers will bid on consolidated volumes of products that have similar characteristics, which should help improve cost, delivery, and quality performance – especially if the supplier practices lean production (Ohno, 1988; Robinson, 1990).

Secondly, the involvement of an intermediary – FreeMarkets Inc., for example – brings valuable experience and facilitates adherence to project milestones. Thirdly, the process requires the buyer to evaluate other capable suppliers that they might not otherwise consider under regular business conditions. Fourthly, the process compresses price negotiations from months to hours, thus saving considerable time and effort and reducing the likelihood of significant changes in business conditions that might affect price. Fifthly, the process leads to a market price. This information is unknown to businesses that are not skilled in cost analysis. In other words, if a procurement organization is skilled in cost analysis, as are some automotive and electronics manufacturers, then the value of online auctions decrease significantly. Sixthly, the buyer receives the entire savings upfront, rather than incremental year-over-year reductions.

Suppliers also benefit from online auctions. Firstly, leveling the field removes some of the advantage enjoyed by incumbent suppliers. Suppliers that bid have a fair opportunity to win the work. Secondly, an expanded market comes to seller. That is to say, qualified

suppliers may be invited to participate in future online auctions sponsored by their current customer, or they may have the opportunity to win business from new customers. Thus, suppliers can grow sales or diversify their customer base, which can reduce expenses related to sales and marketing. They also gain access to large customers and at higher levels of decision-making authority than may be otherwise possible.

Thirdly, the suppliers that participate in online auctions are able to see the market price and validate their competitiveness. Thus, suppliers that dislike online auctions should be encouraged to participate, even if they place only one high bid, because they can obtain valuable competitive information. Fourthly, winning suppliers are awarded work that is organized in part or process families. Fifthly, work that is obtained in part or process families enables the supplier to focus on its core competencies. Sixthly, the online auction process usually results in a multi-year long-term agreement. This type of contract is very useful in ensuring the availability of capital from lending institutions, and is especially important for small businesses.

### Issues to manage

The range of reactions by stakeholders indicates that management will have to develop plans to respond to key issues. Chief

among them is the concerns of individual buyers whose skills have been significantly reduced in value as seen by management. Downward price online auctions replace the core skill of negotiation possessed by human workers. Surely procurement personnel will be needed in businesses that employ online auctions, but the primary role and desired competencies are likely to change. Over time, there will likely be a shift from many people employed in tactical buying to fewer people engaged in strategic supply management.

The new skill set might include supplier relationship management, commodity management, and supplier development. The new role will likely include the following competencies: detailed understanding of production systems (Ohno, 1988; Womack *et al.*, 1990), labor markets, machine tools, environmental impact of packaging and processes, determining cost drivers, estimating total cost, facilitating supplier teams in process improvement activities, etc.

The online auction process may temporarily increase the number of suppliers, since similarly configured parts may have been scattered across a large number of producers. Thus it would be difficult to eliminate a supplier directly from a single online auction, as they probably manufacture other types of parts for the buyer. This would run counter to goals to rationalize the supply base, but most likely only temporarily (i.e. one to two years). However, it is possible that the supply base could remain large if the discipline to achieve this goal is compromised by events such as employee or management turnover.

The buyer must be prepared to support expenses associated with switching from one supplier to another, including travel, qualification, tooling, training, first article inspection, aligning information systems, etc. Materials management personnel will also likely get involved to help determine the requirement, if any, for product delivery overlap to ensure adequate supply during transition from one supplier to another. This too can have an unfavorable impact upon purchased material budgets, inventory turns, etc., and temporarily increase the cost of goods sold.

The buyer should prepare its suppliers for the upcoming change in business practices. It would be preferable if the communications were done in person, at the supplier's location, and supported by "frequently asked

questions" posted on the buyer's Web site. The buyer should ensure that suppliers understand the process and that its goal is to level the field in preparation for online auctions, being careful to note that only qualified suppliers, those with exemplary delivery and quality performance, will be invited to bid. The buyer may also need to include a list of definitions to clarify the meaning of "partnership" and other overused terms.

The buyer must also gain an understanding of the supplier's cost structure to ensure that the prices quoted are actually achievable. It would be unwise for a supplier to perform work at a loss. Further, the buyer would not be interested in negotiating price increases due to financial losses sustained by the supplier. That would defeat the purpose of online auctions. Thus, suppliers must approach the bidding process carefully, determine their final offer in advance of bid day, and not be tempted to place bids lower than their pre-determined final offer. One goal of online auctions, for both buyer and seller, should be to ensure defect-free outcomes. This can be best achieved by having a thorough understanding of the process and ensuring disciplined execution in all phases.

### Unresolved questions

Online auctions of custom-designed industrial components are a new phenomenon brought about in large part by the convergence of key elements of information technology: innovative software, affordable hardware, high-speed global communications infrastructure, etc. The process appears to be very successful as many large companies are adopting it as a key purchasing practice. Yet there are many questions that remain unanswered. What follows are seven key questions, as well as the questions that they, in turn, create:

- (1) *Where does the price reduction come from?* Is it from cost or margins? Or, are online auctions simply an efficient means for shopping for lower overhead cost structures? Does lower overhead result in relationships with smaller businesses that have less capability to meet ever increasing customer service demands? Do suppliers really know how to meet the

- cost targets if they are batch-and-queue producers, or must they employ the philosophy and practice of lean production to successfully reduce their costs? Can they become lean producers on their own, or will they need help from their customer or a third party? Is the supply chain aligned and ready to participate in supporting the supplier's efforts to reduce costs? Does the supplier have agreements with its suppliers to reduce the cost of raw materials and services? If not, how can they obtain agreements given the fact that they have little or no leverage to induce participation?
- (2) *Are online auctions a one-time event, or will they be repeated?* Suppliers participate with the expectation that if they win business, they are awarded a long-term agreement that places them in a favorable position for renewal of the agreement when it expires. But will buyers that rely on cost reduction to meet financial goals stop seeking cost reduction at the end of the long-term agreement? It is not likely. So will the work be put up for bid again? Will it be re-bid during the term of contract, thus effectively breaking the contract? Then what good is a contract? And what will the impact upon trust be, either implicit or explicit, in the buyer-supplier relationship (Kim *et al.*, 1999)? Does trust in business relationships matter anymore? If it does, then does re-bidding the work make sense? Will buyers and sellers revert to traditional, off-line, human negotiation processes?
- (3) *What are the implications for lean production?* Can suppliers fulfill contractual terms by manufacturing goods using common high-cost batch-and-queue production methods? Will online auctions propel suppliers to adopt lean production, since it is the only viable means of systematically reducing product costs? Lean production cannot properly exist without target or kaizen costing (Monden, 1995). Will buyers see the error of their past ways and earnestly implement target or kaizen costing methodology in the design of new products? Or will products continue to be designed to achieve technical performance at the expense of cost, delivery, and quality performance?
- (4) *Do online auctions portend a reduction or elimination of the in-house buying function?* Will production parts sourcing be outsourced to online auction companies, just as non-production products and services have been outsourced to category specialists skilled in electronic order management? Will buyers become supplier relationship or supplier development managers? What new skills will buying personnel need to learn? How many people will be needed to resolve delivery and quality issues in businesses unaccustomed to identifying and eliminating the root cause of non-conformances? Do online auctions help reduce waste in operations (Womack and Jones, 1996)? If they do not reduce waste, then why do them?
- (5) *Is it logical to engage in both supply chain management and online auctions?* Do supply chain management and supplier development activities conflict with online auctions? Can they be done simultaneously by the same organization, without creating obvious or unresolvable conflicts? In what ways can the buyer or supplier encourage the cooperation of lower tier suppliers to support and sustain the results of online auction events? What is the incentive for lower-tier suppliers to participate? Will sub-tier suppliers consolidate and resist efforts to reduce prices?
- (6) *Are online auctions a truly new method of procurement, or do they simply facilitate traditional heavy-handed procurement methods?* Are online auctions simply the newest way to obtain price reductions from suppliers? Will buyers be motivated to gain a competency in cost analysis and an understanding of cost drivers if online auctions do the job for them? Will buyers be motivated to understand total cost? Are online auctions consistent with the development of relationships that professors and CEOs claim are so important to business? Will workers, tired of traditional purchasing tactics, find participation in online auctions to be a more fulfilling activity? Will students be drawn to a career in supply chain management or away from it? To what extent will online auctions facilitate the movement of work to developing nations? Is this shift inevitable, will it force

developed countries to realize a new role in the global economy? Is this outcome acceptable, unacceptable, or rightly inevitable?

- (7) *Do online auctions fundamentally improve productivity?* Is lower price equivalent to an improvement in productivity? Or do online auctions lead to improvements in productivity? Will productivity be driven incrementally by functional departments focused on their own individual metrics, or will it be integrated across stakeholders (Emiliani, 2000a)? Will those employed by suppliers enjoy working in a business whose leadership perpetuates incremental improvements based upon batch-and-queue production methods, or will they demand adoption of lean production and its associated leadership model (Emiliani, 1998a; Emiliani, 1998b)?

## Conclusion

Online auctions conducted over the Internet offer substantial sales growth opportunities for the intermediaries and substantial unit cost reduction for buyers of selected commodities. It is likely that most of the Global 1000 corporations will experiment with downward price online auctions for production materials simply because they change the nature of competition. Management will find it difficult to resist the temptation to achieve quick results, particularly when it comes to actions directed toward suppliers (Emiliani, 2000b). Many companies will likely adopt online auctions as part of their ongoing purchasing process or perhaps even outsource the bulk of purchasing activity to online auction firms.

It is apparent, however, that online auctions are best suited for corporations that do not understand the cost of the materials they purchase. Thus, the number of companies contracting for online auctions will be indicative of the number of companies that do not understand the cost of input materials, their cost drivers, cost build-up through the supply chain, and total cost, not to mention quality or lead-time. The number is likely to be quite large, which raises fundamental questions about how large corporations are managed (Emiliani, 2000a), the training that consultants deliver to managers, and how

students are educated in preparation for business careers.

It should become evident that the dominant production system used by buyers of online auction services is batch-and-queue. The fatal flaw of this production system is now fully exposed: the buyer and its extended enterprise are not learning practices that yield sustainable competitive advantage through demonstrable improvement in productivity (Ohno, 1988; Womack and Jones, 1996). The debilitating inward focus on results is characteristic of batch-and-queue producers and drives self-similar behaviors in associated supply chains.

The downward price online auction is simply traditional purchasing aided by new technology. It is an attractive technological solution for reducing costs, but it does not help uncover the root causes of poor cost management within the buying firm. Further, the intermediaries understand commodity management, markets, and information technology very well, but do not understand supply chain management and lean production, as evidenced by contract terms and conditions. As a result, an unintended consequence of business-to-business downward price online auction process is that it will likely delay the adoption of modern supply chain management and lean production methods that are needed by both buyers and suppliers in order to truly eliminate waste and reduce total costs.

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## Insight from industry

# Supporting small businesses in their transition to lean production

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### Keywords

Supply chain, Supplier relations, Lean production, Kaizen, Small firms, Trust

### Abstract

Discusses the importance of achieving alignment between buyers and sellers, with specific emphasis on efforts by buyers to improve the performance of their suppliers. Describes common barriers and presents strategies and methods that were successful in educating and developing suppliers' capabilities in lean production across multiple tiers. Presents supporting activities that can help facilitate implementation and ensure that lean production does not become another "flavour of the month".

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## Introduction

The effective execution of supply chain management strategies requires the alignment of both internal and external stakeholders. Alignment is a highly sought-after goal, but one which is rarely achieved in western businesses (Mikami, 1982). This is due to a number of factors such as the temporal nature of business relationships, management turnover, inconsistent or confusing direction from senior management, poor morale, and systemic layoffs (Emiliani, 2000a). If internal alignment can not be achieved, then how can external alignment with even first tier suppliers be achieved? In fact, it is more typical for the senior purchasing executive to force alignment by sending letters to suppliers demanding that they must immediately reduce prices by 10 per cent or risk losing all business (Karnitschnig, 2000).

Today, many large manufacturing companies managed in the western tradition seek to obtain alignment with first tier suppliers by engaging them in activities to improve their production capabilities (Handfield *et al.*, 2000). Companies considered as leaders in lean production have long realized that entire supply chains (or supply networks), not just first tier suppliers, must mirror their production practices in order for just-in-time systems to function properly (Womack *et al.*, 1990; Ohno, 1988). The buyer will often devote considerable resources to develop their suppliers at no cost to them (Bounds, 1996; Bounds *et al.*, 1996). Senior managers at Toyota and Honda know implicitly that such investments are small and result in substantial improvement in overall performance including a reduction in total costs.

It has been much less common, however, for western companies to develop entire supply chains for a given type of product. This article presents the strategies and methods used by Pratt & Whitney, a manufacturer of gas turbine engines, for a three-year period (1996-1998), to develop the network of suppliers that produce small machined parts.

## Overview of small machined parts

The small machined parts supply network is part of an aerospace economic cluster located

in the Connecticut Valley region (Porter, 1998), a 125km corridor paralleling the Connecticut River, from Springfield, Massachusetts to Middletown, Connecticut. It came into being shortly after Pratt & Whitney was formed in 1925, with initial emphasis on machining processes. As the product technology advanced from piston to gas turbine engines in the late 1940s, a wide variety of supporting services were formed in order to produce more highly engineered parts with increased durability. The support services include processes such as electroplating, shot peening, brazing and welding, thread rolling, grinding, de-burring, plasma spraying, heat treating, and metallurgical testing. Most machining and support services businesses have been part of Pratt & Whitney's supply network for over 40 years.

Small machined parts consist of a few thousand part numbers in a wide variety of configurations, most less than 30cm in diameter, and with an average price of <\$500 per unit. It was a highly fragmented spend of approximately \$75million per year which had never been managed strategically due to a historical bias in which these parts were perceived to be easy to make and a "no-brainer" to procure. While these parts are certainly not the most complex to produce, there are, however, many systemic issues that resulted in chronic deficiencies in cost, delivery, and quality performance. In addition, small machined parts were considered to have a low level of importance relative to more expensive parts, and thus did not garner much attention from the design or project engineering communities.

It was clear from the outset that the small machined parts supply network was not well-positioned to respond to the marketplace demand for significant improvements in cost, delivery, and quality performance that would arise after the 1989-1994 business downturn. More importantly, suppliers were not prepared for the change in production system, from batch-and-queue mass production to lean production, that P&W was undergoing since the early 1990s, and that they in turn would be asked to follow suit.

The supply network for small machined parts consists of over 100 mostly small, family-owned businesses, with revenues

between \$2million-50million and less than 150 employees. These businesses were established by entrepreneurs, many of which were former machine operators. It is not unusual to hear stories of how they started with just one machine and worked long hours every day of the week, for a decade or more, in order to grow their business.

The owners, many of them now second or third generation, are a remarkable group of people. Compared to large enterprises, small businesses tend to be responsive, resourceful, lower cost, and high quality.

But like any successful businessperson, the owners of small businesses have blind spots that can make it difficult to respond to changes in business conditions. For example, the management style tends to be top-down, with the owner making most of the decisions. They often find it difficult to delegate work to others, preferring instead to be directly involved in all activities. The owner may be so busy that they do not read *Aviation Week* or *The Wall Street Journal*, and thus lose touch with what is happening in the marketplace. In other words, they may possess a debilitating inward focus.

Owners and the management team may have a limited amount of formal education or may not recognize the shortcomings of their fundamental production processes or procurement practices – perhaps largely unchanged for 20 or more years. From the point of view of the owner, they are successful, and are not usually willing to listen to the new breed of young managers that switch jobs every two to three years. There may also be a historical bias against management practices developed in Japan and a general unwillingness to experiment. They will also likely view improvements made by a large company as unattainable in smaller businesses due to a perceived lack of resources. In addition, most owners have difficulty believing that their customer could begin to view their competencies as a commodity that can be purchased anywhere in the world (Emiliani, 2000b).

These management behaviors are not necessarily unique to small businesses. Nevertheless, they cause misalignments between buyer and seller that can take years to overcome. The trouble is, buyers do not typically give suppliers years to overcome them.



## Supplier development strategy

The general strategy was built from the following viewpoint: the benefits of local supply networks greatly outweigh the disadvantages (Porter, 1998) and that opportunities can only be understood through extensive personal interaction with suppliers – i.e. the owner and his or her management team. This included three key components: understanding which business practices or procedures make it difficult for suppliers to meet their customers' expectations; making commitments to resolve systemic problems; and evaluating suppliers' operations and recommending areas for improvement.

The focus was to improve suppliers' operations by helping them understand and implement the fundamentals of lean production which include 5S, total productive maintenance, set-up reduction, mistake-proofing, visual factory, standard work, and cellular production of part families. The cost, delivery, and quality improvements obtained by implementing lean production would eliminate overseas sourcing from consideration.

However, this goal was not made explicit at the time due to rapidly changing conditions in the marketplace and extreme emphasis on the cost reduction of purchased materials.

If suppliers were successful at reducing the price differential by 20 per cent or more (exclusive of freight) within three to four years, then senior management could be convinced that the small machined parts supply network was improving at a high rate, the total cost was favorable for domestic suppliers, and that they were on the path to achieving world-class performance. This would make overseas sourcing considerably less attractive, and the buyer could continue to enjoy the benefits of a highly developed local manufacturing infrastructure.

The first challenge was to educate suppliers on what lean production was and then convince them to adopt new production practices. Suppliers also had to be convinced that lean production was not another fad, one of many that they had seen come and go over the previous 20–30 years.

## Supplier development methods

The principal concern was how best to communicate with the supply network. While concentrated within the Connecticut Valley, the large number of suppliers made daily visits impractical. Part of the solution was e-mail. In early 1996, most suppliers had new computers and local area networks to support computer aided manufacturing, inspection records, deliveries, attendance, etc. However, only 5–10 per cent of the supplier network had e-mail. So the first step was to call the owner of every business and ask them to get an e-mail address, as well as Microsoft Office software, in order to support the exchange of text, spreadsheets, and presentations. Nearly every supplier honored this request, though some required additional prompting.

Though only a few suppliers had e-mail addresses, an activity was instituted whereby the supply manager would e-mail a note to suppliers, every other week, with relevant business information (Emiliani, 1996). This started out modestly, with short, half-page, communications regarding issues or upcoming events. As the distribution list grew, so did the e-mail note. Within a few months, the e-mail note expanded to several pages and typically included the following major sections: Cost, Delivery, Quality, Continuous Improvement, Training Opportunities, Master Production Schedule, Surplus Equipment, and Links to Valuable Web sites. The notes established and reinforced performance expectations, and reinforced parallel on-site supplier development activities in which manufacturing engineers facilitated *kaizen* events.

The e-mail notes consistently emphasized lean production as the only means by which market-driven goals could be achieved. It presented cost, delivery, and quality as parameters that could be improved simultaneously, rather than at the expense of one another, as is traditionally the view in batch-and-queue mass production. They explained the benefits of lean production in relation to the suppliers' own interests, such as reducing inventories, increasing cash flow, improving operating margins, marketing, and competitiveness. The benefits to P&W and the end-use customer were also explained. They also included market data and trends from various internal and external

publications. The e-mail notes provided context, interpreted events, and translated them into specific actions that people could take to improve performance.

They provided examples of set-up reduction and root cause analysis, and recommended important books or articles to read. They contained attachments such as presentations describing the fundamentals of lean production, performance measurement, and how to implement quality control process charts. One spreadsheet was developed to show the impact of set-up reduction on lot size, lead-time, and customer satisfaction, while another was interactive and programmed to show the benefits of process improvements such as set-up reduction on financial performance. The e-mail notes were followed up by personal visits to scores of suppliers in order to witness their progress and reinforce the central theme of lean production. In fact, much of the content of the notes came from supplier visits in which lengthy conversations with senior managers revealed gaps in awareness of each other's business or knowledge of lean production.

The e-mail notes also announced affordable, high quality training in lean production offered by third party sources. Organizations not affiliated with buyers were very effective at spreading lean production in the Connecticut Valley, as the legacy of past business behaviors or operating priorities often makes it difficult for suppliers to trust their customers (Blois, 1998; Kim *et al.*, 1999; Spekman *et al.*, 1998). In addition, suppliers generally regard detailed operating practices and the results of improvement activities as proprietary information.

We also held formal supplier network meetings, but did things somewhat differently. For example, the agenda of most supplier conferences consists of topics that are presented solely from the viewpoint of the buyer. Our agenda contained items of concern to both P&W and of the supply network. Responsiveness to suppliers' needs will always improve credibility. In addition, we gave the attendees some free gifts. But instead of giving out stickers, posters, and pens, we gave out books. Each attendee received a copy of *The Machine that Changed The World* (Womack *et al.*, 1990), *Lean Thinking* (Womack and Jones, 1996), and P&W internal publications on continuous improvement (P&W, 1997a, 1997b). The

supply network also received the book *Modern Approaches to Manufacturing Improvement – The Shingo System* (Robinson, 1990) in a subsequent mailing.

Several suppliers attended a lecture, "The lean leap" by James Womack, at P&W's expense (Womack, 1997). In addition, suppliers were offered discounts on software, computer training, and professional skills development courses. They were also invited to participate in *kaizen* events and have their employees tour manufacturing areas so that they could witness firsthand the many improvements that had been made at P&W.

The e-mail notes were effective because they contained practical information, put issues into context, and explained the specifics of how to achieve challenging goals. This, coupled with P&W-facilitated *kaizen* events, third party training resources, and market conditions that could no longer be ignored, helped propel many suppliers in the aerospace economic cluster to adopt lean production practices.

The next step is to ensure that lean production does not become corrupted or misapplied, and thus turn into yet another passing fad.

## Conclusions

There are many things that buyers can do in order to support the implementation of lean production across its supply networks. Since most businesses are small (i.e. <500 people), higher tier buyers seeking to create lean suppliers must inevitably interact with lower tier suppliers. The interaction will be productive if the buyer first asks for feedback from suppliers and makes commitments to resolve systemic problems prior to requiring the adoption of lean production practices. This is a very effective starting point, as it can help the buyer fix or eliminate wasteful business practices and also gain supplier buy-in for transitioning to lean production.

Small family-owned businesses generally exhibit management behaviors that are very different from large publicly owned businesses because they have different life experiences and are accountable to different stakeholders. A challenge for small businesses is to understand and respond to these differences without compromising their desirable attributes. Likewise, large

businesses have a challenge to understand the strengths of small businesses and help them improve their weaknesses in a collaborative manner. This type of behavior is difficult to exhibit by those accustomed to western management practices because it is neither customary nor rewarded by investors (Emiliani, 2000a). So think of it as a moral imperative instead (Stainer *et al.*, 1999).

The owners of small businesses will implement lean production if they can obtain affordable, high quality instruction on the philosophy and practice of lean production. The substantial differences between batch-and-queue mass production and lean production must be made very clear, including the implications for leadership and human resource management (Emiliani, 1998; Emiliani 2000a). Knowledgeable third parties can be important resources to facilitate implementation in an unbiased and less threatening manner. But it is not just the role of outside teachers to impart knowledge. The owners have a responsibility to read some of the great books and articles published over the last 20 years to gain added depth of understanding, teach their employees, and reinforce their leadership role. They would also benefit from the creation of a local network of like-minded people from similar-sized businesses that have made substantial progress in implementing lean production. Finally, buyers that behave in ways that promote trust among all stakeholders will have discovered the foundation upon which lean production is built.

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## Research note

# Online reverse auction purchasing contracts

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### Keywords

Internet, Contracts, Lean production, Purchasing

### Abstract

Discusses the types of terms and conditions that typically accompany purchasing contracts resulting from online reverse auctions for industrial components. Identifies the terms and conditions that perpetuate traditional batch-and-queue production practices. Concludes that buyers must construct terms and conditions that support the implementation of lean production by suppliers in order to achieve congruency with strategic business goals.

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## Introduction

Online reverse auctions have become a popular method for reducing the price of purchased goods and services (Emiliani, 2000a). Many Fortune 1000 companies are experimenting with this new purchasing technique, while some are making it a regular part of their purchasing practice (Richards, 2000; Tully, 2000; Judge, 2001).

This paper reviews the terms and conditions that typically accompany purchasing contracts that have been awarded to successful bidders for the specific case of industrial components designed by the buyer. The terms and conditions are examined to see if they support batch-and-queue or lean production practices. This is important because many Fortune 1000 companies are implementing lean production in their internal operations. Furthermore, companies that espouse lean production may also deploy "supplier development" teams to teach suppliers the fundamental techniques such as set-up reduction, root cause analysis, *kanban*, 5S (sort, straighten, shine, standardize, and sustain), visual factory, etc. (Shingijutsu, 1992; Imai, 1997).

Terms and conditions provide important clues for determining if there is congruency between key internal departments such as legal, purchasing, and manufacturing operations. A lack of consistency would indicate that the company has not yet trained legal and purchasing departments in business practices that are needed to support supplier efforts to implement lean production. The buyer, having failed to implement the principles of lean in areas other than manufacturing, thus risks under-performance through continued focus on local optimization and emphasis on achieving short-term results (Emiliani, 2001a).

## Terms and conditions

Terms and conditions are established by the buyer and are not usually subject to negotiation because this would complicate the online reverse auction process. One of the purposes of online reverse auctions is to level the playing field. Since many suppliers participate in online bidding, adjusting terms and conditions for individual sellers would favor certain suppliers over others.

In addition, the buyer's legal department often seeks to standardize terms and conditions for contracts where the purchase is repetitive, i.e. for production parts. While perhaps convenient for the seller, standard contracts ignore the reality that business conditions change and different suppliers have different levels of risk tolerance. Small suppliers (i.e. fewer than 200 people) often have difficulty accepting terms and conditions that seek to minimize risk to the buyer. This may or may not prevent small suppliers from participating in the online reverse auction. Such terms and conditions may be less problematic for medium and large suppliers.

Many of the terms and conditions were found to be the same as that contained in purchasing contracts resulting from the traditional three-quote method. However, it is noteworthy that the online reverse auction process gives the buyer an opportunity to establish new terms and conditions that can result in more favorable outcomes for the buyer.

Table I shows the type of terms and conditions that can accompany purchasing agreements that result from online reverse auctions. These terms and conditions were from several online reverse auctions conducted between fall of 1998 through summer of 2000. They are typical of that used by companies in the specific American durable goods industry segment examined for this paper. While these terms and conditions are used to illustrate key points, some may not apply to other industries or specific buyers.

Each of the terms and conditions shown in Table I are considered to be the type that reflects a buyer whose business practices are deeply rooted in batch-and-queue production systems (Emiliani, 2000b). Table II presents

the rationale for this observation, largely driven by the traditional mindset in which tradeoffs are judged to be acceptable solutions to common business problems (Emiliani, 2001b).

Several of these terms and conditions require further discussion.

#### **“Offer”, “base unit”, “pricing” and “termination”**

The buyer makes no commitment to purchase the forecasted quantities that the seller used to help determine pricing. Thus, the buyer may, for selected line items:

- Purchase nothing over the life of the contract for selected line items.
- Purchase 10 per cent of the forecasted quantity, but will not permit higher prices due to reduced purchase volumes.
- Purchase double the forecasted requirement and will require a price reduction due to the increase in volume.

This type of behavior shows that the buyer has little knowledge of its customer's near-term requirements and that its production planning process is terribly flawed. This simply increases waste (Ohno, 1988).

The buyer seeks to transfer as much risk as possible to the seller. The supplier will have to rely on guesswork to determine what the buyer wants and will likely have difficulty meeting the buyer's performance expectations. If the seller can not achieve the price because they guessed wrong, then the buyer may terminate the contract for convenience.

The lack of commitment to purchase is inconsistent with the production planning and order release practices used by lean buyers (Ohno, 1988; Monden, 1998). Lean buyers operate pull systems, and thus know

**Table I** Typical online auction terms and conditions

<b>Terms and conditions</b>	<b>Requirement</b>
<b>Re-negotiation frequency</b>	Upon termination of agreement (usually after 2-3 years)
<b>Offer</b>	No buyer commitment to purchase. Price agreement only
<b>Base unit</b>	Volume drives price
<b>Termination</b>	For convenience
<b>Acceptance of terms</b>	Without exception
<b>Pricing</b>	Firm fixed prices
<b>Continuous improvement</b>	Buyer encourages seller to implement lean production to meet performance goals
<b>Charge-backs</b>	Supplier assessed financial penalties for quality non-conformances
<b>Payment terms</b>	Extend to > 30 days
<b>Inventory</b>	Consigned at supplier's expense
<b>Lead-time</b>	Meet lead-time goals by stocking finished goods inventory

Table II Typical online auction terms and conditions

Terms and conditions	Requirement	B&Q practice
Re-negotiation frequency	Upon termination of agreement (usually after 2-3 years)	Multiyear period between negotiation unrealistically assumes business conditions do not change
Offer	No buyer commitment to purchase. Price agreement only	Buyer makes no firm commitment to purchase, thus increasing cash flow and reducing working capital
Base unit	Volume drives price	Legacy of "learning curve" mentality, where cost depends upon volume
Termination	For convenience	Buyer seeks maximum flexibility to switch sources if lower prices can be found
Acceptance of terms	Without exception	Unrealistically assumes that all sellers have same level of risk tolerance (i.e. "one size fits all")
Pricing	Firm fixed prices	No price adjustments under any circumstances
Continuous improvement	Buyer encourages seller to implement lean production to meet performance goals	Does not recognize conflict with other terms and conditions
Charge-backs	Supplier assessed financial penalties for quality non-conformances	Punitive punishments designed to ensure compliance
Payment terms	Extend to > 30 days	Maximize benefit to buyer through improved cash flow
Inventory	Consigned at supplier's expense	Push the problem of inventory onto suppliers
Lead-time	Meet lead-time goals by stocking finished goods inventory	Assumes lead-times cannot be reduced

what they want, when they want it, and where they want it. They will usually commit to purchase a minimum quantity because they have a much better understanding of customer demand and recognize that suppliers function more effectively when uncertainties and unrealistic expectations are mitigated. These practices reduce waste (Ohno, 1988; Womack *et al.*, 1990).

#### **"Inventory" and "lead-time"**

The buyer requires winning suppliers to establish a stocking program to meet its lead-time reduction goals. This, of course, is pure batch-and-queue thinking, and plays to the common paradigm that high levels of inventory are needed in order to achieve high fill rates (Chase *et al.*, 1998). It does not make sense to build and maintain expensive finished goods inventory (waste of over-production) in order to reduce lead-times (Ohno, 1988).

Instead, lead-times are reduced by process improvements such as 5S, cellular manufacturing, set-up reduction, standard work, total productive maintenance, root cause analysis, and mistake proofing. This, coupled with production leveling and *kanban*, enables suppliers to achieve high performance at low cost (Shingijutsu, 1992).

#### **"Charge-backs"**

The buyer seeks to apply punitive financial punishments for quality non-conformances to ensure compliance to the contract. However, the supplier may respond to this by increasing inventory or adding inspections to eliminate repeat occurrences. But this does not address the root cause of the problem. Thus, the buyer does not apply the right incentive to motivate suppliers to continuously improve their performance. In contrast, lean buyers work with their suppliers to help them develop root cause analysis skills and may use charge-backs as a last resort.

#### **"Payment terms"**

A favorite tactic used by batch-and-queue buyers is to extend payment periods in order to improve their own cash flow. Predictably, this antagonizes suppliers, especially small ones, as they too have bills to pay. Small suppliers rightly question why buyers do this. The cost of capital (combined debt and equity) for large buyers is lower than for small suppliers. The costs incurred by small suppliers when financing inventory is contained in the overhead rate paid by large buyers. So the buyer, fixated on optimizing its own financial performance, lays the foundation for future problems such as price increases, switching costs, etc.

### The purchase contract

The contract examined by the authors is approximately 20 pages long and contains many other terms and conditions with which suppliers must comply. The terms and conditions are written to ensure that all of the benefits accrue to the buyer and virtually none to the supplier. The result is a complex and burdensome contract that will be difficult for both buyer and seller to administer. It perpetuates incorrect thinking, entrenches bureaucracy, and does not add value as perceived by the end-use customer (Womack and Jones, 1996). Disputes or other undesirable outcomes are likely, which are forms of waste that can be avoided (Emiliani, 1998). It appears that suppliers are being positioned for dismissal as soon as the buyer finds a better deal. This is a key characteristic of the short-term, results-focused, management practices that pervade business today.

In contrast, lean producers establish contracts with sellers that contain terms and conditions in which benefits are shared (Nishiguchi, 1994; Bounds *et al.*, 1996). Suppliers are seen as valuable resources that can help increase competitive advantage. Buyers that correctly practice lean production willingly transfer their knowledge to suppliers in order to help develop their capabilities. (Nishiguchi, 1994; Bounds, 1996; Bounds *et al.*, 1996; Fujimoto, 1999). As might be expected, suppliers that are treated fairly are responsive in times of crisis (Nishiguchi and Beaudet, 1998), whereas suppliers treated

unfairly will search for opportunities to exploit the buyer by inflating non-recurring charges (i.e. tooling and expedite fees), increasing part prices, or withholding delivery (Goodman, 2001; Green, 2001).

Finally, it is worth noting that online reverse auctions negate the reality that 70-90 per cent of the cost of components is in their design (Cooper and Slagmulder, 1999). Thus, buyers that adopt online reverse auctions as part of normal purchasing practices will fail to develop their engineers' capabilities to design to target cost (Monden, 1995). It also diminishes marketing's responsibility to understand the price that customers will pay and ensures that finance's role remains largely reactive.

Table III compares the terms and conditions applied by buyers skilled in batch-and-queue versus lean business practices. Note that the intent and use of the terms and conditions are quite different. The terms and conditions applied by lean buyers more accurately reflect the realities of business (Emiliani, 2001a). They motivate the supplier to continuously improve, eliminate waste, and achieve shared business objectives (Nishiguchi, 1994).

### Summary

A supplier's ability to develop its capabilities as a lean producer will be driven in large part by the buyer's business practices. Specifically,

Table III Comparison of batch-and-queue versus lean terms and conditions

Terms and conditions	B&Q buyer	Lean buyer
Re-negotiation frequency	Upon termination of agreement (usually after three years)	Annually, or as changing market conditions dictate
Offer	No buyer commitment to purchase. Price agreement only	Commitment to purchase defined quantity or percent of requirement
Base unit	Volume drives price	Mutually agreed upon price, based on target cost process
Termination	For convenience	For non-performance (two-way)
Acceptance of terms	Without exception	Mutual problem solving
Pricing	Firm fixed prices	Ongoing dialogue on price; adjustments when reasonable
Continuous improvement	Buyer encourages seller to implement lean production to meet performance goals	Buyer teaches supplier how to implement lean production
Charge-backs	Supplier assessed financial penalties for quality non-conformances	Root cause analysis and mistake proofing; charge-back used as last resort
Payment terms	Extend to > 30 days	Pay upon receipt or shipment of finished product
Inventory	Consigned at supplier's expense	Little or none; may have strategic buffers in supply chain
Lead-time	Meet lead-time goals by stocking finished goods inventory	Reduce lead-time by eliminating waste

the ability to incorporate the concepts of lean in purchasing and legal, as well as product design, production planning, finance, and manufacturing. Terms and conditions that minimize buyer risk can have unintended consequences that result in increased waste and reduced customer value.

The buyer must remove inconsistencies in contract terms and conditions such as those presented in this paper. This can be accomplished by benchmarking the contract terms and conditions used by lean buyers such as Toyota and Honda. In addition, buyers must understand the supplier relationship practices that lead to sustained competitive advantage if they wish to be considered truly lean producers (Bounds 1996; Bounds *et al.*, 1996; Fujimoto, 1999; Cooper and Slagmulder, 1999; Nishiguchi, 1994).

Senior managers of large publicly traded businesses typically view the sole purpose of business to be to increase shareholder value (Rappaport, 1998). The single-minded pursuit of this objective invariably leads to practices that disenfranchise key stakeholders such as suppliers (Caux, 2001; Emiliani, 2001a; Emiliani, 2001c). While the best practitioners of lean production may use online reverse auctions for commercially available items such as office supplies or industry standard parts (Nikkei, 2000a), they continue to use collaborative cost reduction methods for high value-added components (Nikkei, 2000b; 2000c; 2000d; 2000e).

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## Research note

# Squaring online reverse auctions with the Caux Round Table *Principles for Business*

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### Keywords

Purchasing, Internet, Shareholders, Stakeholders, Ethics

### Abstract

Examines if online reverse auctions are consistent with the Caux Round Table *Principles for Business*. Identifies numerous contradictions that contribute to the perpetuation of divisive business practices. Concludes that buyer behaviors must evolve from focusing on short-term tactics designed to reduce purchase price and instead pursue collaborative cost reduction practices with key suppliers.

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## Introduction

Online reverse auctions have recently emerged as a popular method among *Fortune* 1000 businesses for reducing the price of purchased goods and services (Emiliani, 2000; Richards, 2000; Tully, 2000; Sheridan, 2001). This new purchasing tool creates a forum in which many suppliers compete against one another in real time dynamic open bidding versus the traditional static three-quote closed bidding process. The typical result is a substantial reduction in prices and the time it takes to negotiate prices.

Online reverse auctions appear to deliver fast, measurable savings, and thus have great appeal to senior managers interested in reducing costs, increasing price competitiveness, and delivering greater shareholder value. However, this tool has numerous practical limitations that can result in reduced savings (Emiliani and Stec, 2002; GE, 2001a) and other undesirable consequences (Emiliani, 2000; Emiliani and Stec, 2001).

This paper critically examines the online reverse auction tool to determine if it is consistent with the Caux Round Table *Principles for Business* (Caux, 2001). The analysis is limited to the specific case where online reverse auctions are used by large, publicly owned businesses for buyer-designed machined or fabricated components. In other words, the bidders serve their customers as make-to-print sources of supply for high value-added components.

The Caux Round Table *Principles for Business* is reprinted in its entirety. Commentary is provided in response to specific items that are found to be incongruent with the generative business practices advocated by the *Principles for Business*. These judgments are based upon first-hand experience in managing nearly a dozen online reverse auction events for a large North American durable goods manufacturer, as well as direct responsibility for the actual implementation of online reverse auction results to secure the identified savings. The comments are thus rooted in practical experience; they are not presented as conceptual or abstract limitations that might result from the use of online reverse auctions. The deficiencies identified are quite real.

This descriptive analysis is important because it identifies buyer behaviors that



perpetuate decadent business practices known to divide buyer and sellers (Emiliani, 2001; Emiliani, 2002), resulting in waste (Ohno, 1988; Womack and Jones, 1996; Emiliani and Stec, 2002). A summary of the key issues for online reverse auctions related to the *Principles for Business* is presented in Table I. Prescriptive solutions to dysfunctional purchasing practices, inclusive of online reverse auctions, have been previously identified (Womack *et al.*, 1990; Nishiguchi, 1994; Bounds, 1996; Bounds *et al.*, 1996; Cooper and Slagmulder, 1999; Fujimoto, 1999; Dyer and Nobeoka, 2000; Johnson and Bröms, 2000; Emiliani, 2002; Emiliani and Stec, 2001, 2002).

## **Caux Principles for Business**

### **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 US 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.

*Comment 1.* The use of online reverse auctions denies the existence of any stakeholder other than the buyer and its shareholders (Emiliani, 2002). The buyer’s overarching objective is simply to reduce the price it pays for purchased materials (Emiliani, 2000).

*Comment 2.* The values possessed by buyers and sellers are typically not shared (Kim *et al.*, 1999; Tracey and Tan, 2001; Emiliani, 2002), though there are notable exceptions in companies that correctly practice lean production (Womack *et al.*, 1990; Bounds, 1996; Bounds *et al.*, 1996; Nishiguchi and Beaudet, 1998; Fujimoto, 1999). In general, buyers want the lowest price while sellers expect to build long-term relationships and believe that quality and delivery are more important. Most buyers are not interested in sharing prosperity with sellers (Nishiguchi, 1994; Emiliani, 2002). Instead, corporate boards mandate that prosperity be distributed to shareholders (Emiliani, 2001).

### **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

**Table I** Key issues for online reverse auctions

CRT Principles for Business	Key issues
<b>Section 1:</b> preamble	<p>Values possessed by buyers and sellers are not always shared; buyers seek the lowest price while sellers expect to build long-term relationships</p> <p>Many buyers use online reverse auctions to increase earnings per share in an effort to maximize shareholder value</p>
<b>Section 2:</b> general principles	<p>Principle 1. The responsibilities of business: <i>Beyond Shareholders Toward Stakeholders</i>  Most senior managers of large companies recognize only shareholders and (perhaps) customers as key stakeholders  The spirit of honesty and fairness are not achieved in actual practice</p> <p>Principle 2. The economic and social impact of business: <i>Toward Innovation, Justice, and World Community</i>  Buyers are generally not interested in contributing to the social advancement of low wage countries. They usually just want to take advantage of lower labor costs</p> <p>Principle 3. Business behavior: <i>Beyond the Letter of Law Toward a Spirit of Trust</i>  Managerial beliefs, behaviors, and resulting business practices are frequently inconsistent with espoused desire for “partnerships” with suppliers  The use of online reverse auctions indicates that buyers do not trust the pricing given to them by suppliers. Managers must determine the root cause of distrust</p> <p>Principle 4. Respect for rules  Buyers use online reverse auctions to optimize their own business position at the expense of its suppliers  Online reverse auction rules may not be strictly adhered to</p> <p>Principle 5. Support for multilateral trade  Online reverse auctions support this principle by matching buyers and sellers across continents, notwithstanding the issues identified</p> <p>Principle 6. Respect for the environment  This principle is not yet part of the expectations associated with online reverse auctions</p> <p>Principle 7. Avoidance of illicit operations  This principle is relevant to any business activity, including online reverse auctions</p>
<b>Section 3:</b> stakeholder principles	<p>Customers  The buyer’s key responsibilities to its customers may falter as a result of online reverse auctions  Customer health, safety, or environmental concerns are not considerations in the online reverse auction process</p> <p>Employees  Online reverse auctions will challenge employee dignity and ethics, due to a split in objectives: senior managers focus on stock price while employees focus on customer satisfaction</p> <p>Owners/investors  Online reverse auctions do not address the root cause of systemic cost problems, which should be of prime interest to owners/investors  Long-term use of online reverse auctions may also decrease owners/investors’ assets through a slow but steady decline in competitiveness and market share</p> <p>Suppliers  The use of online reverse auctions demonstrates a lack of mutual respect  Auction rules and contract terms and conditions are designed to heavily favor the buyer’s interests  Online reverse auctions are not free of coercion: there is explicit and implicit coercion, through both human and electronic means  Online reverse auctions do not foster long-term stability in supplier relationships nor do they promote integration of supplier personnel into the buyer’s planning process for new products  Seeking suppliers whose employment practices respect human dignity is not yet part of the expectations associated with online reverse auctions</p> <p>Competitors  Online reverse auctions focus companies inwardly on efforts to remedy chronic cost problems and therefore less on the competitive environment that surrounds them  Online reverse auctions can be viewed as a demonstration of mutual disrespect among competitors</p> <p>Communities  Concern for communities is not yet part of the expectations associated with online reverse auctions</p>

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.

*Comment 3.* Businesses are led by managers whose belief system is based on either companies existing to maximize shareholder value (Rappaport, 1998), or businesses existing to fulfill socio-economic objectives (Matsushita, 1984; Basu, 1999). These beliefs have existed as philosophical arguments and are thus not subject to a single deterministic solution. However, recently it has been proven that companies do not intrinsically exist to maximize shareholder value (Emiliani, 2001). The divisive tactics commonly used by management to increase shareholder value (Baker, 2001; Ball, 2001; Fraser, 2001; Petersen, 2001) are thus fatally flawed from the perspective of ethical business practices (Emiliani, 2001).

*Comment 4.* The online reverse auction bidding process is designed with the intent of ensuring fairness between the buyer and sellers. However, fairness is often not achieved in actual practice, particularly with regard to the implementation of online auction results (Emiliani and Stec, 2001, 2002). In addition, the buyer is under no obligation to accept the results of online reverse auctions. Thus, the buyer can, at any time, ignore the “spirit of honesty and fairness” for whatever reason. Further, some buyers may pursue parallel paths and use online reverse auctions to achieve short-term savings with the intent to source work to lower cost producers in the future.

*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.

*Comment 5.* The primary, if not sole reason for using online reverse auctions is to reduce the price of purchased materials in order to reduce the cost of goods sold (Emiliani, 2000). This can result in sourcing work to low wage countries. The buyer’s interest in social and economic development in foreign countries is weak, if even a consideration. If fact, some buyers would prefer that social and economic conditions remain poor in order to prolong the benefits of low-cost labor.

*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.

*Comment 6.* Buyers frequently use the word “partnership” to describe the type of relationship that they seek. However, their true intent, as demonstrated by managerial beliefs and behaviors, as well as actual business practices, is often inconsistent with this goal (Emiliani, 2002). As a result, sellers will continue to distrust buyers and withhold key information, such as price breakdowns, in order to maintain leverage. Sellers may also invoke overt or covert retaliatory measures to achieve financial restitution when the opportunity presents itself (Emiliani and Stec, 2001).

*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.

*Comment 7.* Rules are difficult to respect when buyers seek to optimize their own business position at the expense of their suppliers. As a result, online reverse auctions can result in many types of adverse consequences and unintended outcomes (Emiliani, 2000, 2001, 2002; Emiliani and Stec, 2002). Principal shortcomings include terms and conditions that heavily favor the

buyer's interests, reducing the long-term competitiveness of buyers and sellers, perpetuating short-term transactional relationships, and the ineffective use of resources (Emiliani and Stec, 2001, 2002).

*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.

*Comment 8.* Online reverse auctions support this principle by matching buyers and sellers across continents, notwithstanding the issues identified in all previous and following comments.

*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.

*Comment 9.* This principle is not yet part of the expectations associated with online reverse auctions. The authors are unaware of any company whose procurement policy links the use of online reverse auctions to respect for the environment. Terms and conditions reviewed by the authors do not require overseas sellers to adhere to the same environmental standards that apply to domestic sources, let alone practice sustainable development. Suppliers residing in countries with few or ineffective environmental laws will likely enjoy improved price competitiveness and thus may be attractive sources of supply, all other capabilities being equal.

*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.

*Comment 10.* This principle is relevant to any business activity, including online reverse auctions. Buyers or sellers may use illicit practices to influence post-bid award decisions. Most large companies have a code of ethics to guide buyer and seller behaviors.

### Section 3. Stakeholder 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.

*Comment 11.* There is a high probability that the buyer's key responsibilities to its customers may falter as a result of online reverse auctions. For example, the quest for low prices may come at the expense of quality, delivery, or service. Remedies for customer dissatisfaction may be complicated by short-term difficulties in re-establishing capable sources of supply and associated costs. Customer health, safety, or environmental concerns are not yet mainstream considerations in the online reverse auction process.

#### *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.

*Comment 12.* Employee dignity will be challenged by companies that use online reverse auctions. First, the very use of online reverse auctions is an affront to the knowledge and capabilities of purchasing professionals. It diminishes, if not trivializes, the importance of the purchasing function and the knowledge possessed by its practitioners. Favorable auction results often inspire executives to comment on the poor job that purchasing professionals have historically done to obtain the lowest price. Management incorrectly concludes that purchasing professionals are at fault and ignores the flawed business system within which they are forced to operate (Womack *et al.*, 1990; Emiliani, 2002).

*Comment 13.* Importantly, employee ethics will also be challenged. By using online reverse auctions, management creates an intense split in business objectives: i.e. senior management focuses on stock price (Emiliani, 2001; GE, 2001b), while employees focus on customer satisfaction (i.e. quality, delivery, and service). But don't rush to blame the employees. Management must first perform root cause analysis to determine the factor(s) that cause employees to behave this way. Inevitably, the root cause will lie in the direction of management's focus on local optimization (Emiliani and Stec, 2002).

*Comment 14.* Given the resourcefulness of humans, it is likely that they will find many creative ways to undermine online reverse auctions and quickly render them another "flavor of the month". For example, engineers may design new products that are immune to online reverse auctions by selecting suppliers with highly specialized capabilities, equipment, or proprietary processes. Remarkably, the unintended consequence of such actions will be higher costs! Purchasing people may establish material requirements far into the future to complicate resourcing or hedge against possible quality or delivery problems by maintaining a second source of supply, thus partially defeating the purpose of online reverse auctions. Quality personnel may slow down or deny qualification of new suppliers, withhold quality history (i.e. lessons learned) from new sources, or provide inadequate instruction on compliance.

#### *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.

*Comment 15.* Online reverse auctions are a technological solution to the fundamental problem of continuous cost reduction faced by businesses operating in competitive markets. However, it does not address the root cause of systemic cost problems, which should be of prime interest to owners/investors. By not understanding the root cause, it is reasonable to conclude that in using online reverse auctions, management has failed to honor the trust that investors have placed in them. The outcome will be unpredictable cyclic financial performance: going from boom to bust every three to five years (Johnson and Bröms, 2000). Thus, investors must pressure management to determine the root cause of why it needs to use online reverse auctions and then demand corrective actions that result in the elimination of systemic cost problems (Emiliani and Stec, 2002).

*Comment 16.* Long-term use of online reverse auctions may also decrease owners/investor's assets through a slow but steady decline in competitiveness and market share, as customers become less tolerant of the problems they experience caused by management's willingness to make trade-offs in price, delivery, quality, and service. Since online reverse auctions do not address the root cause of poor cost performance, their use will retard the company's ability to develop capabilities that will be necessary to compete effectively in the future (Emiliani and Stec, 2002). In particular, it relieves key functions of important responsibilities relative to cost reduction. For example, 80-90 percent of the cost of a product is in its design (Cooper and Slagmulder, 1999). Why should engineers worry about product cost if purchasing will do the job for them?

#### *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.

*Comment 17.* The use of online reverse auctions demonstrates a lack of mutual respect. Specifically, the company discounts the value of its current suppliers and their capabilities, particularly with regard to price. The buyer, in essence, thinks that it is being overcharged by its current supplier(s). Also, the rules established for online reverse auctions, as well as terms and conditions, are designed to heavily favor the buyer's interests (Emiliani and Stec, 2001).

*Comment 18.* The buyer's responsibility to seek fairness and truthfulness are compromised by the belief that they are being overcharged. Thus, buyers who believe that suppliers are not fair or truthful will typically feel no compulsion to themselves be fair or truthful. Root cause analysis will point to the buyers' own history of using divisive business practices as the source of distrust (Emiliani, 2002).

*Comment 19.* Online reverse auctions are not free of coercion. In fact, explicit and implicit coercion, both human and electronic, are integral components of the process. Both the buyer and the provider of online reverse auction services coerce suppliers, particularly incumbent suppliers, to participate in the auction or risk losing the business up for bid. Real-time open dynamic bidding, as documented in the bid record graph (Emiliani, 2000), constitutes electronic coercion in that it compels suppliers to bid. In addition, the software used to control bidding may require suppliers to input lower bids in fixed increments of 2-4 percent, thus forcing conformance. The online reverse auction process greatly magnifies the buyer's clout and thus perpetuates traditional power-based bargaining relationships.

*Comment 20.* Online reverse auctions do not foster long-term stability in supplier relationships. Rather, their intent is to perpetuate short-term relationships, which supports most buyers' long-standing practice of switching sources when convenient in order to obtain lower unit prices.

*Comment 21.* Online reverse auctions do not result in the integration of supplier personnel into the buyer's planning process, particularly for new products. Since the bulk of parts auctioned have already been designed, suppliers are unable to materially influence part cost. In general,

buyers continue to view suppliers as instruments instead of valuable resources, thus perpetuating transactional purchasing practices which block the flow of valuable information (Nishiguchi, 1994).

*Comment 22.* Most buyers seek to pay suppliers on time and in accordance with the agreed-upon terms of trade. However, online reverse auctions present buyers with the opportunity to amend terms and conditions. It is common for a buyer to seek to extend payment terms from 30 days to 45 or 60 days, in an attempt to improve its own cash flow (Emiliani and Stec, 2001). Thus, the buyers' desire for improved financial performance will come at the suppliers' expense. See comments 16 and 19.

*Comment 23.* Seeking suppliers whose employment practices respect human dignity is not yet part of the expectations associated with online reverse auctions.

### *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.

*Comment 24.* Online reverse auctions focus companies inwardly on efforts to remedy chronic cost problems and therefore less on the competitive environment that surrounds them. Thus, companies that use online reverse auctions may lose sight of their customer's interests and miss important opportunities to better serve them, such as new products or services.

*Comment 25.* Socially beneficial competitive behavior implies the creation of jobs, increasing the standard of living, mutual prosperity, etc. (Matsushita, 1984). Online reverse auctions can have the opposite outcome if work is sourced from domestic to overseas suppliers. In addition, there is no guarantee that buyers will remain committed to new foreign sources, thus making socially beneficial competitive behavior an unrealistic goal.

*Comment 26.* Online reverse auctions can be viewed as a demonstration of mutual disrespect among competitors if the outcomes are price wars, reduced competitiveness (see comments 15 and 16), customer dissatisfaction, and erosion of prosperity in a given industry (Matsushita, 1984).

### 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.

*Comment 27.* Concern for communities is not yet part of the expectations associated with online reverse auctions.

### Summary

The analysis of online reverse auctions in relationship to the Caux Round Table *Principles for Business* reveals numerous inconsistencies and adverse outcomes. These results have important implications for both economic theory and everyday business practices (Emiliani, 2001; Emiliani, 2002; Sigmund *et al.*, 2002).

While the results contained in this paper clearly point to opportunities for improving

online reverse auctions, the fact remains that their fundamental purpose is to leverage buying power and perpetuate power-based bargaining relationships (Womack *et al.*, 1990; Nishiguchi, 1994; Emiliani, 2000). Sellers will continue to protect their own interests, thus preserving the traditional pattern of undesirable behavior between both parties.

Our findings illustrate that businesses using online reverse auctions for buyer-designed industrial components can never be in compliance with the *Principles for Business*. The reason is simple: online reverse auctions lead to a breakdown of cooperation between the buyer and sellers, as the buyer seeks to satisfy its own selfish desires (Emiliani, 2001, 2002; Sigmund *et al.*, 2002). Not surprisingly, sellers will retaliate when the opportunity arises. Further, the *Principles for Business* is based in part on the spirit of cooperation: the Japanese concept of *kyosei*. Online reverse auctions are simply a new and more effective means of operationalizing a zero-sum purchasing game, where the gains of the buyer are derived from the losses of the seller. While they may improve the short-term competitiveness of buyers and sellers, they do not contribute in any meaningful way to long-term competitiveness because they do not result in capability building (Fujimoto, 1999) or provide a rational framework for analyzing costs, establishing prices, or determining profits (Womack *et al.*, 1990).

The simple reality that most buyers choose to ignore is that effective cost reduction can only be achieved if they forge close links with their key suppliers and engage in collaborative cost reduction (Womack *et al.*, 1990; Bounds, 1996; Bounds *et al.*, 1996; Cooper and Slagmulder, 1999). This will require a much higher level of commitment and discipline than that typically exhibited by today's managers.

Instead of resorting to online reverse auctions, buyers are advised to determine the root cause of systemic cost problems (Emiliani and Stec, 2002), align their purchasing policies and practices with the Caux Round Table *Principles for Business*, focus on customer needs, and develop innovative products and services to drive sales growth.

This paper points to several avenues for future research. For example, what is the impact of online reverse auctions on



buyer-seller relationships? How does the breakdown of cooperation between buyer and sellers affect future interactions? Will they be diminished or strengthened? If so, how and why? What types of unique explicit and tacit knowledge do suppliers possess that cannot be easily replicated by other sources? Did the buyer understand, prior to the online reverse auction, the types of knowledge that could not be replicated? What are the strategies and tactics used by sellers to retaliate against buyers in order to re-establish a sense of fairness? How satisfied are senior managers with online reverse auction results? This could be determined via questionnaire for a cross-functional group of senior managers from both buyer and seller companies in defined intervals such as six months, 1.5 years, three years, and five years after the first online reverse auction event. Finally, are there any circumstances under which buyers can use online reverse auctions while at the same time being in compliance with the *Principles for Business*?

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# Insight from industry

## Realizing savings from online reverse auctions

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### Keywords

Business-to-business marketing, Cost management, Internet, Reverse logistics

### Abstract

Discusses the savings that can result from online reverse auctions for the specific case of buyer-designed machined parts. Distinguishes between gross and net savings, and highlights factors that can reduce the magnitude of anticipated savings. Determines that the savings actually achieved are less than that reported by suppliers of online auction services for the type of buyer-designed production materials under consideration. Examines the root cause of why managers use online reverse auctions to reduce the price of purchased goods and services. Concludes that the root cause of online reverse auctions is local optimization of the business system along functional, managerial, or financial dimensions, which in turn perpetuates chronic underutilization of valuable internal and external resources.

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### Introduction

Online reverse auctions, also known as downward price auctions, have recently become a popular method for reducing the price of purchased materials used in the production of durable goods (Richards, 2000; Tully, 2000; Judge, 2001). The potential benefit is significant because large publicly owned businesses that suffer from low top-line growth can significantly increase their profitability simply through a reduction in the cost of goods sold. For a 20 percent gross margin business, one dollar saved in cost is equivalent to five dollars in sales. The financial benefit of online reverse auctions is simply too attractive for most senior managers to ignore. It is a highly sought-after "quick hit" solution that supports short-term management objectives driven by the requirement to maximize shareholder value (Rappaport, 1998; Emiliani, 2001a,b).

The general process, as well as its dubious strengths and key weaknesses, have been described previously (Emiliani, 2000a). The scope of this paper is limited to online reverse auctions of machined parts that have been designed by the buyer. Thus, the focus is on sellers that function solely as "make to print" sources of supply. It does not address commercial services or industry standard products, where anticipated savings may be more commensurate with that reported by the suppliers of online reverse auction services.

Companies that provide online reverse auction services are also known as "market makers". They assist the buyer in creating comprehensive request for quote (RFQ) packages that categorize parts in logical groupings, by part or process family, to facilitate quoting and online bidding. The RFQs are often better structured than the buyer has historically produced which results in a more complete description of the procurement under consideration. Sellers thus gain a better understanding of the buyer's total requirements with regard to cost, delivery, and quality (Emiliani and Stec, 2001a).

The process culminates in real-time, dynamic, open bidding conducted over the Internet between tens of suppliers versus the traditional static three-quote closed bidding process. The dynamic bidding process typically results in significantly lower prices



than the buyer has previously paid (Figure 1). The value delivered by online market makers is primarily in the RFQ process and joining the buyer and multiple sellers in real-time reverse auctions using proprietary software. The market maker does not support implementation of online reverse auction results. That activity, known as resourcing, requires significant additional work, including qualification of new suppliers, switching sources, schedule overlap, etc., and is left entirely to the buyer.

The leading providers of online reverse auction services include Ariba, Commerce One, eBreviate, FreeMarkets, and FrictionlessCommerce. Their web sites and promotional materials claim savings that range from 10-50 percent for the type of buyer-designed industrial parts considered in this paper (Ariba, 2001; CommerceOne, 2001; eBreviate, 2001; FreeMarkets, 2001a; FrictionlessCommerce, 2001). This paper examines the savings that result from online reverse auctions to determine if it is as great as advertised. The ensuing analysis is based upon first-hand experience with nearly a dozen online reverse auctions conducted by a leading multinational durable goods company located in the USA.

## Savings terminology

Three terms are used to describe the savings that result from online reverse auctions.

These include:

- (1) identified savings;
- (2) estimated savings;
- (3) achievable savings.

All are used interchangeably to describe the maximum achievable savings, or gross savings, that exist at the conclusion of the online auction. Gross savings is defined as (Figure 1):

$$\text{Gross savings} = \text{Historic price} - \text{Lowest bid.}$$

The actual, or net savings will almost always be less than that indicated by the lowest bid, and is defined as:

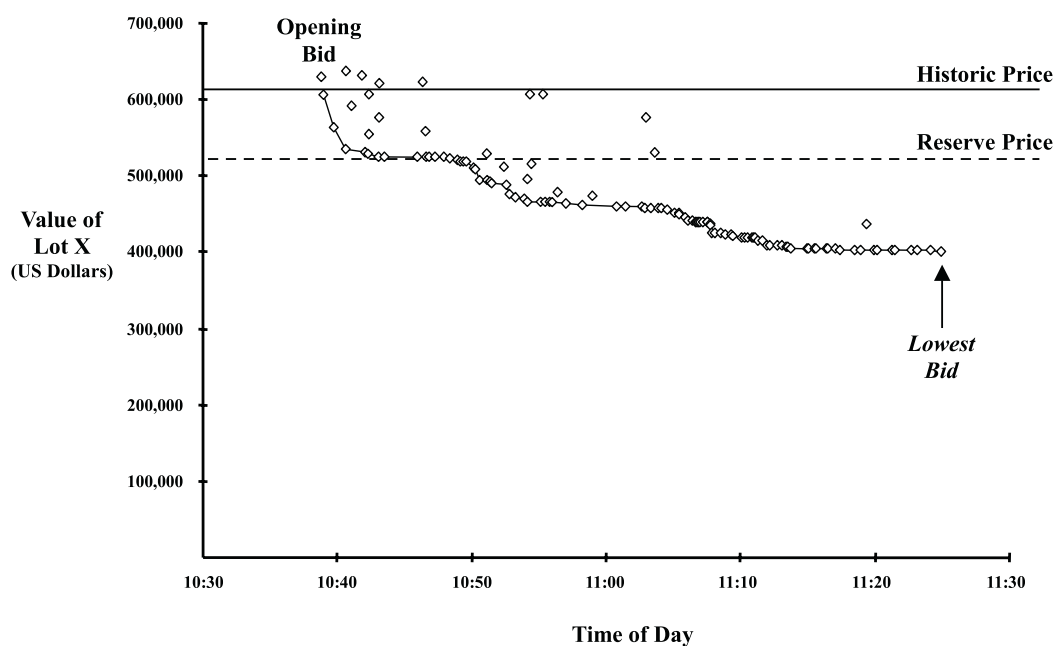
$$\text{Net savings} = \text{Gross savings} - \text{Losses.}$$

Online auctions often result in switching to new sources of supply. The reserve price, which is established by the buyer, represents the price at which the buyer will consider switching sources. This can serve as an estimate of the switching cost, which is defined as:

$$\text{Switching cost} = \text{Historic price} - \text{Reserve price.}$$

The actual switching costs can be higher or lower depending upon the specific

**Figure 1** Example of a bid record generated from an online auction for "Lot X" of buyer-designed machined parts



**Notes:** The historic price is the price most recently paid by the buyer. The reserve price represents the price at which the buyer will consider switching sources. Gross savings is the maximum achievable savings, and is the difference between the historic price and the lowest bid (Emiliani, 2000a). It should not be assumed that all bid data are correct, as supplier pricing may only be a rough estimate or contain errors, or that the lowest bids accurately represent the lowest price

circumstances. Often it is higher because the reserve price may be determined arbitrarily or without consideration or knowledge of total costs.

### Savings losses

The savings advertised by all market makers is, in fact, the gross savings. That is, the maximum achievable savings if the buyer was to source the work to the lowest bidder. Market makers inform their clients that the net savings they can expect to realize may be lower due to various factors including (FreeMarkets, 2001b):

- The buyer may not select the lowest bid.
- Changes in price through post-online auction negotiation.
- The buyer may not purchase all of the line items.
- The buyer may not purchase any of the line items.

These are termed direct losses. Auction rules give the buyer the discretion to accept any bid, not just the lowest bid. The buyer normally selects bids that represent the best combination of price, quality, and delivery, and may also include other factors such as available capacity, technology, location, management acumen, etc. In addition, post-auction bid analysis may result in additional price negotiations between buyer and seller. Thus, some line items may be removed while others could be added. Finally, the buyer's production schedule may change significantly between the time the auction is held and when parts are actually needed.

These are just a few of the direct losses that the buyer may experience. In the real, and thus imperfect, world of procuring buyer-designed machined parts, many other types of direct losses are likely to be encountered. The buyer will also suffer indirect losses that are not accounted for in the purchase price. Table I summarizes the numerous types of direct and indirect losses that buyers fail to consider when contracting for online reverse auction services.

The gross savings evident at the conclusion of the online reverse auction are thus likely to be significantly higher than the net savings realized as the buyer begins to receive parts from the new supplier a few months after the online reverse auction

event. Figure 2 shows the major direct and indirect losses and the range by which gross savings can be reduced.

The companies that provide online reverse auctions services have targeted the *Fortune* 1,000 companies. Most of these are publicly owned businesses largely managed by executives that focus their efforts on maximizing shareholder value (Rappaport, 1998). In addition, the majority of these businesses are also batch-and-queue producers whose businesses typically lack well-defined processes for proactively managing costs. Instead, they rely on traditional measures to reduce cost, including layoffs, plant closings, and squeezing suppliers (Ball, 2001; Nikkei, 2001; Young, 2001). Both points are significant for the following reasons:

- By focusing exclusively on maximizing shareholder value, management ensures that its decisions result in benefits that accrue primarily to its shareholders – including senior managers, whose compensation is often heavily weighted towards stock price. This results in activities that, knowingly or not, divide key stakeholders (Emiliani, 2000b; 2001b).
- Managers that practice batch-and-queue production focus on local optimization of individual disciplines or metrics (Emiliani, 2000b; Emiliani and Stec, 2001a). The focus on local optimization typically results in cyclic financial performance – going from boom to bust every four to seven years (Fulghum, 1999; Maremont and Berner, 1999; Ball, 2001; Brubaker, 2001). These unfortunate outcomes are driven by repetition of errors, high cost designs, poor production planning, and slow response to changing market conditions (Emiliani, 2001a).

Online reverse auctions pander to vast number of executives that are fixated on unit cost. They typically view online reverse auctions as an easy way to improve financial performance, and thus quickly increase shareholder value, by locally optimizing the purchase price of production materials. The service is sold as a “quick hit” solution, strengthened by the allure of rapid price negotiation and B2B e-commerce hype. This combination has proved irresistible to many

**Table I** Summary of direct and indirect losses

<b>Direct losses</b>	
<b>Award decision</b>	Lowest bid not selected Buyer does not purchase all line items Buyer does not purchase some line items
<b>Data integrity</b>	Errors in buyer's purchasing database Errors in seller data (i.e. raw material or outside service pricing) Lot bids do not equal sum of line item bids
<b>Timing (realization of savings)</b>	Post-auction negotiation Award analysis and decision process Contract approvals Change in part volume and mix Current purchase order coverage Schedule overlap policy Seller can not produce or qualify part Part transition delays due to capacity constraints Timing of receipts
<b>Indirect losses</b>	
<b>Logistics</b>	Travel expense to monitor resourcing and new supplier performance Increased telecommunications costs Increased transportation costs Longer lead-time requires finished goods buffer inventory (i.e. overproduction)
<b>Recurring expense</b>	Additional manpower to manage resourcing program
<b>Non-recurring expense</b>	Fees paid to online reverse auction service company Qualification of new supplier Technical assistance Errors in blueprint or specification interpretation System set-up and administration Durable tooling Expedite fees Litigation due to supplier non-performance
<b>Customer dissatisfaction</b>	Quality problems and late deliveries Lost sales Financial penalties Warranty expenses

senior managers, particularly CEOs, presidents, and purchasing vice-presidents; people not known for their grasp of total costs (Brady, 2000; Schultz, 2000; Ball, 2001; Brubaker, 2001).

When the benefits of online reverse auctions are understood at only a superficial level, it clearly appears to be an effective way to reduce unit costs. However, for many companies the promise of lower unit costs is just an illusion because expenses in other budget categories (i.e. indirect losses) may actually increase. The cost of goods sold will thus be maintained or may even increase. Senior executives typically do not care to know about the details regarding possible direct and indirect savings losses. Instead, they prefer to let mid-level managers deal with process shortcomings, including the lengthy

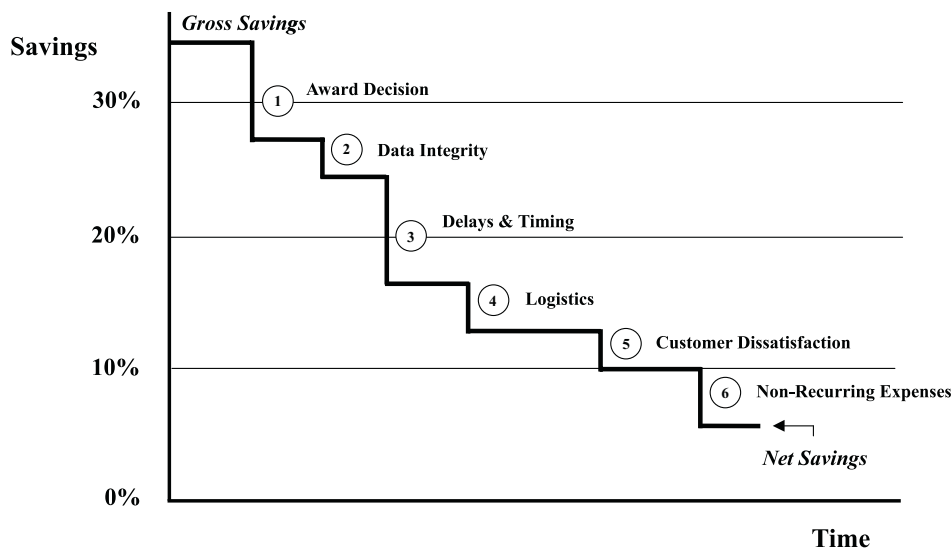
and difficult task of implementing online reverse auction results.

A typical response by a supplier to online reverse auctions for buyer-designed machined parts is (Supplier, 2001):

[The worst vendors are being awarded the work]. And as an extra bonus, [Company X] has killed the supplier morale in the process . . . as these vendors collapse, they are calling all around for material and parts to satisfy urgent needs. The buyers at [Company X] are calling too, for the same parts that these places can not produce, and paying expedite fees to legitimate machine shops to run quick lead-time work. [Company Y] went out of business, a few more have already sold and the rumor has that some of the others are on the block. I've never seen such a total eradication of an entire supply base in such a short time.

An over-reaction? Perhaps. One can surely find examples of more successful outcomes.

**Figure 2** Schematic diagram of direct and indirect savings losses that buyers may experience when implementing online reverse auction results



**Note:** Savings are not realized until the buyer begins to receive parts from the supplier

However, the evidence indicates that online reverse auctions are a destructive cost reduction tactic that divides key stakeholders (Emiliani, 2000a; Emiliani and Stec, 2001a).

If online reverse auctions are so good, then how come its most ardent users do not want it applied to their own products (Richards, 2000)? Companies that hold this view do not want to be “beat up” by their customers in the same way that they “beat up” their suppliers! A duplicitous view of online reverse auctions will certainly not improve the buyer’s credibility in the eye of suppliers.

### Alternative approaches

The reduction in gross savings due to direct and indirect losses can result in substantially lower net savings (Figure 2). So a question needs to be asked: “Can this level of savings be achieved, or exceeded, by other means?”

The first place to look is the supply management practices used by Lean producers, which stand in stunning contrast to the practices used by companies deeply scripted in batch-and-queue management practices (Emiliani, 2000b). The literature describes many examples of the type of collaborative cost reduction methods used by Lean producers (Womack *et al.*, 1990; Nishiguchi, 1994; Monden, 1995; Bounds, 1996; Bounds *et al.*, 1996; Cooper and Slagmulder, 1999; Fujimoto, 1999; Nikkei,

2000a,b). A rational approach is used to establish prices, analyze costs, and share the benefits of process improvement activities. It emphasizes mutual prosperity, reciprocal obligation, and problem solving versus exploitative power-based bargaining.

In order to begin to apply these practices, senior management must first accept the fact that 90 percent of the cost of a product is in its design (Nishiguchi, 1994; Cooper and Slagmulder, 1999). Most managers, particularly those responsible for engineering, ignore this reality and instead reinforce individual and organizational behaviors that emphasize the importance of producing the best possible technical design. This type of local optimization is common to most businesses, not just those that are engineering-driven.

The design activity has the greatest influence on cost reduction, followed by manufacturing (Monden, 1995). But in order to realize cost reduction in design, the producer must understand market prices, effectively transmit this information to engineering who must then practice value engineering and target costing (Monden, 1995). When implemented correctly, engineering assumes the primary responsibility for cost management – not finance or operations. Manufacturing (inclusive of suppliers) assumes an important secondary role, using value analysis and *kaizen* costing to reduce costs further in

response to changes in market conditions such as increases in raw material prices or price reductions by competitors (Monden, 1995).

There are many important details regarding the introduction and development of lean supply practices (Nishiguchi, 1994; Fujimoto, 1999). It will not work effectively if only certain practices are adopted (Shinohara, 1988). It is part of a larger constellation of management practices that together yield business results based upon leveraging the skills and capabilities of key stakeholders, rather than by dividing them. Practitioners must recognize that the methods pioneered by lean producers require a level of commitment and discipline that does not exist in businesses that are driven by batch-and-queue thinking.

Online reverse auctions can also have unintended consequences or undesirable outcomes, two of which are worth noting.

First, it perpetuates the existence of transactional, or instrumental, relationships between buyers and sellers (Nishiguchi, 1994; Fujimoto, 1999). Buyers do not challenge suppliers to accept additional responsibilities and develop new value-added capabilities. Over time, the buyer inadvertently de-skills its suppliers, or at least ensures maintenance of only its current skills. Paradoxically, this will hurt the buyer's own future competitiveness and will result in many more rounds of heavy-handed cost cutting. Thus, as a result of online reverse auctions, both the buyer and seller will fail to develop the capabilities that are needed to compete effectively in the future. A fundamental skill is to practice consistently the specific buyer behaviors that lead to superior supplier performance (Nishiguchi, 1994; Fujimoto, 1999).

The second relates to the structure of the supply base. Batch-and-queue companies typically conduct business with numerous Tier-1 suppliers, in part to ensure redundant capabilities in times of peak demand. Predictably, the annual spend for a given commodity is highly fragmented among many suppliers. So in addition to unit cost reduction, online reverse auctions can help the buyer consolidate its fragmented supply base. The intended outcome is fewer suppliers (Figure 3), while the actual result may be a temporary increase in the number of suppliers until the resourcing of specific commodities is complete.

More importantly, however, the online reverse auction process does not fundamentally restructure the supply network, as shown in Figure 4. Lean producers have, over time, organized their suppliers in tiered clusters to simplify coordination and control, improve communication, develop supplier capabilities, and enable more rapid response to changing market conditions (Nishiguchi, 1994; Cooper and Slagmulder, 1999).

Buyers that perpetuate instrumental supplier relationships and ignore the need to restructure their supply networks place their enterprise at risk. The frantic quest for unit cost reduction using online reverse auctions can, in fact, turn out to be far more expensive than first appearances would indicate.

In addition, online reverse auctions, as currently practiced, are clearly inconsistent with key tenets of the Caux Round Table "principles for business", particularly as it pertains to supplier relationships: i.e. mutual respect, coercion, and long-term stable relationships (Caux, 2001; Emiliani and Stec, 2001b).

### Why do managers use online reverse auctions?

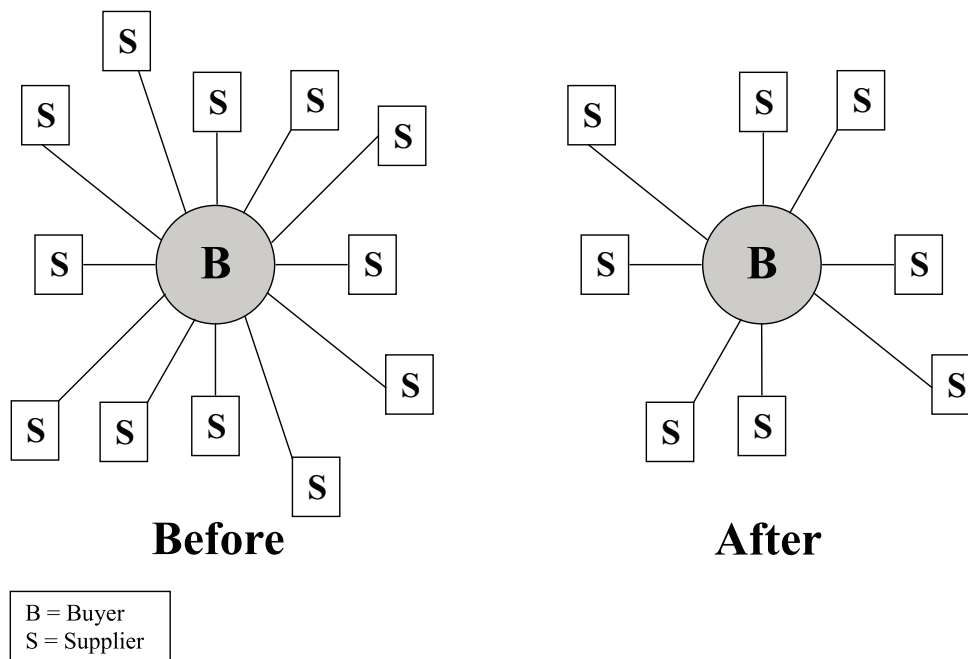
A fundamental question has yet to be answered: "Why do managers use online reverse auctions?" Is it simply because a new, and apparently effective, tool is now available? Or are there other reasons?

Business leaders regularly establish aggressive goals for corporate performance in response to global competition. The goals are usually financial in nature, but can also include quality, lead-time, and new product development. For example:

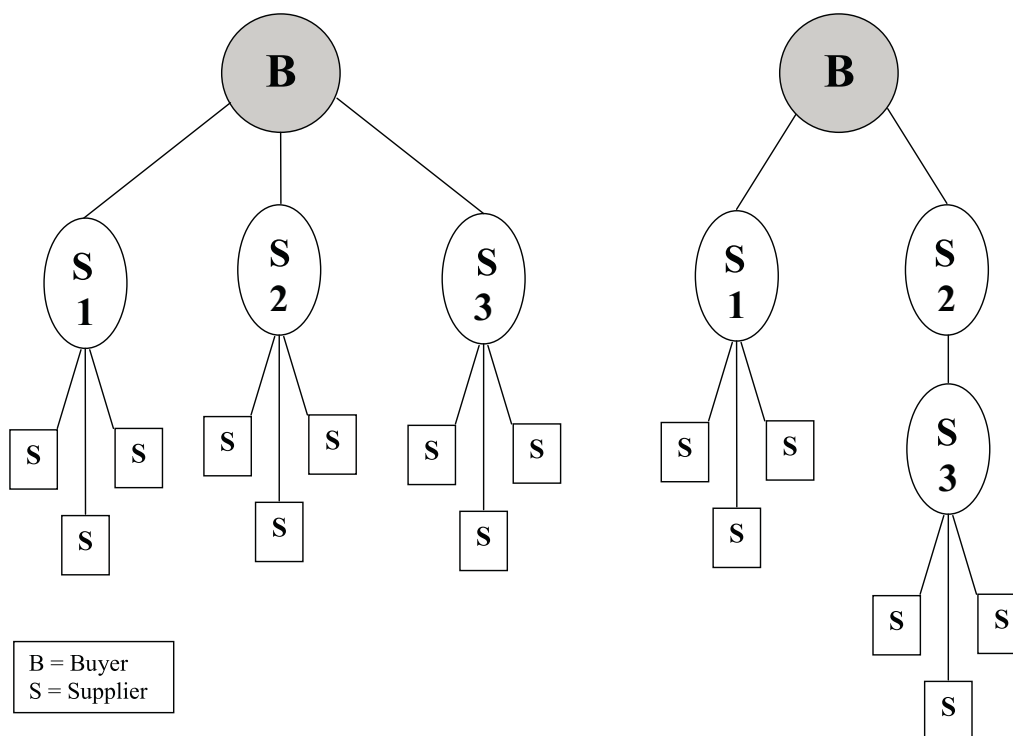
- increase cash flow by 100 percent;
- increase working capital turnover by 30 percent per year;
- double inventory turns;
- develop new products in half the time with half the money;
- reduce costs by 30 percent;
- improve product or service quality by 50 percent.

Employees lacking well-defined processes for managing and reducing costs are often left to their own devices for meeting these goals. They focus on local optimization and believe

**Figure 3** Online reverse auctions preserve the existence of many individual supplier relationships for a given commodity, resulting in the continuation of high maintenance costs to the buyer for a given commodity



**Figure 4** In contrast to Figure 3, the buyer (left) organizes its suppliers into clusters for specific commodities (Nishiguchi, 1994)



**Note:** In the future, buyers (right) may ask key suppliers (S2) to coordinate the work of other large suppliers (S3) in the same commodity group where the annual spend, product functionality, engineering content, and value-added are all high (Nikkei, 2000a)

that their individual efforts will accrue to the larger goal. In reality, local optimization comes at the expense of optimizing the performance of the entire enterprise

(Emiliani, 2000b). Managers, pressured by a lack of time and the need for quick results, will tend to use the well-worn methods that have worked for them in the past. The focus is



clearly on achieving results and not the process used.

Individual departments will accept responsibility only for the goals that they consider to be relevant to them or within their direct control. Rarely will they think about how to achieve goals that, at face value, appear to be another department's area of responsibility. This view is strongly reinforced by senior management because expectations, performance measures, and rewards are aligned with functional areas of responsibility. Senior management rarely asks:

- How can engineering contribute to the goal of increasing cash flow by 100 percent?
- How can human resources contribute to the goal of doubling inventory turns?
- How can marketing contribute to the goal of reducing costs by 30 percent?
- How can quality contribute to the goal of doubling net income?
- How can finance contribute to the goal of improving product quality by 50 percent?

Senior managers do not ask these questions simply because they cannot answer them. This is due in large part to the fact that business schools focus on teaching local optimization and implicit integration among stakeholders. Explicit integration cannot be realized when the basis for learning is rooted in batch-and-queue business practices, dominated by the traditional mindset in which tradeoffs are seen as acceptable solutions to business problems.

When businesses face severe performance problems, a great deal of effort is expended to identify solutions that will quickly restore the company's health. However, the solutions usually address the symptom but not the fundamental cause of the problem. As a result, mistakes are repeated (Bianco and Moore; 2001; Higgins, 2001). Interestingly, managers rarely use root cause problem solving methods to solve management problems.

### Root cause analysis

Given its high potential for creating discord among stakeholders and the likelihood of other unfavorable outcomes, it would make sense if management first understood the root cause of why it needs to use online reverse

auctions. This information will either validate the need for using online reverse auctions or point to fundamental shortcoming in business practices that must be corrected in order to eliminate the occurrence of costly repetitive errors.

The method used to determine the root cause of why managers use online reverse auctions is called the "five whys". The "five whys" is a technique commonly used by Toyota Motor Corp. and other practitioners of lean production (Ohno, 1988). In this method, the people closest to the problem ask "why" five or more times until the root cause has been determined. It is a simple yet highly effective tool.

The basic question of "why managers use online reverse auctions" can be complicated by the fact that there may be many first-order reasons for undertaking this activity. Thus, several different paths can be taken depending on the point of view of the people involved in determining the "five whys". Figure 5 shows the results of several different root cause analyses. While the path, or frame of reference, differs in each case, the result is the same. The root cause of online reverse auctions is local optimization of the business system along functional, managerial, or financial dimensions.

Business utilizes many different types of resources, both internal and external, in order to fulfill customer requests, including: financial, physical (land, building, and machines), information, people (explicit knowledge, tacit knowledge, social), and time. Most executives struggle to utilize resources effectively because they manage intuitively using the principles of batch-and-queue production (Emiliani, 2000b). This results in the practice of managing resources as separate entities, principally because it appears to simplify management's duties.

In contrast, lean production is counterintuitive and views resources as linked, or closely-coupled, elements that must be managed in unison in order to deliver value to customers (Ohno, 1988; Womack *et al.*, 1990; Monden, 1993; Womack and Jones, 1996). As a result, tradeoffs, which pervade batch-and-queue thinking, are minimized or eliminated. This view will also achieve greater satisfaction among stakeholders (Emiliani, 2000b; 2001a).

There are many important tenets in lean production (Ohno, 1988; Womack and

**Figure 5** Why do managers use online reverse auctions?

(a)

**Why do Managers Use Online Reverse Auctions?***Costs are too high*

Why are costs too high?

*Managers don't know how to manage costs*

Why don't managers know how to manage costs?

*Managers are not taught how to manage costs*

Why don't managers know how to manage costs?

*Professors don't teach how to manage costs*

Why don't professors teach how to manage costs?

*Professors don't know how to manage costs*

Why don't professors know how to manage cost?

*Professors focus on local optimization*

Why do professors focus on local optimization?

*Solutions are deterministic*

(b)

**Why do Managers Use Online Reverse Auctions?***Products are designed without customer input*

Why are products designed without customer input?

*Company thinks it knows what customers want*

Why does the company think it knows what customers want?

*Company is arrogant (past success)*

Why is the company arrogant?

*Leaders don't talk to customers*

Why don't leaders talk to customers?

*Leaders are internally focused*

Why are leaders internally focused?

*There are many internal problems*

Why are there many internal problems?

*Managers explicitly or implicitly approve of local optimization*

Why do managers approve of local optimization?

*That is how they were taught to manage*

(c)

**Why do Managers Use Online Reverse Auctions?***Products are designed with low emphasis on cost*

Why are products designed with low emphasis on cost?

*Designers control tradeoffs*

Why do designers control tradeoffs?

*Management lets designers control tradeoffs*

Why does management let designers control tradeoffs?

*Management manages by using tradeoffs*

Why does management manage by using tradeoffs?

*Because tradeoffs are seen as acceptable solutions*

Why are tradeoffs seen as acceptable solutions?

*Because they result in local optimization (which is presumed to be an efficient outcome)*

(d)

**Why do Managers Use Online Reverse Auctions?***Because they need a quick solution to cost problems*

Why do managers need a quick solution to cost problems?

*They have pressure from investors*

Why do they have pressure from investors?

*Company must increase financial performance*

Why must the company increase financial performance?

*To increase stock price*

Why must management increase stock price?

*Rewards tied to stock price*

Why are rewards tied to stock price?

*To align management and investor interests*

Why are manager and investor interests aligned?

*To optimize financial performance (i.e. local optimization)*

(e)

**Why do Managers Use Online Reverse Auctions?***Products are designed with low emphasis on cost*

Why are products designed with low emphasis on cost?

*Marketing lacks influence*

Why does marketing lack influence?

*Other functions judged to be more important*

Why are other functions judged to be more important?

*Management explicitly or implicitly perpetuates fiefdoms*

Why do managers perpetuate fiefdoms?

*To maintain power and control*

Why do managers maintain power and control?

*To achieve function-specific goals*

Why do managers focus on achieving function-specific goals?

*Structure and reward system reinforces local optimization*

Jones, 1996). However, two are particularly worth noting:

- (1) Specify value from the perspective of the end-use customer; i.e. the customer who pays for and uses the product or service.
- (2) Elimination of waste (where waste is defined as: activities that add cost but do not add value as perceived by the end-use customer).

As might be expected, resources will be more effectively utilized when activities that are not required by the customer are not performed.

In actual business practice, employees perform many types of activities that customers would not prefer to pay for. Examples can include management controls to ensure conformance to internal policies and procedures, or certain requirements mandated by regulatory agencies. Despite such requirements, these activities are just like any other in that they consist of both value-added work and waste. When confronted with non-value activities that cannot be easily eliminated, systematic efforts are directed towards eliminating waste using well-defined processes. However, the intent is not to evade the requirement. Rather, it is to understand better the requirement and deliver the desired result while more effectively utilizing resources.

Local optimization, by its very nature, requires focusing on improving individual departments or business metrics with little or no attention given to their impact on system-wide performance. It is assumed that improvements in one area will accrue to others, but without any detailed understanding of how this actually takes place. The online reverse auctions are an example of a business tool in which improvements (i.e. cost savings) can fail to provide enterprise-wide benefits due to increases in expenses in other budget categories.

The root cause analysis shows that management uses online reverse auctions to locally optimize purchasing performance in the belief that it will result in improved financial performance. This is done in tacit recognition of the fact that management has not utilized its key resources effectively. The rationale supporting this claim is summarized in Table II.

To understand better how poorly resources are typically utilized, consider both “people”

and “time”. The authors periodically ask their students, who are also full-time working professionals, how much of their time is wasted in activities unrelated to its end-use customers. Their response averages 50 percent, so approximately 1,000 hours per year is wasted. It is no surprise that many employees feel that they are not utilized effectively and could make much greater contributions to the business.

Couple this finding with the statement often uttered by senior management and repeated by followers: “resources are scarce”. In saying this, management perpetuates the false view that resources are scarce, when, in reality, waste is abundant. Thus, management’s persistent drive for local optimization delivers unintended consequences including gross underutilization of human resources.

## Summary

This paper examined the use of online reverse auctions for the specific case of custom-designed machined parts. In this context, online reverse auctions are judged to be a destructive cost reduction practice that divides key stakeholders. Further, its use can have unintended consequences such as reducing the long-term competitiveness of both buyers and sellers by reinforcing behaviors that degrade current capabilities or discourage the development of new competencies.

Pressure from investors to maximize shareholder value forces senior managers to look for “quick hit” solutions in order to meet short-term financial objectives. Online reverse auctions appear to be a quick and easy way to reduce the cost of purchased materials. However, gross savings are eroded by direct and indirect losses, which result in a net saving that may be unattractive given the amount of work that is needed to secure it. Managers considering the use of online reverse auction services should be mindful of the saying: “if it looks too good to be true, it probably is”.

Collaborative cost reduction methods, pioneered by lean producers, such as Toyota and Honda, are known to be more effective at both reducing the cost of purchased production materials and developing both the buyer’s and supplier’s capabilities (Bounds,

Table II Impact of local optimization on resource utilization

Resource	Rationale
<b>Internal resources</b>	
<b>Cash</b>	Spends too much money on new product development Does not share existing parts with new products New product exceeds market price, resulting in slow sales or discounting
<b>Physical</b>	Not applicable – see “Suppliers” category, below
<b>People</b>	Management reinforces tradeoff and local optimization thinking Employees focus on achieving functional performance measures
<b>Information</b>	Information loss, distortion, or blockage due to confusing and inconsistent messages
<b>Time</b>	Time wasted on local optimization, non-value added management reviews, responding to repeat problems, etc.
<b>External resources</b>	
<b>Suppliers (Nishiguchi, 1994; Fujimoto, 1999)</b>	Lack of supplier participation at the onset of design results in higher cost products Supplier overhead higher due to capital intensity of buyer-designed products that emphasize technical superiority Expensive equipment needed to produce difficult-to-make parts, resulting in higher overhead rates Overall failure by buyer to engage supplier and utilize the ideas, creativity, etc. of its personnel
<b>Customers</b>	Does not understand value as perceived by end-use customer Does not utilize customers as valuable source of information Important customer information does not reach key personnel
<b>Investors</b>	Investor capital not utilized effectively, which degrades stock price performance
<b>Competitors</b>	Does not learn from competitors: i.e. errors or innovations

1996; Bounds *et al.*, 1996). It is also consistent with the Caux Round Table “principles for business” (Caux, 2001; Emiliani and Stec, 2001b).

Long-term success in business requires commitment and discipline to business practices that leverage the skills and capabilities of key stakeholders over generations of managers. It also requires senior management to have the ability to discern the true nature of new opportunities such as online reverse auctions. Is the “quick hit” solution really as good as it appears to be? What hidden costs accompany such shortcuts and how will they impact key stakeholders? These are important questions to answer before joining the herd (Nikkei, 2000c).

The question “Why do managers use online reverse auctions?” was analyzed using the “five whys” technique. The results show that the root cause is local optimization of the business system along functional, managerial, or financial dimensions.

The results do not validate the use of online auctions. Rather, they point to serious shortcomings in traditional management

practices that must be corrected in order to eliminate costly repetitive errors.

Management’s focus on local optimization is characteristic of business practices rooted in batch-and-queue thinking. A persistent focus on local optimization results in poor resource utilization, which, over time, can further degrade the company’s performance.

Managers cannot reverse this situation by using traditional tools and techniques. Instead, they must unlearn what has been taught to them by academics and practitioners and re-learn the philosophy and practices associated with lean production.

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## Research note

# The inevitability of conflict between buyers and sellers

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### Keywords

Buyers, Conflict, Purchasing, Selling, Supply-chain management

### Abstract

Examines the source of conflict between buyers and sellers as it relates to the price of goods purchased for use in production. Focuses on management's understanding and application of the term "maximize shareholder value", which is found to result in business decisions that marginalize suppliers' capabilities and interests. Concludes that conflict between buyers and sellers is an inevitable outcome when buyers make decisions principally centered upon the literal interpretation of management's role as agents of the board whose primary responsibility is to maximize shareholder value. This finding has widespread implications for both academics and practitioners, as making this linkage explicit defines the challenge for improving purchasing and supply chain management practices in a new way.

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## Introduction

Relationships between buyers and sellers, in the context of business-to-business purchasing and supply chain management practices, are often strained due to differences in expectations or actual performance related to pricing. Efforts to reduce the price of goods purchased in support of production are often said by managers to be necessary in order to maintain or improve competitiveness in the end-use customer markets where a company's products are sold. This explanation will often be factually correct and therefore satisfactory. However, in many cases, there is a more fundamental reason for aggressively pursuing lower priced purchased production materials - to improve a company's financial performance in relation to equity markets. While both end-use customer markets and equity markets are necessary and, of course, connected, strongly favoring the latter over the former will usually result in wasteful imbalances.

This paper seeks to present the view that the primary source of conflict between buyers and sellers is generally rooted in the buyer's insatiable desire to rapidly improve its financial performance at the expense of other key stakeholders, namely suppliers. Of particular interest is the misalignment of goals that can result between buyers and sellers as it relates to corporate purpose - i.e. shareholder value maximization. Conflicts between buyers and sellers result in wasteful disagreements, quality and delivery problems, re-work, and loss of focus on end-use customer needs (Emiliani, 2000b). When a performance problem arises, one of the first places that senior management looks for cost savings is in the supply chain, rather than to eliminate the massive amount of waste that exists in internal business processes (Emiliani, 2001b). In other words, the quickest way to increase earnings is to reduce the purchase price, often unilaterally (Ball, 2001; Chappell and Kachadourian, 2001; Kobe, 2001).

We begin with an overview of the fundamental nature of buyer-seller relationships, followed by a root cause analysis that examines the question: "Why do companies seek to reduce the price of purchased goods?" The common corporate

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purpose, shareholder value maximization, is critically examined relative to its impact on buyer-seller relationships. An example is provided to show the different business results that are achieved with shareholder-centered management practices compared to stakeholder-centered management practices. The buyer's and seller's individual viewpoints are then compared in order to highlight the pervasiveness of goal incongruence. Finally, implications for managers as well as suggestions for future research are discussed.

### Buyer-seller relationships

The types of relationships that exist between buyers and sellers of goods purchased for use in production have been well documented by numerous researchers (Womack *et al.*, 1990; Nishiguchi, 1994; Bounds, 1996; Bounds *et al.*, 1996; Nishiguchi and Beaudet, 1998; Fujimoto, 1999; Humphreys *et al.*, 2001). Their findings can be broadly characterized by the two basic approaches that buyers take regarding their purchasing perspective and resultant decisions:

- (1) power-based bargaining; or
- (2) collaborative problem solving.

Power-based bargaining is quite common and leads to ongoing conflicts between buyers and sellers, while collaborative problem solving tends to be quite rare (Womack *et al.*, 1990; Nishiguchi, 1994; Kobe, 2001). The rules that govern power-based bargaining are normally *ad hoc*, while collaborative problem solving requires a highly disciplined approach supported by stable management principles, policies, and practices which include the use of tools such as target costing, *kaizen* costing, value analysis, and value engineering (Monden, 1995; Cooper and Slagmulder, 1999; Fujimoto, 1999).

It is widely accepted by academics that power-based bargaining has many shortcomings and generally represents an immature, antiquated, or unsophisticated means of conducting business (Womack *et al.*, 1990; Nishiguchi, 1994; Cooper and Slagmulder, 1999; Tracey and Tan, 2001). When asked, most practitioners will also acknowledge the deficiencies of transactional or exploitative approaches to purchasing, particularly with regards to

achieving strategic alignment, trust, and long-term commitment. While many researchers have outlined the steps necessary to achieve improved supplier relationships (Nishiguchi, 1994; Cooper and Slagmulder, 1999; Handfield *et al.*, 2000; Liker and Wu, 2000), their solutions do not typically address the fundamental source of misalignment between buyers and sellers.

Despite the existence of more effective collaborative purchasing and supply chain management processes and widespread recognition of numerous negative consequences (Nishiguchi, 1994; Cooper and Slagmulder, 1999), power-based bargaining remains the dominant practice in most large purchasing organizations (Bartholomew, 2001; Hays and Kaufman, 2001; McCracken, 2001a; Nikkei, 2001; Diem, 2002; Kaufman, 2002; Zimmerman, 2002). Further evidence supporting this view includes the widespread use of online reverse auctions among *Fortune* 1,000 businesses to reduce the price of purchased goods (Emiliani, 2000b; Richards, 2000; Tully, 2000; Judge, 2001).

There are a great many sources of potential conflict between buyers and sellers, including:

- price;
- quality;
- delivery;
- delayed payment;
- financial penalties for non-performance;
- order cancellations;
- intellectual property.

As purchasing professionals know quite well, a substantial portion of their time is spent on issues related to the purchase price.

This paper critically examines the factors that create conflicts between buyers and sellers as they relate to price, for the specific case where management believes that its primary responsibility is to maximize shareholder value. This condition is most thoroughly actualized in large publicly owned companies, and is particularly prevalent in the USA. Thus, the fundamental framework is one in which large corporations purchase goods from sellers that may be either publicly or privately owned. The same rationale applies to the purchase of services. This framework is not abstract. Rather, it

represents real business conditions that most buyers and sellers face every day.

### Root cause analysis

Root cause analysis is a method that is frequently used to solve technical problems such as those that may be encountered in manufacturing or the failure of engineered components. It is rarely, if at all, used to solve managerial problems. This is due in part to the fact that root cause analysis is not normally taught in business school curricula. However, there is no reason why root cause analysis should not be taught and used by managers in business settings. If it were widely used, then wasteful repetition of errors could be avoided, which would benefit all key stakeholders.

The key question is: "Why do companies seek to reduce the price of purchased goods?" To answer that question, it is assumed that the buyer is a publicly owned company whose shares are traded via stock exchanges and that the company operates in competitive markets. The root cause analysis technique used is called the "five why's", in which a series of related questions are asked and answered five or more times until the root cause has been determined. The root cause analysis is as follows:

- (1) Why do companies seek to reduce the price of purchased goods? *To reduce the cost of goods sold.*
- (2) Why do companies seek to reduce the cost of goods sold? *To increase profitability.*
- (3) Why do companies seek to increase profitability? *To increase earnings per share.*
- (4) Why do companies seek to increase earnings per share? *To increase the stock price.*
- (5) Why do companies seek to increase the stock price? *To maximize shareholder value.*
- (6) Why do companies seek to maximize shareholder value? *Because management's compensation is based on share price.*

From this root cause analysis, it is apparent that efforts to reduce the price of purchased goods are driven by the need to increase share price, which is usually tied directly to management's compensation. While this outcome is judged to be applicable to most companies, it is certainly not the case for all

companies. Some companies may be more interested in gaining price competitiveness even if it does not significantly impact share price; for example, using lower prices as a means to compete against superior products or ensuring short-term survival in rapidly consolidating markets.

### Maximizing shareholder value

Since the early 1980s, management practice in the USA has become increasingly focused on maximizing shareholder value (Rappaport, 1998; Kelly, 2001; Mitchell, 2001). Large institutional shareholders, in particular, enjoy enormous influence on boards of directors and senior managers. This trend is now expanding to other countries whose business tradition has been to serve the interests of key stakeholders such as employees, suppliers, customers, and communities, as well as investors (Taylor, 1999; Shirouzu, 2000; Wessel, 2001, Nikkei, 2002).

The belief that companies exist to maximize shareholder value is now ubiquitous among large US-based corporations and has become the very essence of post-modern business school education. However, by assuming this to be true, we forego the opportunity to critically analyze its intrinsic (i.e. inherent or natural) and extrinsic (i.e. extraneous or man-made) foundations to determine if this thinking is actually correct. Believing that their role is to maximize shareholder value, senior managers will make many important business decisions that may be misaligned with the interests of key stakeholders whose dedicated efforts are needed to realize continuing success in the marketplace.

It has recently been shown, using a unique mathematical logic approach, that companies do not intrinsically exist solely to maximize shareholder value (Emiliani, 2001a). While this method elevates the debate from purely philosophical grounds to data-driven arguments, a simple check against reality would indicate that companies exist for both economic and social reasons. The economic reason is obvious. But what is the social reason? You can answer this question yourself by thinking about the wide-ranging impact that high unemployment has on society.

Most countries have laws regarding corporate governance that require company directors to represent shareholders' interests.



The laws, which are extrinsic, typically manifest themselves as a requirement to maximize shareholder value. If corporate directors do not execute their responsibilities effectively, then they can be subject to dismissal or shareholder lawsuits. As might be expected, senior managers follow the board's direction.

A critical question to ask is: "What is meant by 'maximizing shareholder value'?" In actual business practice, this term is applied in two different ways depending on the particular company: literally, i.e. purely financial; or non-literally; i.e. financial plus other factors such as market share, quality, service, innovation, etc. Both interpretations can be valid with regards to the effective fulfilment of legal responsibilities by corporate directors (Emiliani and Stodder, 2002). Today, many company directors and senior managers apply the term "maximize shareholder value" in the literal sense (Barboza and Feder, 2002; Brown 2002a, b; Browning, 2002; Byrne and Eglin, 2002; Eichenwald, 2002; Leaf, 2002; Serwer, 2002).

For example, General Motors Corporation (GM) has, over the last 50 years, used a literal interpretation. This means that management bestows on itself the unilateral right to make tradeoffs between key stakeholders, in order to ensure that all financial benefits accrue to shareholders (Maremont and Berner, 1999; Green, 2000; Schultz, 2000; Chappell and Kachadourian, 2001; Kobe, 2001).

The simplest way for management to maximize shareholder value is to minimize the interests of other stakeholders, which is most commonly achieved through layoffs (Okuda, 1999), plant closings, and squeezing suppliers' profit margins. Despite focused efforts by senior management to maximize shareholder value, GM has been unable to deliver consistent profitability over the last 20 years (Kawahara, 1998).

Common sense says that layoffs, squeezing suppliers, closing plants, etc., divides, rather than unites, key stakeholders (Emiliani, 2000a, b). The result is many short- and long-term problems such as loss of market share, customer complaints, disgruntled employees, erosion of supplier capabilities, lower tax revenues, environmental problems, etc. In early 2002, GM market capitalization was approximately 33 percent that of the Toyota Motor Corporation.

The Toyota Motor Corporation, on the other hand, uses a non-literal interpretation, and thus seeks to minimize or eliminate trade-offs among key stakeholders without losing sight of the importance of generating profits (Basu, 1999; Cho, 2001; Toyota, 2001).

Indeed, Toyota developed a unique, highly integrated, and balanced management practice that leverages the capabilities of key stakeholders (Ohno, 1988; Womack *et al.*, 1990; Monden, 1993; Nishiguchi, 1994; Fujimoto, 1999).

As a result, Toyota has out-performed GM over the last 50 years in terms of cost, growth rate, market share, quality, profitability, and customer satisfaction, while the average annual return on sales since 1950 for GM is 3.18 percent versus 4.96 percent for Toyota (Kawahara, 1998). Toyota's non-literal interpretation is demonstrably more responsive to the extrinsic legal responsibility for directors to maximize shareholder value (Colvin, 2002; Johnson and Bröms, 2000).

The simple reality is that focusing on the interests of only one stakeholder - investors - creates mountains of waste that, over time, results in reduced competitiveness (Womack *et al.*, 1990; Kawahara, 1998; Green, 2000; Ball, 2001; Bianco and Moore, 2001; Emiliani, 2001b).

Directors and senior managers who focus on maximizing shareholder value, in the literal sense, also tend to forget about the "business cycle". Institutional shareholders are fickle stakeholders and do not substantially reward management's efforts to maximize shareholder value when the industry outlook for short- to mid-term profitability is poor.

So it is clear that we must re-think our fundamental assumptions related to corporate governance, and further realize that what is taught in most business schools may be wrong, or, at the very least, incomplete.

Stakeholder-centered management is not a sin, as characterized by most management pundits. In reality, it is virtuous and, applied correctly, can lead to superior financial performance, better purchasing processes, and long-term competitive strength (Ohno, 1988; Womack *et al.*, 1990; Kawahara, 1998; Emiliani, 2000b; Kelly, 2001; Emiliani and Stodder, 2002).

## The buyer's viewpoint

Stock options are commonly used as a form of compensation for senior managers that usually represents a significant portion of total annual compensation (Anderson *et al.*, 2000; Fox, 2001; Lublin, 2001; Maher, 2001; Strom, 2002). While the intent of stock options is to align the interests of senior managers with shareholders, this is not the typical actual outcome as senior managers enjoy benefits, such as stock option re-pricing, that are not available to retail or institutional shareholders (Colvin, 2001; Morgenson, 2001; Lublin, 2002). So the desired outcome is often at odds with the actual result (Loomis, 2001; Hitt and Schlesinger, 2002).

Despite this shortcoming, senior managers of large publicly-owned businesses generally adhere to the belief that their role is to maximize shareholder value, in the literal context. Many businesses face competitive pressures that make it difficult to raise prices, grow sales, or invest in new products. As a result, they will often seek to increase profitability through cost reduction. For a business with 20 percent gross margin, a one-dollar reduction in cost is equivalent to \$5 in new sales. Thus, cost reduction is a very powerful means of increasing profitability. When faced with the need to reduce costs, senior managers usually look to reduce the cost of purchased goods and services because they typically account for 50-80 percent of the cost of goods sold.

Since management's ultimate objective is to maximize shareholder value, they will need financial measurements to determine if the actions taken by the purchasing organization to reduce the price of purchased goods and services are achieving the desired results. The most frequently used metric is "purchase price variance" (PPV) or "purchase order variance". This metric measures the past unit price against the current unit price. If the current price is higher than the past price, the purchase price variance is unfavorable. The objective, of course, is to ensure that the PPV metric is favorable, which would indicate that unit cost savings have been achieved.

It is beyond the scope of this paper to argue the merits or shortcoming of this business metric in pure terms or as it relates to total cost (Emiliani, 2000b). However, its importance cannot be overstated because it is

a very simple number to calculate precisely and is one that senior managers commonly use to gauge the success of cost-cutting initiatives that are designed to maximize shareholder value (Child, 2002). Thus, the PPV metric aligns nicely with the needs of organizations engaged in intensive cost cutting.

However, the use of the PPV metric by purchasing organizations generally declares that quality and delivery are less important relative to the goal of reducing costs, and ultimately to maximize shareholder value. It also is likely to reflect the fact that the company, and the buying organization in particular, do not understand the cost structure of the goods and services that they purchase. After all, the primary focus is on unit price. While senior managers may utter words that indicate the importance of quality and on-time delivery, the use of the PPV metric drives behaviors that focus on price reduction. Further, it demonstrates that the company lacks broad awareness of processes that can achieve lower prices without making trade-offs against quality and delivery (Ohno, 1988; Monden, 1995; Womack and Jones, 1996; Emiliani, 2000b; Emiliani and Stec, 2002a).

## The seller's viewpoint

In general, suppliers, whether they are publicly or privately owned, perceive things differently than their customers (Kim *et al.*, 1999; Cousins and Stanwix, 2001; Kobe, 2001; Emiliani, 2001c). While buyers focus on reducing prices, many suppliers strive to get their customers to recognize the total value that they offer: price plus quality and delivery, as well as technical capability and perhaps other factors (Tracey and Tan, 2001). However, suppliers' efforts to establish their value may go unrecognized, often for decades.

Surprisingly, many senior managers of both large publicly owned and small privately owned suppliers do not understand, or simply fail to acknowledge, that their customers are marching to a different drumbeat; i.e. maximizing shareholder value versus creating value for end-use customers (Womack and Jones, 1996). Many suppliers seem to hold out hope that their customers will one day

recognize the folly of making purchasing decisions based principally on unit price.

Suppliers that have not yet given up hope may continue to cooperate with their customers as they try yet another new tool for reducing the price of purchased goods and services. The newest tool is online reverse auctions (Emiliani, 2000a; Richards, 2000; Tully, 2000; Bartholomew, 2001; Judge, 2001; Emiliani and Stec, 2002a). Most suppliers are compelled to participate because they feel the need to please the customer and demonstrate their willingness to “play the game”. Another reason why suppliers may participate is to mollify their own concerns over an uncertain future. However, it is very easy for sellers lacking experience in online reverse to make decisions that will unwittingly result in financial distress (Emiliani, 2001c; Emiliani and Stec, 2002b). The use of online reverse auctions by large corporations has made some suppliers finally realize that there is a fundamental misalignment of interests.

Faced with relentless price pressure, suppliers can come to view their customers as adversaries (Green, 2000; Emiliani, 2001c; Chappell and Kachadourian, 2001; Kobe, 2001). The consequences of this attitude are far-reaching. For example, the opportunistic behaviors exhibited by the buyer may result in similar opportunistic behavior among suppliers. Buyers often return to incumbent sellers when other sources of supply are unable to perform. This gives suppliers the opportunity to retaliate: i.e. charge a higher unit price, impose a large expediting fee, or both. Buyers usually try to negotiate to obtain the former unit price, so that the PPV is zero, and are willing to pay an expediting fee instead, which is charged to a different budget category and thus does result in unfavorable PPV. However, the cost of goods sold has increased despite efforts to reduce costs!

A natural reaction by suppliers is to become less loyal to the customers that rely on divisive business practices, even if that customer represents a significant portion of annual sales (Emiliani, 2001c). Suppliers will be less committed and less willing to share their best ideas and newest technologies with customers that are perceived as unfair (Chappell and Kachadourian, 2001; Kobe, 2001; McCracken, 2001b). Left with few alternatives, suppliers will seek to find other customers that understand the total value that they offer. This may propel suppliers to

market their products to businesses residing in countries that have a tradition of balancing stakeholders' interests. However, this approach clearly has practical limitations, as there are precious few large companies that operate using stakeholder-centered management practices (Caux, 2002). The few that exist are under increasing pressure to adopt US-style business practices that focus on maximizing shareholder value.

There is no doubt that many suppliers are complacent and need to substantially improve their performance if they wish to stay in business. While one would expect a large portion of suppliers in any given industry segment to be strong performers, it must be recognized that even their performance is limited by the buyers' behavior. Only when buyers stop focusing on maximizing shareholder value, and instead start to focus on creating value for end-use customers, can suppliers follow suit.

## Summary

The inevitable conflict that arises between buyers and sellers with regards to price is traced to the fundamental belief possessed by most senior managers that companies exist to maximize shareholder value. The truth of this statement is shown to be false from an intrinsic perspective (Emiliani, 2000a), while the extrinsic rationale can be interpreted in either literal or non-literal terms. The literal interpretation is argued to be defective in its approach and thus destructive in its outcomes (Johnson and Bröms, 2000; Kelly, 2001; Mitchell, 2001).

Managing a business for the purpose of maximizing shareholder value also results in internal conflict, as other departments view the purchasing organization as being concerned only about price. When quality or delivery problems arise, purchasing gets the blame, which further reinforces their negative stereotype. The responsibility, however, can be more correctly placed on the shoulders of senior managers, for it is they who believe in and disseminate the false paradigm that companies intrinsically exist to maximize shareholder value. Unfortunately, the responsibility does not stop there. Where do senior managers get this idea from in the first place? They get it principally from business school professors (Aspen, 2002)! The

paragon of knowledge thus inadvertently helps create a very undesirable situation as it pertains to business relationships between buyers and sellers.

While this paper focuses on the inevitability of conflict between buyers and sellers, we can, using the same logic and rationale, expect that conflict between other key stakeholders, such as customers, employees, and communities, is also inevitable. Couple this with the common mantra of senior managers: "Competition is intense; we are fighting for our survival!" Could it be that the need to fight for survival is actually caused by self-inflicted wounds originating from actions taken by senior managers to maximize shareholder value (Byrne, 1998; Maremont and Berner, 1999; Smith and Murphy, 1999; Bannon and Lublin, 2000; Eliopolous, 2000; Grimes, 2000; Sherer, 2000; Agins and White, 2001; Berman and Blumstein, 2001; Bianco and Moore, 2001; Klinger, 2001; McLean, 2001; Thurm, 2001; Barboza and Feder, 2002; Byrne and Eglin, 2002; Eichenwald, 2002; Leaf, 2002)? Senior managers can instead re-define and elevate the competitive capabilities of their business by focusing on creating value for end-use customers (Womack and Jones, 1996).

The implications for managers are profound, as their efforts to improve the management of supply chains and purchasing practices may be eclipsed by suppliers' perceptions that zero-sum outcomes, driven by the need by buyers to maximize shareholder value, are inevitable. Managers who can differentiate between the literal and non-literal interpretations of "maximize shareholder value", as well as intrinsic and extrinsic corporate purpose, will realize that they must embark on a completely different path for improving purchasing and supply chain management practices (Womack *et al.*, 1990; Monden, 1993, 1995; Nishiguchi, 1994; Bounds, 1996; Bounds *et al.*, 1996; Cooper and Slagmulder, 1999; Fujimoto, 1999; Caux, 2002).

Future research can be directed towards assessing the perceptions and attitudes of buyers and sellers with regards to shareholder value maximization as the driving force behind activities designed to reduce the price of purchased goods. A longitudinal survey of large OEMs and their primary first and second-tier suppliers would establish perceptions of both motive and the

effectiveness of contemporary supply chain management practices, inclusive of new purchasing tools such as online reverse auctions, as well as specific characteristics such as trust, loyalty, and collaborative problem solving.

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## Sourcing in the global aerospace supply chain using online reverse auctions

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### Abstract

This article discusses the use of online reverse auctions to source engineered components in global aerospace supply chains using online reverse auctions and examines the specific case where a long-established U.S. economic cluster supporting large tier-one aerospace companies must compete against globally distributed sources of supply favored by their customers due to unit price savings, principally the result of lower wages. The article also examines if global sourcing practices based on power-based bargaining is an intelligent or effective solution to market pressure demanding lower prices, or whether collaborative problem solving and the creation of knowledge-sharing networks offers greater potential for cost savings and improved long-term supply chain competitiveness. Key factors that contributed to the recent failure of global sourcing initiatives using online reverse auctions are presented. Findings can be generalized to other industries that use online reverse auctions for globally sourcing engineered components that rely on networks of supporting service suppliers to create finished goods.

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*Keywords:* Global sourcing; Supply chain; Reverse auctions; Total cost; Unit price

### 1. Introduction

Globalization over the last 10–15 years has expanded trading relationships between U.S.-based companies and nascent businesses in developing nations. For large, multi-billion-dollar, U.S.-based aerospace businesses, globalization represents opportunities to sell products to new customers and establish new sources of supply in countries with lower wages. Key drivers for global sourcing in the aerospace industry include:

1. Obtaining lower unit prices on recurring production materials,
2. Increasing market share, country- or region-specific, or win key sales opportunities.

The first item is related to the basic requirement for increasing profits and meeting marketplace demands for lower prices. The second item is partly related to a unique aspect of U.S. aerospace industry sales in the global marketplace for both commercial and military products: the use of

“offsets” (Wayne, 2003). Offsets are part of a sales contract in which the buyer agrees to fund an activity that may be directly or indirectly related to the product sold. For example, an offset agreement may contain a provision that the seller invest in the creation of a parts-manufacturing facility in the buyer’s country, or provide funding to establish nonmanufacturing infrastructure such as a hospital or telecommunications capability. Today, offsets can have a value ranging from 100% to 300% of the sale price (Anonymous, 2003a). A substantial amount of global sourcing in the aerospace industry is driven by the need to satisfy offset requirements.

Regardless of the drivers for global sourcing, U.S.-based small- and midsize aerospace suppliers face an extremely challenging business environment in which their much larger customers remain strongly focused on unit price—disregarding total costs—and view suppliers as largely interchangeable. That is because buyer–seller relationships in the aerospace industry, like in most other industries (Hays, 2003; Kaufman, 2002; Kobe, 2001; Maremont & Berner, 1999; Nishiguchi, 1994; Stecklow, Raghavan, & Ball, 2003), have long focused on power-based bargaining with regard to purchase prices. As a result, buyers have gained little or no knowledge of suppliers’ manufacturing and nonmanufacturing capabilities, inclusive of explicit and

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tacit knowledge, and are thus unable to distinguish when global sourcing is a sensible course of action and when it is not. This sets the stage for reckless pursuit of global sourcing opportunities, many of which can turn out to be expensive mistakes (Emiliani & Stec, 2004).

This paper does not address global sourcing activities that arise as a result of offset agreements. Instead, it examines the use of online reverse auctions as a means for globally sourcing the production of goods and to obtain lower unit prices, two key benefits for buyers cited by the companies that provide online reverse auction services (Emiliani & Stec, 2004). In particular, this paper examines the case of how a long-established aerospace economic cluster located in central Connecticut responded to global sourcing initiatives by large local original equipment manufacturers (OEMs) using online reverse auctions, as well as the outcomes. It also discusses how, at about the same time, the State of Connecticut separately established an industry cluster initiative to help improve the global competitiveness of small- and midsize aerospace component suppliers. In addition, alternatives to power-based bargaining are presented. The findings are generally applicable to other industries, and especially to those that specify engineered components to suppliers that rely on a network of supporting service suppliers to create finished goods.

## 2. Online reverse auctions

Large aerospace companies began using business-to-business online reverse auctions in earnest starting around 1998. It became a key method for both globally sourcing engineered components not subject to offset agreements and as a tool to bargain with suppliers to reduce the unit price of purchased materials used in the production of durable goods. The principal source of unit price savings is lower labor costs where components are sourced in developing countries, and margin reduction where components are sourced in developed countries. Less frequently, however, cost savings are achieved through fundamental manufacturing process improvement and the elimination of waste (Emiliani & Stec, 2004; Ohno, 1988; Womack & Jones, 1996). Key theoretical foundations supporting the use of online reverse auctions include:

- Lower purchase prices result in reduced costs.
- “Total cost” RFQs represent actual total costs.
- Qualified suppliers are interchangeable.
- Costs are external to the buyer, rather than internally generated (i.e., costs are designed in by buyers).
- Suppliers benefit from participating in online reverse auctions.

This paper examines the veracity of these commonly accepted theoretical underpinnings for the specific case of buyer-designed and specified components.

The companies that provide online reverse auction services are also known as “market makers.” Leading providers of online reverse auction services in the aerospace industry include Ariba, CommerceOne, eBreviate, FreeMarkets, and Orbis Online. Aerospace industry-specific market makers include Cordiem and Exostar. These market makers assist the buyer in creating detailed request for quote (RFQ) packages that categorize parts into logical groupings, by part or process families, to facilitate price estimating and online bidding. Market makers often refer to the RFQs they help create as “total cost” RFQs, thus indicating to both buyers and sellers that the RFQs represent an accurate depiction of all the costs associated with doing business. The process culminates in real-time, dynamic, open bidding conducted over the Internet between tens of suppliers versus the traditional static three-quote closed bidding process. The dynamic bidding process typically results in significantly lower unit prices than the buyer has previously paid, usually between 10% and 30%. Upon conclusion of the online reverse auction, the buyer must implement the results (e.g., switch sources and receive goods) to secure the “gross” savings. Additional details of the online reverse process have been previously described (Emiliani, 2000).

Importantly, the price that buyers pay for the online reverse auction services often includes incentive compensation based on the difference between the current price paid and the maximum theoretically achievable savings identified at the close of bidding, termed the “gross” savings. This motivates market makers to recommend to the buyer that it invite several “qualified” low-cost sources of supply to bid in order to drive down prices. Alternative low-cost sources of supply are usually identified by the market maker, based on the supplier’s self-reported materials and process capabilities and performance in previous online reverse auctions conducted with other customers for similar commodity categories.

Prior work has reported the losses that are incurred in postauction implementation activities to secure the identified savings (Emiliani & Stec, 2002a). The “net” savings is an average of at least 50% less when measured across a broad market basket of product and service commodity categories (Center for Lean Business Management [CLBM], 2003). Thus, the amount of savings that buyers actually achieve is, in most cases, much less than that portrayed by the market makers. In essence, the actual costs are usually higher than that depicted by so-called “total cost” RFQs (Emiliani & Stec, 2004).

Online reverse auctions are widely perceived by incumbent suppliers as a divisive purchasing tool designed principally to drive down unit prices (Emiliani & Stec, 2004; Richards, 2000; Tulder & Mol, 2002) without adequate consideration given to other important measures of performance or production capability (Bartholomew, 2001, 2002; Emiliani & Stec, 2004; Kobe, 2001). Recent studies have concluded that online reverse auctions damage a buyer’s long-term performance by creating distrust among its in-



cumbent suppliers (Emiliani & Stec, 2004; Jap, 2001). One such source of distrust arises when buyers use online reverse auction to test the market with no real intention of switching sources, but instead to drive down the unit prices of incumbent suppliers. Attempts to mitigate distrust between buyers and suppliers has resulted in the creation of a *voluntary* online reverse auction “code of ethics” in the U.S. auto industry (Kisiel, 2002a, 2002b, 2002c; Original Equipment Suppliers Association [OESA], 2002), a “good trading practice” guideline in the European aluminum foil industry (European Aluminum Foil Association [EAFA], 2002), and recommendations on the correct use of online reverse auctions (Beall et al., 2003; Goetting, 2002).

The use of online reverse auctions by major U.S.-based aerospace companies to globally source component part production has declined significantly over the last 2 years due to the following factors (Emiliani & Stec, 2001, 2002a, 2002b, 2004):

- Poor bid lot structure by the buyer or market maker.
- Deficiencies in technical information: for example, missing dimensions on blueprints, incorrect or missing specifications, or specifications subject to misinterpretation.
- Lack of local infrastructure to perform special processes (e.g., electroplating, welding, nondestructive inspection, shot-peening, grinding, etc.), or provide special sub-components such as bearings.
- Inadequate resources expended by the buyer to qualify new sources of supply and support production.
- New suppliers that win the work were often unable to meet price, quality, delivery, or other requirements.
- Buyer experienced long delays in securing the “net” savings.
- Higher costs associated with dual sourcing (schedule overlap) when switching suppliers.

It is not surprising that some or all of the work returns to the incumbent supplier after 6–18 months (Emiliani & Stec, 2004). The online reverse auction purchasing tool appears to have largely run its course in the aerospace industry for engineered components—at least until market makers or buyers develop effective solutions to these systemic problems.

### 3. Connecticut aerospace industry cluster

The State of Connecticut formed a public–private sector partnership in 1999 called the “Governor’s Council on Economic Competitiveness and Technology” (Porter & Miller, 2003; Waldron, 2002). The council consists of industry leaders, legislators, academics, union representatives, and public sector representatives, and has a mission that includes: “[to] promote innovation, productivity and competitiveness through industry cluster economic devel-

opment” (Department of Economic and Community Development [DECD], 1999). The industry cluster initiative is intended to improve the competitiveness of businesses in key industries, which will in turn expand the state’s economy. The role of the public sector is to “support and facilitate cluster activation” (DECD, 1999). The industry cluster economic development strategy was based on the work of Michael Porter (Porter, 1998; Porter & Miller, 2003).

Clusters are a dense concentration of competing, complementary, and interdependent firms within a general industrial category, such as “aerospace,” that make substantial contributions to local economic activity. Clusters result in improved productivity and competitiveness, innovation, and the creation of new businesses and also have numerous intangible benefits including lower transaction costs (Porter, 1998). The much larger OEM aerospace customers, whether located near or far from the cluster, enjoy these benefits and do not bear any costs associated with direct investment. While the benefits are many and varied, clusters that do not enjoy long-term support and development by a large OEM are vulnerable to organizational dynamics that can reduce individual or group competitiveness (Dyer & Nobeoka, 2000; Nishiguchi, 1994; Porter, 1998; Womack, Jones, & Roos, 1990).

In July 1999, the Aerospace Components Manufacturers (ACM) cluster was formally recognized and activated. It began with a core group of about 30 small- to midsize component manufacturers, and managed by a newly formed nonprofit 501C(3) corporation (ACM, 2003) whose board of directors included member company presidents. The ACM created a plan to achieve “worldwide recognition as a premier source for aerospace components.” A principal focus of the ACM was the adoption by member companies of Lean production principles and practices to improve competitiveness (DECD, 1999, 2003; Ohno, 1988; Womack & Jones, 1996). Support from the state included funding for “progressive manufacturing practices” (i.e., training in Lean production methods) and “workforce development” designed to expand workers’ skills. The State’s investment in cluster activation was matched by member company contributions at a ratio of approximately 1:4; thus, member companies provide about 75% of the funding.

The aerospace components manufacturing cluster, inclusive of their subtier suppliers, existed informally—that is to say, not recognized via a state-sponsored cluster initiative—for over eight decades, with roots in metals and metal products manufacturing dating from the late 1700s (Porter & Miller, 2003). The aerospace components cluster served the needs of Connecticut-based OEM customers such as Pratt and Whitney, Hamilton Standard (now called Hamilton Sundstrand), and Sikorsky, all units of United Technologies Corporation, and others.

The suppliers are concentrated principally along a 50-mile stretch of Interstate 91, from Granby to Middletown, known as the Connecticut River Valley region. The informal

cluster consisted of hundreds of small- and midsize suppliers, from machining to metal forming to surface finishing to nondestructive testing and related firms, resulting in a dense network of companies with broad capabilities to manufacture a wide variety of aerospace propulsion, airframe, and support system components. Difficult economic conditions at various times over the last 20 years have resulted in numerous business closures, bankruptcies, and some mergers and acquisitions. Despite this, the cluster—recognized both formally (i.e., the ACM) and informally—still possess considerable capabilities, remains a unique asset, and is an important contributor to Connecticut's economy.

The intangible benefits to large OEM customers of the long-standing informal cluster include:

- Short supply lines
- Easy communication
- Knowledge sharing
- Skilled labor pool
- Rapid response to part shortages
- Capacity to satisfy surges in customer demand
- Personal relationship building (ethical context)
- Cooperation among cluster members, when needed
- Well-established infrastructure, both technical and logistic
- Creation of new businesses to satisfy the OEM's needs

It should be noted that the Connecticut aerospace manufacturing cluster developed on its own, without purposeful sponsorship or long-term development by the Connecticut-based OEMs, though they did attempt at various times over the last 20 years to help improve their supplier's performance using various methods. Most of these efforts were largely unsuccessful because they were short-term "program-of-the-month" activities, often rooted in power-based bargaining. Instead, the suppliers that survive today typically made their own advances in production capabilities and productivity driven by competitive forces within the aerospace industry.

The component and subtier suppliers, while cordial and generally trusting of one another, largely acted as independent entities and thus competed against each other in ways that diminished their collective interests. They did not understand themselves as a cluster, and consequently did not realize that there could be substantial benefits associated with much closer collaboration (noncollusive context) and offering OEM customers higher value-added goods and services.

In the early 1990s, the competitive landscape within the aerospace industry began to change dramatically. OEM customers demanded much lower prices, higher quality, and shorter lead times. No longer would large OEMs be run by the best engineers; they were now run by MBAs, with an intense focus on cost reduction, margin expansion, cash flow, and stock price. This came as a shock to most suppliers, and it took years for most of them to completely accept the change. In the late 1990s, it became apparent that

something had to be done. The question was, who should develop and improve the capabilities and competitiveness of the cluster: the cluster members, or the OEMs?

In general, the senior managers of large aerospace OEMs operate with the belief that their suppliers are completely responsible for their own fate, rather than valuable resources to support and develop over the long term as is done by some large OEMs in other industries (Bounds, 1996; Bounds, Shaw, & Gillard, 1996; Dyer & Nobeoka, 2000; Nishiguchi, 1994; Sonoda, 2002; Womack et al., 1990). Realizing this, a core group of about six cluster members decided in 1997 that they should take responsibility for improving their own situation and seek modest support from the State of Connecticut. This action would also benefit current customers, as well as new customers that cluster members sought, if they could improve their competitiveness using Lean production principles and practices.

In the 1990s, senior managers at large OEMs typically viewed the local aerospace cluster as deficient, principally with respect to pricing, and otherwise viewing suppliers as essentially interchangeable. This sent a signal, interpreted by both OEM employees and suppliers, that quality and delivery performance were less important. Incumbent cluster suppliers were seen as high unit price sources for recurring production materials, while new global suppliers represented opportunities for obtaining lower unit price, reducing the cost of goods sold, increasing cash flow, and thus raise the stock price. Unfortunately, finance and accounting education, as well as the financial management information systems used by most large corporations support this simplistic view.

In reality, the sourcing choice, absent of offset agreements, is better represented as:

- Local industry cluster → high unit price, lower total cost
- Global supplier → low unit price, higher total cost

If large OEMs were cognizant of total costs, they could more easily and directly satisfy the financial aspects of an offset agreement, without resorting to creative accounting (Anonymous, 2003a), and reduce their financial liabilities on the balance sheet. It might also reduce the total number of offsets. It is surprising that the finance executives of large aerospace OEMs have not rushed to understand total costs. The ACM, therefore, has four key challenges:

1. Teaching their current U.S.-based customers to understand total costs and the benefits of sourcing in industry clusters, features that senior managers at large non-U.S. based aerospace OEMs appear to understand better.
2. Expanding efforts to apply Lean principles and practices to all business processes (Emiliani et al., 2003; Emiliani & Stec, 2004).
3. Generate sales from large non-U.S. aerospace companies—global sourcing in reverse.
4. Continue working together and grow.

While the senior managers of long-time U.S.-based customers typically do not favor their incumbent suppliers at the present time on a unit price basis, new non-U.S. customers are finding U.S.-based cluster companies highly capable and competitive on a total cost basis. In addition, these new customers are using highly disciplined conventional cross-functional strategic sourcing strategies and practices, rather than new technological solutions such as online reverse auctions, to identify, qualify, and develop new sources of supply. The cluster companies thus must confront and manage a difficult paradox in challenging economic times: being viewed by long-time customers as noncompetitive, while at the same time being viewed by new customers as globally competitive—with each customer group possessing data that support their view.

Global sourcing to developing nations can have many positive attributes and may indeed be the correct solution under certain circumstances. However, it can also inadvertently result in the dismantling of all or part of a well established and globally competitive U.S.-based industry cluster, developed and paid for over decades by a panoply of stakeholders, if total costs are not understood (Womack, 2003). This outcome can be directly tied to long-term patterns in buyer–seller relationships that favor power-based bargaining, which in turn provides buyers with little or no knowledge of suppliers' manufacturing and nonmanufacturing capabilities. Online reverse auctions have the capability to deconcentrate a cluster, although this outcome was not achieved in Connecticut's aerospace cluster over the last 5 years. Perhaps it can do so in the future, which would be an unfortunate outcome that senior managers of OEM companies should be more concerned about. Offset agreements, however, are capable of deconcentrating an industry cluster much more rapidly.

#### **4. Collaborative problem solving and knowledge-sharing networks**

The online reverse auction purchasing tool is a new technological solution to cost problems. Most senior managers find the potential savings too great to ignore, and eagerly embrace online reverse auction services (Richards, 2000; Smeltzer & Ruzicka, 2000; Tully, 2000). However, the reality is that online reverse auctions have failed to live up to expectations with regard to global sourcing and unit price reduction, let alone total cost reduction, for aerospace components (Emiliani & Stec, 2002a, 2004). For many companies, the “reduce costs at any cost” mantra ends up resulting in embarrassing and expensive mistakes, including sourcing work back to the original supplier. In addition, if the OEMs corporate ethics policy contains specific references to fairness or fair competition, building long-term relationships, trust, respect, or conducting business free of deception or coercion, then using online reverse auctions

will likely violate the company's code of ethics (Emiliani & Stec, 2002b).

The market makers claim many benefits for suppliers (Beall et al., 2003; Emiliani & Stec, 2004), but cannot substantiate them save for a few isolated testimonials. Nor do they possess data supporting their claim that reverse auctions improve relationships between buyers and sellers (Emiliani & Stec, 2004). In fact, contract terms and conditions generally drive buyers and sellers apart, as it simply shifts the cost burden from buyer to seller (Emiliani & Stec, 2001). Importantly, suppliers view online reverse auctions as opportunistic behavior by buyers. It is not surprising that this then results in opportunistic behavior among most suppliers, principally retaliatory pricing; that is, charge higher prices when the opportunity to do so arises (Emiliani & Stec, 2004). The overall impact of online reverse auctions is to degrade the competitive capabilities of both buyers and sellers, and does not help engineering, operations, purchasing, marketing, or finance learn how to avoid high costs from the start (Emiliani & Stec, 2002a, 2002b, 2004). In summary, online reverse auctions, rooted in power-based bargaining, offer no real benefits for buyers or sellers.

The use of online reverse auctions by large aerospace OEM clearly indicates that senior managers do not understand the root cause of their cost problems, which typically lies in the design of goods, and historically done in the absence of cross-functional and interorganizational collaboration. So what can they do to better manage costs? First, they are going to have to overcome strongly embedded organizational routines that intentionally or inadvertently marginalize the interests of other key stakeholders.

Global sourcing, just like local sourcing, requires people to work together and solve problems. In short, they have to get along. If power-based bargaining dominates local supplier relationships, then is there any doubt that it will also dominate new global supplier relationships and eventually lead to poor outcomes? Importantly, the aerospace industry treats employees in much the same way as they treat suppliers—as entities to bargain with (Emiliani, 2003). So employees, driven by senior managers to reduce costs, often at all costs, treat suppliers in self-similar ways. Before external relationships can be improved, internal relationships must be improved. Thus, power-based bargaining must be abandoned as a principal tool for governing internal relationships. Only then can external relationships with suppliers be improved. Both employees and suppliers must be viewed as valuable resources to develop and improve, rather than exploit (Dyer & Nobeoka, 2000; Fujimoto, 1999; Nishiguchi, 1994; Toyota, 2001; Womack et al., 1990). While this would be a major paradigm shift within the aerospace industry, the consequences of not making the shift are enormous, as demonstrated by the U.S. auto industry.

The U.S. auto industry has a long, well-documented history of power-based bargaining with its suppliers (Kobe,

2001; Miel, 2003; Nishiguchi, 1994; Womack et al., 1990) and union employees. It is now widely acknowledged that this behavior has become a significant factor in reducing the competitiveness of the U.S. auto industry over the last 20 years (Kosdrosky, 2003; Sherefkin & Wilson, 2003; Treece, 2003). The annual negotiations for price reductions, which largely ignore suppliers' costs, has eroded suppliers' margins and threatened their ability to reinvest or even exist at all (Chappell, 2002a; Wilson, 2003a). As a result, trust between the "Big Three" American automakers and their domestic suppliers has fallen to a 10-year low (Bennett, 2002; Sherefkin & Armstrong, 2003). Many senior managers are aware of the problem, and some have begun to act (Sherefkin, 2002), yet there is no evidence that the common metric used by purchasing organizations—purchase price variance—has been eliminated to help create new behaviors (Butters, 2002).

In contrast, automobile OEMs that practice collaborative problem solving and help build the capabilities of their suppliers achieve superior competitiveness and stronger financial performance (Bounds, 1996; Chappell, 2002b; Dyer & Nobeoka, 2000; Nishiguchi, 1994; Wilson, 2003b; Womack et al., 1990). It is not surprising that domestic suppliers strongly prefer to work for the transplant automakers, particularly Toyota and Honda (Bennett, 2002; Sherefkin & Armstrong, 2003).

The long-embedded practice of power-based bargaining, recently expanded through the use of online reverse auctions, threatens the competitiveness and financial performance of the aerospace industry. Its fate will follow a path similar to the "Big Three" U.S. automakers, but with an important difference. There is no large aerospace OEM or large tier one supplier in the United States that sponsors collaborative cost reduction and the creation of knowledge-sharing supplier networks as part of their long-term sourcing strategy. In other words, the systematic approach to supplier development as pioneered by Toyota and Honda has been ignored or at least inconsistently applied.

The result of decades of zero-sum negotiations will likely be continued, resulting in slow, broad-based, industry decline, while working within the aerospace industry as an employee (Anonymous, 2003b), or supplier becomes increasingly less desirable. However, it may not be too late to reverse the trend. The senior management team of one or two large U.S. or non-U.S.-based aerospace OEMs could recognize the opportunity that stands before them. They can kick the power-based bargaining habit and begin to make the necessary changes in internal (Emiliani et al., 2003) and external relationships (Dyer & Nobeoka, 2000), business processes, tools, and metrics. Buyers and sellers will next have to learn the disciplined use of collaborative problem-solving routines and cost management processes such as target costing, value engineering, value analysis, and kaizen (Cooper & Slagmulder, 1999; Fujimoto, 1999; Monden, 1995; Nishiguchi, 1994), and improve these processes over time and over generations of managers. The benefits include

higher profits and long-term competitive advantage, whether sourcing is local or global, as demonstrated in the auto industry (Bennett, 2002; Bounds, 1996; Bounds et al., 1996; Chappell, 2002b; Dyer & Nobeoka, 2000; Nishiguchi, 1994; Wilson, 2003b; Womack et al., 1990).

## 5. Summary

This paper examined the use of online reverse auctions to source engineered aerospace components in the global aerospace supply chain. The driving source for global sourcing is the buyer's strong interest in quickly obtaining lower unit prices due to lower labor costs in developing countries, and margin reduction where components are sourced in developed countries. Online reverse auctions are shown to be a technology-assisted form of power-based bargaining that was initially unsuccessful as a global sourcing solution. This is principally due to the lack of infrastructure in developing countries to support the production of goods made to company-specific specifications and local capability for performing important secondary special processes. These barriers will likely be removed in coming years as large aerospace OEMs work to establish the necessary infrastructure, likely facilitated by offset agreements.

Global sourcing may indeed be an appropriate solution for reducing the price of purchased production materials if the true nature of the cost problem is understood. In general, however, senior managers of large OEM aerospace companies tend to pursue low cost at any cost, setting the stage for unanticipated cost, quality, and delivery problems. In most cases, high labor costs are not the root cause of the price problem. Instead, there are massive amounts of waste in production (Womack, 2003; Womack & Jones, 1996) and nonproduction (Emiliani et al., 2003) processes. Global sourcing is typically promulgated by financial education and information systems that focus exclusively on unit price and do not take into account the total cost of procurement, including the costs associated with establishing new sources of supply. If these costs were taken into account, then long-established domestic sources of supply might indeed be globally competitive.

Collaborative cost reduction and the creation of knowledge-sharing networks are ultimately more efficient solutions, both socially and economically, to competitive pressures that drive the need for ongoing improvements in cost, delivery, and quality performance. However, this requires the abandonment of short-term, power-based bargaining routines and associated metrics, and the common view that suppliers are readily interchangeable. Large OEMs can instead establish long-term sourcing strategies that include disciplined interorganizational cost management and capability building. Genuine bilateral continuous improvement has much greater value because it leads to lower costs, higher quality, enables faster response to changing

market conditions, and thus delivers greater end-use customer satisfaction.

Key theoretical foundations supporting the use of online reverse auctions were shown to be wholly or partially flawed. Ultimately, online reverse auctions do not help the buyer or seller understand the root cause of cost problems. This indicates the need for additional research to improve practitioner and academic knowledge of the domain of successful application for online reverse auctions. Currently, the most important areas of study with respect to buyer-designed and specified components are (1) determine the “net” savings that buyers have actually achieved (CLBM, 2003; Emiliani & Stec, 2002a) and (2) quantify each of the purported benefits for sellers (Emiliani & Stec, 2004).

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## Research paper

# Aerospace parts suppliers' reaction to online reverse auctions

*M.L. Emiliani and  
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### Keywords

Business-to-business marketing, Electronic commerce, Aerospace industry, Auctions, Purchasing techniques, Suppliers

### Abstract

Presents the results of a survey conducted among aerospace part and sub-assembly suppliers to quantitatively assess their reaction to online reverse auctions and its impact on their business policies and practices. Findings are compared to the qualitative benefits identified for suppliers by third party online reverse auction service providers. Determines that incumbent suppliers do not realize the benefits suggested by online reverse auction service providers. Identifies new sources of costs which accrue to buyers and are not accounted for in so-called "total cost" request for quotes, including retaliatory pricing practices, less cooperative relationships, and sourcing work back to the original supplier. Concludes that both buyers and sellers participating in online reverse auctions will likely encounter unfavorable outcomes, thus questioning the effectiveness of this new purchasing tool as a means of reducing the unit price of buyer-designed engineered components.

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## Introduction

Business-to-business online reverse auctions, also known as downward price auctions, have gained popularity among *Fortune* 2000 companies as a tool to reduce the unit price of purchased materials used in the production of durable goods (Richards, 2000; Tully, 2000; Anderson and Frohlich, 2001; Judge, 2001). The general process, as well as its purported strengths and key weaknesses, have been described previously (Emiliani, 2000; Emiliani and Stec, 2001, 2002a, b; Tulder and Mol, 2002). The companies that provide online reverse auction services are also known as "market makers".

The market makers assist the buyer in creating detailed request for quote (RFQ) packages that categorize parts into logical groupings, by part or process families, to facilitate price estimating and online bidding. Market makers often refer to the RFQs they help create as "total cost" RFQs, thus indicating to both buyers and sellers that the RFQs represent an accurate depiction of all the costs associated with doing business. The process culminates in real-time, dynamic, open bidding conducted over the Internet between tens of suppliers versus the traditional static three-quote closed bidding process. The dynamic bidding process typically results in significantly lower unit prices than the buyer has previously paid, usually between 10-30 per cent.

Leading providers of online reverse auction services include Ariba, CommerceOne, Covisint, eBreviate, FreeMarkets, Moai Technologies, Orbis Online, Procuri, and PurchasePro. Aerospace industry-specific market makers include Cordiem and Exostar. Most companies characterize themselves as neutral third parties that facilitate the matching of buyers and sellers. In actual practice, however, this may not be the case because the price that the buyer pays for the online reverse auction services often includes incentive compensation based on the level of savings achieved. Importantly, the incentive compensation is usually based upon the gross savings, or maximum theoretically achievable savings identified at the close of bidding. This motivates market makers to recommend to the



buyer that it invite several "qualified" low-cost sources of supply to bid in order to drive down the price. Alternative low-cost sources of supply are usually identified by the market maker, based upon the supplier's performance in previous online reverse auctions conducted with other customers for similar commodity categories.

It is worth briefly noting that prior work (Emiliani and Stec, 2002a) has reported the losses that are incurred in post-auction implementation activities to secure the identified savings. The net savings is an average of at least 50 per cent less when measured across a broad market basket of product and service commodity categories (CLBM, 2002). Thus, the amount of savings that buyers can actually achieve is, in most cases, much less than that portrayed by online reverse auction service providers.

Online reverse auctions are widely perceived by incumbent suppliers as a divisive purchasing tool designed principally to drive down unit prices (Tulder and Mol, 2002), without adequate consideration given to other important measures of performance or production capability (Richards, 2000; Bartholomew, 2001, 2002). A recent study (Jap, 2001) concluded that online reverse auctions damage a buyer's long-term performance by creating distrust among its incumbent suppliers. One such source of distrust arises when buyers use online reverse auction to test the market with no real intention of switching sources, but instead to drive down the unit prices of incumbent suppliers. Attempts to mitigate distrust between buyers and suppliers has resulted in the creation of a voluntary online reverse auction "code of ethics" in the US auto industry (Kisiel, 2002a, b, c; OESA, 2002), a "good trading practice" guideline in the European aluminum foil industry (EAFA, 2002), and recommendations on the correct use of online reverse auctions (Goetting, 2002).

The online reverse auction process is clearly of great concern to incumbent suppliers because they stand to lose work to other suppliers engaged in online bidding (Tulder and Mol, 2002). The quantitative impact of online reverse auctions on suppliers' specific business policies, practices, relationships with

sellers, and the purported benefits to suppliers has not been previously reported. This paper examines these aspects in a segment of the aerospace supplier community. The results should be of interest to buyers and sellers, as well as those who invest in the market makers, because it may foretell the sustainability of the online reverse auction process within the buying company or in certain commodity categories.

## Research method

A 20-question survey was constructed to determine how suppliers react to online reverse auctions, including changes to strategy and operating practices and the impact on relationships with their customers. The questions were based on unpublished research conducted by the authors in the summer of 2001. A dozen aerospace suppliers were visited and asked several questions pertaining to their general experiences with online reverse auctions, including the specific data asked for by buyers and the market makers before, during, and after an online reverse auction. The interviews indicated there were important discrepancies between the purported benefits and outcomes promulgated by buyers and market makers, and those experienced by suppliers participating in online reverse auctions. The identified discrepancies provided the basis for the current research.

The survey was sent via e-mail to senior managers, typically president or vice president, of 43 aerospace part and sub-assembly suppliers located in the eastern USA and whose core competency is principally machining components from various types of metals, including bar stock, castings, and forgings. On average, the level of complexity of the engineered parts made by these suppliers can be characterized as medium to high. These companies supply the majority of their products directly to large, multi-billion dollar Tier 1 original equipment aerospace product manufacturers based in the USA. Data collection for the survey began at the start of September 2002 and was completed three weeks later.

There were two e-mail addresses which were no longer valid, and four suppliers indicated



that they had never been asked to participate in online reverse auctions. The reasons cited were:

- The supplier's parts are proprietary designs, and thus can not be easily sourced elsewhere.
- The type of parts the supplier produces has not yet been subjected to online reverse auctions.

Of the remaining 37 suppliers, 23 responses to the survey were received resulting in a response rate of 62 per cent. All of the suppliers surveyed were USA-based Tier 2 incumbent suppliers that have had decades-long business relationships with their USA-based Tier 1 customers, from which they generate 25-75 per cent of annual sales. The suppliers responding to the survey are principally make-to-print sources of supply, which means the Tier 1 customer owns the part design. This greatly facilitates the customer's ability to source work using the online reverse auction process.

## Results and analysis

Survey participant responses were measured on a one-to-five Likert scale. The format for presenting the results is: the question, the scale for the response, a "box-and-whisker plot", explanation of the data plot, and then a brief analysis of the finding. The box-and-whisker plots show the minimum response (far left) and maximum response (far right), as well as the first quartile (left side of box), second quartile (median; vertical line in box), and third quartile (right side of box). Some questions were asked that required respondents to provide written details. In these cases, the non-repeating responses are grouped under various categories. A summary of the findings is presented in Table I.

### Question 1. Has your business strategy changed as a result of online reverse auctions?

Scale: 1 = no change in strategy; 3 = minor change in strategy; 5 = major change in strategy (Figure 1).

#### Results

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of three. The

interquartile range (Q3-Q1) is 3.5 indicating the middle 50 per cent of data were significantly varied between values of 1 and 4.5. The minimum value and first quartile are the same at a value of 1.

#### Analysis

Suppliers interpreted this question many different ways and in some cases characterized what most people would perceive to be a minor change in strategy as a major change in strategy. For example, the use of online reverse auctions by customers propelled some suppliers to find new customers that do not use online reverse auctions ( $n = 4$ ), have greater caution regarding participation in online reverse auctions or increased selectivity on items they bid on ( $n = 3$ ), recognition that work awarded through traditional sourcing practices would be short term ( $n = 2$ ), or that new technology equipment was needed ( $n = 1$ ). A more substantive change in strategy was an increased awareness of the need to improve productivity using lean production practices ( $n = 2$ ). One supplier noted that their major shift in strategy was to aggressively win new work through the online reverse auctions process. The strategy was to "go low on pricing" to increase production volume and thus improve overhead absorption. That supplier is now out of business. While there were many factors that contributed to the supplier's demise, the ongoing deterioration in gross margin due to contractually defined year-over-year price reductions could be directly attributed to winning new work through the online reverse auction process – despite ongoing efforts to improve productivity using lean production practices and the benefits associated with producing families of parts using similar processes.

### Question 2. Has your company's participation in online reverse auctions resulted in changes to your operating practices?

Scale: 1 = no change in operating practices; 3 = minor change in operating practices; 5 = major change in operating practices (Figure 2).

#### Results

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 1. The interquartile

Table I Summary of online reverse auction survey findings

Survey question	Median response value (scale description)	Capsule result/analysis
1. Has your business strategy changed as a result of online reverse auctions?	3 (minor change in strategy)	Seek new customers not using ORAs ( $n=4$ ); exhibit greater caution participating in ORAs or increased bid selectivity ( $n=3$ ); adopt lean production practices ( $n=2$ )
2. Has your company's participation in online reverse auctions resulted in changes to your operating practices?	1 (no change in operating practices)	Greater awareness of costs or greater emphasis on cost reduction ( $n=2$ ); adopt lean production practices to improve productivity ( $n=2$ )
3. What has been the effect of online reverse auctions with regards to your production capabilities?	3 (no change in capabilities)	Most suppliers reported no change in production capabilities; adopt lean production practices ( $n=2$ ); obtain new and different types of work ( $n=1$ ); diversify customer base ( $n=1$ )
4. What has been the effect of online reverse auctions with regards to your long-term competitiveness?	2 (reduction or no change in competitiveness)	Most suppliers reported either a reduction or no change in long-term competitiveness; deterioration of long-term competitiveness ( $n=3$ ); improved long-term competitiveness by adopting lean production practices to become more flexible and responsive ( $n=2$ )
5. What has been the effect of online reverse auctions on your company's overhead burden?	3 (no change in overhead burden)	Most suppliers reported an increase in overhead burden
6. What has been the effect of online reverse auctions on your company's gross margins?	1 (decrease in gross margin)	Most suppliers reported a decrease in gross margin
7. What has been the effect of online reverse auctions with regards to relationships with your customers?	1 (less cooperation)	Most suppliers reported less cooperative relationships with their customers
8. Do you feel that online reverse auctions are an ethical business practice?	1 (no)	Most suppliers judged ORAs as an unethical business practice
9. Do you feel that online reverse auctions create a "level playing field"?	1 (no)	Most suppliers judged ORAs as being ineffective at leveling the playing field
10. As a result of your experience with customers using online reverse auctions, do you actively seek opportunities to charge them higher prices?	4 (sometimes to all the time)	ORAs compel most suppliers to retaliate with respect to pricing when the opportunity arises with their customers
11. List a few key benefits of online reverse auctions for suppliers	–	39 per cent of suppliers said there were no benefits
12. List a few key drawbacks of online reverse auctions for suppliers	–	Pricing, RFQ, intangibles, process management
13. How could the online reverse auction process be improved to deliver greater benefits to suppliers?	–	Can not be improved ( $n=10$ ); pricing, contracts, bidders, process management
14. Has work that you lost as a result of online reverse auctions come back to you? If "yes", what percent of the total lost has returned?	–	Yes ( $n=14$ ); average amount of work returned = 19.5 per cent
15. When was the first and last time you participated in an online reverse auction? Give month and year	–	First 11/97, Last 9/02; average duration = 23.2 months
16. About how many online reverse auctions events (not individual lots) have you participated in?	1 (one to ten)	The level of participation in ORAs is low or suppliers are selective regarding the extent of their participation
17. How many new customers have you won as a result of online reverse auctions?	1 (zero to two)	Half of the incumbent suppliers won no new customers
18. How much has your sales increased as a result of online reverse auctions?	1 (0 to 5 per cent)	Most suppliers reported no increase in sales
19. How many new markets have you gained access to as a result of online reverse auctions?	1 (zero to one)	Most suppliers reported little or no access to new markets
20. Total number of full-time employees?	2 (51 to 100)	All suppliers responding to the survey can be classified as small businesses

Figure 1

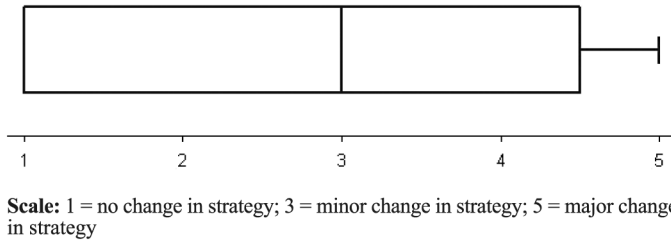


Figure 3

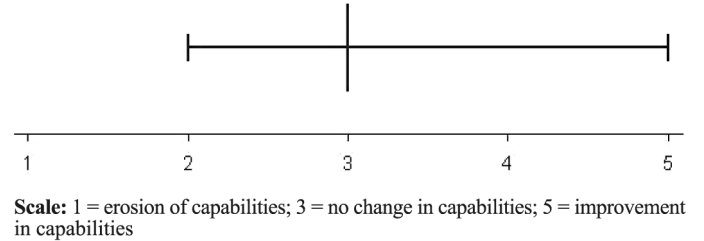
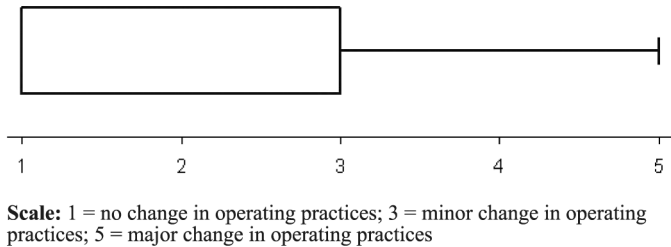


Figure 2



range (Q3-Q1) is 2 indicating the middle 50 per cent of data were fairly consistent between values of 1 and 3. The minimum value, first quartile, and median are the same at a value of 1.

#### Analysis

A few suppliers described the specific changes in operating practices, including: increased awareness of costs and greater emphasis on cost reduction ( $n = 2$ ), improving productivity through the adoption of lean production practices ( $n = 2$ ), and outsourcing simple machining operations ( $n = 1$ ).

#### Question 3. What has been the effect of online reverse auctions with regards to your production capabilities?

Scale: 1 = erosion of capabilities; 3 = no change in capabilities; 5 = improvement in capabilities (Figure 3).

#### Results

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 3. The interquartile range (Q3-Q1) is 0 indicating the middle 50 per cent of responses were consistent at a value of 3. The first quartile, median, and third quartile are the same at a value of 3.

#### Analysis

Most suppliers reported no change in production capabilities as a result of online reverse auctions. A few suppliers provided additional information regarding changes to their production capabilities including: adopting lean production practices ( $n = 2$ ), obtaining new and different types of work ( $n = 1$ ), diversifying the customer base ( $n = 1$ ), and investing in new equipment ( $n = 1$ ).

#### Question 4. What has been the effect of online reverse auctions with regards to your long-term competitiveness?

Scale: 1 = reduction of competitiveness; 3 = no change in competitiveness; 5 = improvement in competitiveness (Figure 4).

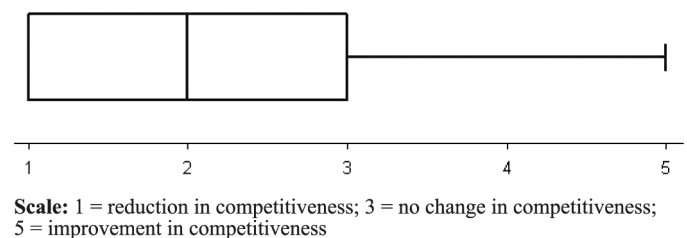
#### Results

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 2. The interquartile range (Q3-Q1) is 2 indicating the middle 50 per cent of data were fairly consistent between values of 1 and 3. The minimum value and first quartile are the same at a value of 1.

#### Analysis

Most suppliers reported either a reduction or no change in long-term competitiveness as a result of their participation in online reverse auctions.

Figure 4



A few suppliers provided information on how their long-term competitiveness has deteriorated including less money to spend on improvement activities, technology, or equipment ( $n = 3$ ). A few others noted how their long-term competitiveness has improved by adopting lean production practices to become more flexible and responsive ( $n = 2$ ) and through better market intelligence relative to pricing ( $n = 1$ ).

**Question 5. What has been the effect of online reverse auctions on your company's overhead burden?**

Scale: 1 = increase in overhead burden; 3 = no change in overhead burden; 5 = reduction in overhead burden (Figure 5).

*Results*

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 3. The interquartile range (Q3-Q1) is 2 indicating the middle 50 per cent of data were fairly consistent between values of 1 and 3. The minimum value and first quartile are the same at a value of 1. The median and third quartile are the same at a value of 3.

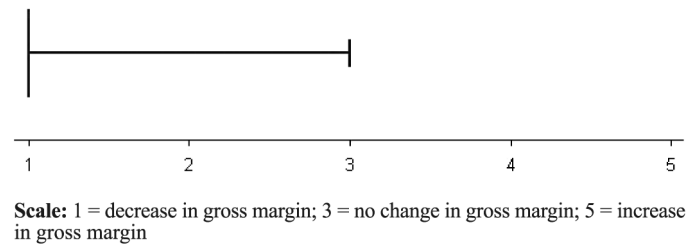
*Analysis*

Most suppliers reported an increase in overhead burden due to the work lost to other suppliers. Suppliers reported an increase in overhead expenses associated with the team of people required to work on the RFQ and bidding process ( $n = 3$ ), and an increase in engineering and clerical personnel as well as higher tooling costs ( $n = 3$ ).

**Question 6. What has been the effect of online reverse auctions on your company's gross margins?**

Scale: 1 = decrease in gross margin; 3 = no change in gross margin; 5 = increase in gross margin (Figure 6).

**Figure 6**



*Results*

The box-and-whisker plot displays a narrow range of overall responses to this question with a median response value of 1. The interquartile range (Q3-Q1) is 0 indicating the middle 50 per cent of data were consistent at a value of 1. The minimum value, first quartile, median, and third quartile are all a value of 1.

*Analysis.* Most suppliers reported a decrease in gross margin as a result of the work that was lost to other suppliers.

**Question 7. What has been the effect of online reverse auctions with regards to relationships with your customers?**

Scale: 1 = less cooperation; 3 = no change in level of cooperation; 5 = more cooperation (Figure 7).

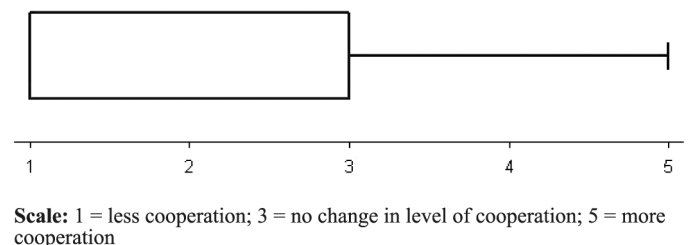
*Results*

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 1. The interquartile range (Q3-Q1) is 2 indicating the middle 50 per cent of data were fairly consistent between values of 1 and 3. The minimum value, first quartile, and median all have a value of 1.

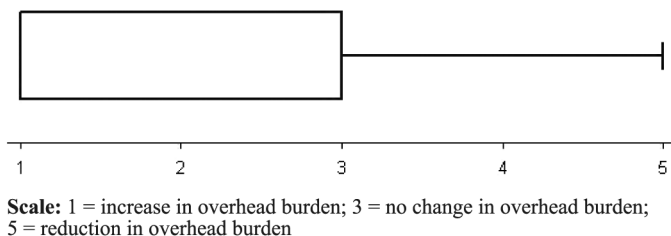
*Analysis*

Most suppliers reported less cooperative relationships with their customers as a result of

**Figure 7**



**Figure 5**



online reverse auctions. The one supplier that reported "more cooperation" is the supplier mentioned previously that is no longer in business. Note that the costs associated with less cooperative relationships are not accounted for in so-called "total cost" RFQs.

**Question 8. Do you feel that online reverse auctions are an ethical business practice?**

Scale: 1 = no; 3 = don't know or neutral; 5 = yes (Figure 8).

*Results*

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 1. The interquartile range (Q3-Q1) is 0 indicating the middle 50 per cent of data were consistent at a value of 1. The minimum value, first quartile, median, and third quartile have the same value of 1.

*Analysis*

A total of 21 of 23 suppliers (91 per cent) reported a score of 3 or less. One supplier gave this question a score of 4, while another gave a score of 5. Most suppliers judged this new purchasing tool as an unethical business practice.

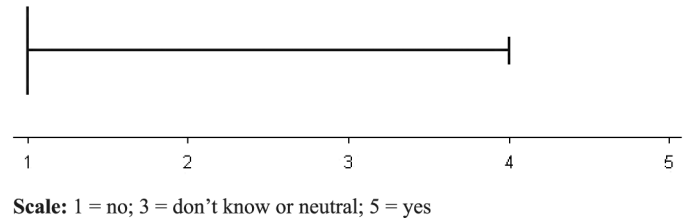
**Question 9. Do you feel that online reverse auctions create a "level playing field"?**

Scale: 1 = no; 3 = don't know or neutral; 5 = yes (Figure 9).

*Results*

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 1. The interquartile range (Q3-Q1) is 0 indicating the middle 50 per cent of data were consistent at a value of 1. The minimum value, first quartile, median, and third quartile all have values of 1.

**Figure 9**



*Analysis*

A total of 21 of 23 suppliers (91 per cent) reported a score of 1. One supplier gave this question a score of 3, while another gave a score of 4. Most suppliers judged this new purchasing tool as being ineffective at leveling the playing field.

**Question 10. As a result of your experience with customers using online reverse auctions, do you actively seek opportunities to charge them higher prices?**

Scale: 1 = not at all; 3 = sometimes; 5 = all the time (Figure 10).

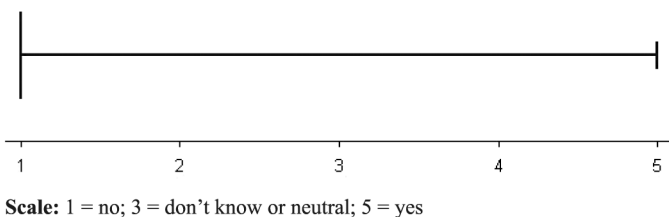
*Results*

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 4. The interquartile range (Q3-Q1) is 3 indicating the middle 50 per cent of data were significantly varied between values of 2 and 5. The third quartile and maximum value are the same at a value of 5.

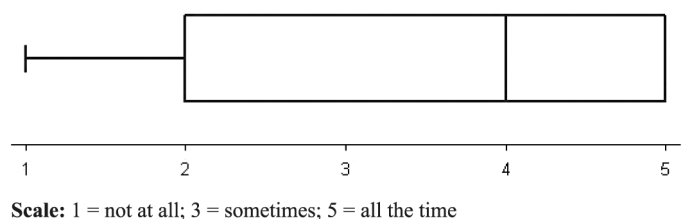
*Analysis*

A total of 17 suppliers (74 per cent) reported a score of 3 or more; 12 suppliers (52 per cent) reported a score of 4 or more; and five suppliers (22 per cent) reported a score of 5. A total of six suppliers (26 per cent) reported a score of 1. This indicates that the use of online reverse

**Figure 8**



**Figure 10**



auctions compels most suppliers to retaliate with respect to pricing when the opportunity arises with their customers that use online reverse auctions (i.e. spot buys, expedited orders, etc.). Note that the costs associated with opportunistic behavior by incumbent suppliers are not accounted for in so-called “total cost” RFQs.

**Question 11. List a few key benefits of online reverse auctions for suppliers**

See Figure 11.

*Analysis*

The responses are clustered into three groups. A total of nine suppliers said there were no benefits associated with online reverse auctions. This is supported by the responses under “markets or customers” where suppliers said they look for customers that are not using reverse auctions. The benefits listed under “contracts” are not specific to online reverse auctions; i.e. the reported benefits could be achieved under traditional strategic sourcing processes without using online reverse auctions.

**Question 12. List a few key drawbacks of online reverse auctions for suppliers?**

See Figure 12.

*Analysis*

The drawbacks of online reverse auctions for suppliers were more numerous than the benefits. The majority of the responses to this question centered on “pricing” and “intangible” aspects. The long-term effect of the pricing drawbacks is a reduction in the profitability and capability of suppliers. The responses also highlighted the fact that there is no rational framework for determining costs,

setting prices or profits, and that buyers continue to exert their leverage to lower suppliers' prices. The responses grouped under “intangibles” reflect the concern that buyers are not considering the total cost in the RFQ or the bids received, and that the use of reverse auctions is promoting adversarial relationships between the buyer and supplier.

**Question 13. How could the online reverse auction process be improved to deliver greater benefits to suppliers?**

See Figure 13.

*Analysis*

Responses for improving the online reverse auction process were varied as indicated by the five groupings. The majority of respondents ( $n = 10$ ) said that the online reverse auction process can not be improved or do not know how it can be improved, indicating that buyers should re-evaluate the use of this purchasing tool and its long-term effect on suppliers rather than trying to improve the process. The responses grouped under “pricing” and “bidders” are inconsistent. This suggests that suppliers are coping with this process differently and that many may still be unaware of the key drivers for maximizing savings in online reverse auctions – namely, attractive bid volumes and the inclusion of new suppliers in the bidding process.

**Question 14. Has work that you lost as a result of online reverse auctions come back to you? If “yes”, what percentage of the total lost has returned?**

- Yes ( $n = 14$ ).
- Percentage of work returned ( $n = 10$ ):  
high = 50 per cent; low = 5 per cent;  
average = 19.5 per cent.

Figure 11

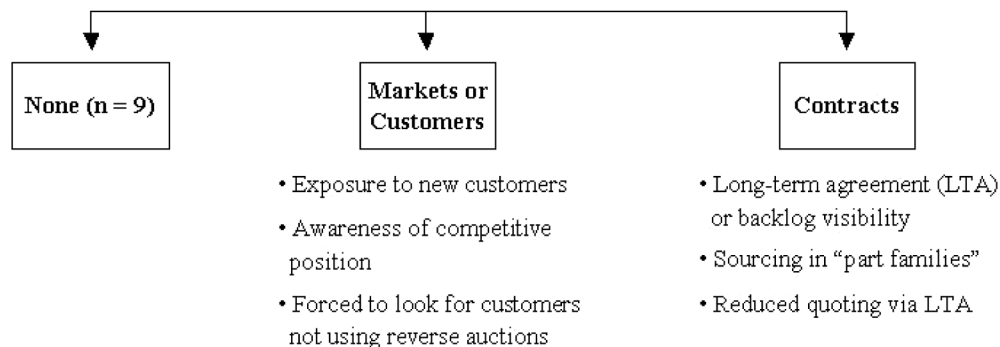


Figure 12

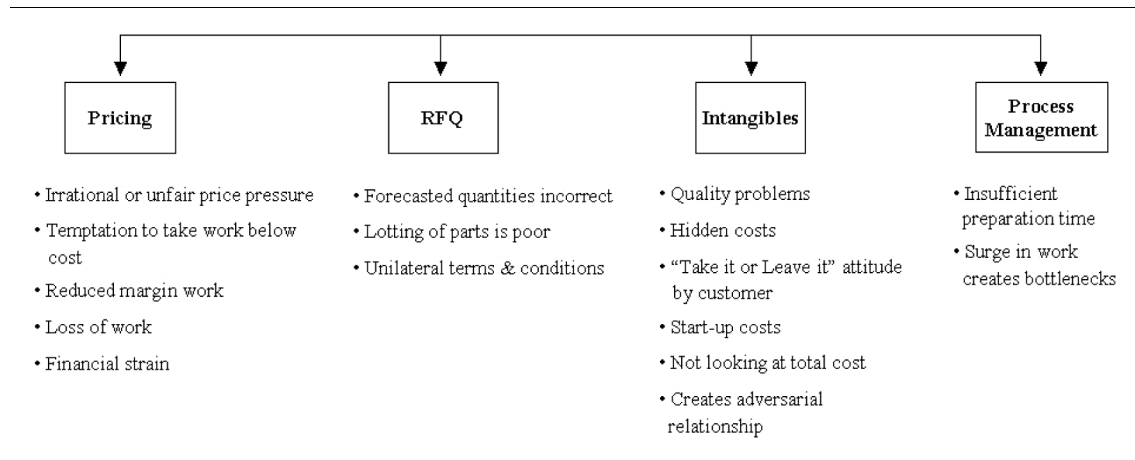
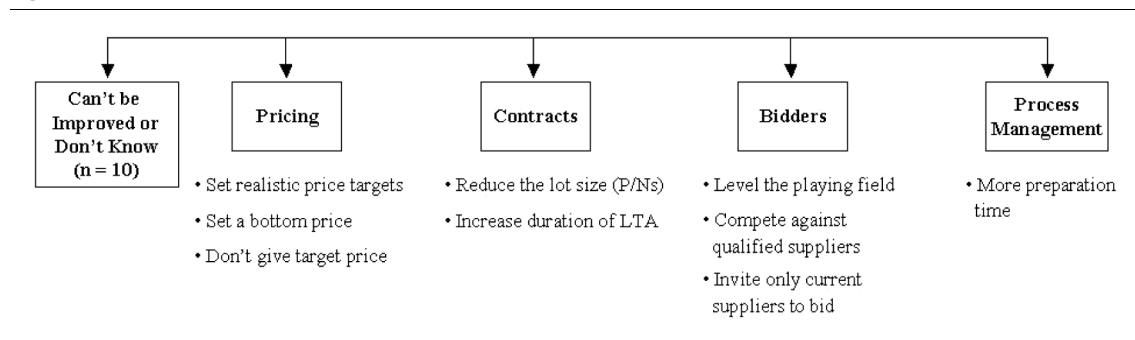


Figure 13



### Analysis

A total of 43 per cent of the suppliers responding said an average of 19.5 per cent of the work returned to them later on, presumably due to non-performance by the new source of supply. This is an important finding because buyers entering into online reverse auction service agreements are likely to be unaware that such outcomes are highly probable for engineered parts.

It also indicates that some suppliers are not as interchangeable as the buyer might believe them to be, and that some suppliers may have more power than they or their customers realize. The power that make-to-print sources of supply have will rest in their capabilities, which can range from relationships with their own suppliers to manufacturing processes to specialized equipment or tooling, and associated tacit knowledge. Note that the costs associated with sourcing work back to the original supplier are not accounted for in so-called "total cost" RFQs.

### Question 15. When was the first and last time you participated in an online reverse auction? Give month and year

- First: November 1997; last: September 2002 ( $n = 18$ ).
- Average duration of participation: 23.2 months ( $n = 16$ ). Standard deviation: 15 months.
- Participating in online reverse auctions in 2002:  $n = 8$ .

### Analysis

These data show that most aerospace parts suppliers participate at some level for periods of up to two years in duration, and then drop out of the process. The average duration of incumbent supplier participation indicates the life cycle of the online reverse auction process for the aerospace machined parts commodity category is relatively short. The coefficient of variation (standard deviation  $\div$  mean = 0.65) indicates that the process has low variability and is tightly distributed around the mean of 23 months. Within that time period, suppliers

learn the issues surrounding online reverse auctions and gain insight into their potential benefits. If the benefits are tangible, then it should result in sustained commitment among suppliers to participate in the online reverse auction process. However, the results indicate that the benefits (presented in the "Discussion" section) are not realized by most of the incumbent suppliers surveyed and so they drop out of the process. Only 35 per cent of the suppliers responding were engaged in online reverse auctions at the time the survey was conducted.

**Question 16. About how many online reverse auctions events (not individual lots) have you participated in?**

Scale: 1 = 1-10; 2 = 11-25; 3 = 26-50; 4 = 51-75; 5 = over 75 (see Figure 14).

*Results*

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 1. The interquartile range (Q3-Q1) is 1 indicating the middle 50 per cent of data were fairly consistent at values between 1 and 2. The minimum value, first quartile, and median are the same at a value of 1.

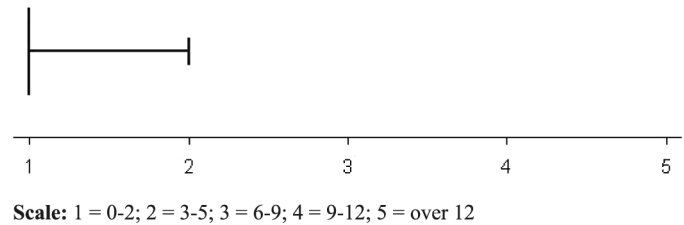
*Analysis*

These data show that level of participation is low or that suppliers are very selective with regards to the extent of their participation. This finding indicates that most incumbent suppliers approach online reverse auctions cautiously and do not view them as a desirable opportunity.

**Question 17. How many new customers have you won as a result of online reverse auctions?**

Scale: 1 = 0-2; 2 = 3-5; 3 = 6-9; 4 = 9-12; 5 = over 12 (see Figure 15).

**Figure 15**



*Results*

The box-and-whisker plot displays a small range of overall responses to this question with a median response value of 1. The interquartile range (Q3-Q1) is 0 indicating the middle 50 per cent of data were consistent at a value of 1. The minimum value, first quartile, median, and third quartile all have values of 1.

*Analysis*

These data show that incumbent suppliers win few new customers as a result of their participation in online reverse auctions. A total of 12 suppliers (52 per cent) said they won no new customers.

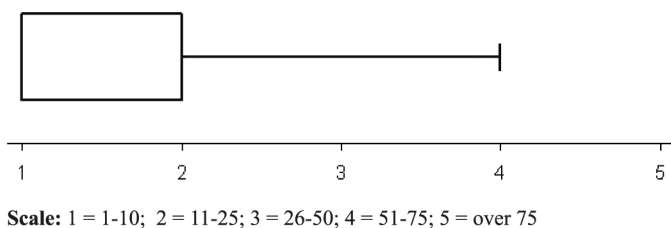
**Question 18. How much has your sales increased as a result of online reverse auctions?**

Scale: 1 = 0-5 per cent; 2 = 6-10 per cent; 3 = 11-15 per cent; 4 = 16-20 per cent; 5 = over 20 per cent (see Figure 16).

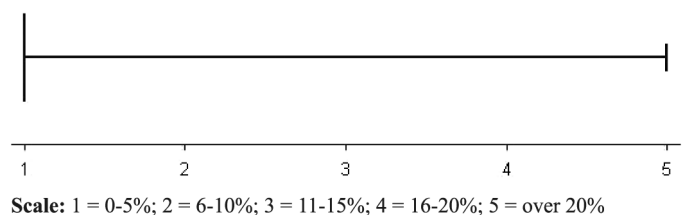
*Results*

The box-and-whisker plot displays a wide range of overall responses to this question with a median response value of 1. The interquartile range (Q3-Q1) is 0 indicating the middle 50 per cent of data all were consistent at a value of 1. The minimum value, first quartile, median, and third quartile all have values of 1.

**Figure 14**



**Figure 16**





*Analysis*

Most suppliers reported that their sales did not increase. A total of two suppliers reported financial losses, while two suppliers reported 20 per cent or more increase in sales.

**Question 19. How many new markets have you gained access to as a result of online reverse auctions?**

Scale: 1 = 0-1; 2 = 2; 3 = 3; 4 = 4; 5 = 5 or more (see Figure 17).

*Results*

The box-and-whisker plot displays a very small range of overall responses with a median response value of 1. The interquartile range (Q3-Q1) is 0 indicating the middle 50 per cent of data all were consistent at a value of 1. The minimum value, first quartile, median, and third quartile all have values of 1.

*Analysis*

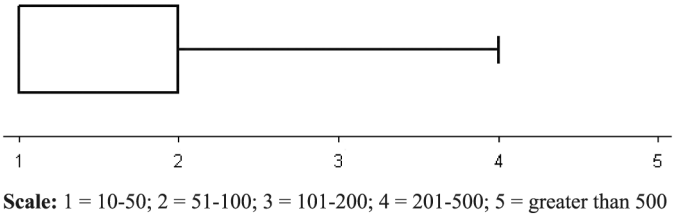
Most suppliers reported little or no access to new markets as a result of their participation in online reverse auctions. A total of 12 suppliers (52 per cent) said they have not gained access to any new markets.

**Question 20. Total number of full-time employees?**

Scale: 1 = 10-50; 2 = 51-100; 3 = 101-200; 4 = 201-500; 5 = greater than 500 (see Figure 18).

*Results.* The box-and-whisker plot displays a large range of responses with a median response value of 2. The interquartile range (Q3-Q1) is 1 indicating the middle 50 per cent of data all were fairly consistent at values between 1 and 2. The minimum value and first quartile are at a value of 1. The median and third quartile are the same at a value of 2.

**Figure 18**

*Analysis*

All of the suppliers responding to the survey can be classified as small businesses, most with less than 100 employees.

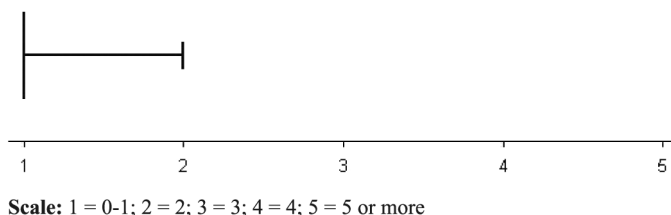
## Discussion

The purported benefits of online reverse auctions for suppliers as described by the market makers (Ariba, 2002; CommerceOne, 2002; Cordiem, 2002; Covisint, 2002; eBreviate, 2002; Exostar, 2002; FreeMarkets, 2002; Moai, 2002; Orbis, 2002; Procuri, 2002; PurchasePro, 2002) are presented in Table II. They make no distinction between these benefits as they relate to incumbent suppliers or lower cost sources of supply that may win new work. Thus, the benefits are apparently equally available to incumbent suppliers and all other qualified suppliers located in the USA or in low wage countries such as Eastern Europe or China.

Importantly, none of the online reverse auction service providers cited previously quantify the benefits that suppliers can expect to achieve in numerical terms. Suppliers must therefore take it on faith that there are benefits they can actually realize. Items (a) through (f) were directly addressed in this study – i.e. Questions 5, 7, 9, 17, 18, and 19, respectively. In general, the suppliers surveyed indicated that they failed to realize these key benefits.

Several suppliers noted that the online reverse auction process does not address total costs (item (g)) as claimed by the market makers. Some suppliers noted benefits associated with improved market intelligence relative to pricing (item (h)) and the creation of long-term agreements (item (i)) for incumbent suppliers that won the work. No mention was made of items (j) through (q) as being beneficial to the suppliers.

**Figure 17**



**Table II** Purported benefits for suppliers

Item	Benefits
(a)	Reduce operating, selling or customer acquisition costs
(b)	Improve buyer-seller relationships
(c)	Compete on a level playing field
(d)	Access to new customers
(e)	Increase sales
(f)	Access to new markets
(g)	Focus on total cost
(h)	Improved market intelligence (relative to pricing)
(i)	Long-term (e.g. two-to-three-year) contracts
(j)	Reduce the complexity of the bid process
(k)	Reduce the bid cycle time
(l)	Process efficiencies
(m)	Improve customer service/customer satisfaction
(n)	Save time
(o)	Fewer geographic boundaries
(p)	Share critical information
(q)	Improved supplier communication

### The principal findings of this study

- The incumbent suppliers surveyed realized few benefits, if any, from participating in online reverse auctions. The claims made by the market makers regarding the benefits to suppliers are at best inaccurate and at worst false. Importantly, previous work has shown that the claims made by market makers with respect to the benefits (i.e. savings) that buyers can expect to realize are greatly exaggerated (CLBM, 2002; Emiliani and Stec, 2002a). This indicates that online reverse auctions are more hype than substance, and that buyers using this new tool will likely encounter unfavorable outcomes when applying the online reverse auction tool to buyer-designed and specified engineered components.
- Over 70 per cent of incumbent suppliers responding to the survey actively seek opportunities to charge their customer higher prices as a direct result of their participation in online reverse auctions when the opportunity to do so arises. This provides concrete evidence that the natural reaction among incumbent suppliers is to retaliate with respect to pricing. The buyer is viewed as behaving in an opportunistic manner, which creates self-similar behavior among incumbent suppliers. Importantly, the market makers claim that the online reverse auction process accurately portrays the “total cost” of acquisition of purchased goods. However, the reality is that it does not account for retaliatory pricing practices, less cooperative relationships, and sourcing work back to the original supplier, all of which appear to be common outcomes that will surely increase total costs – the very opposite of that which is so much desired by buyers.
- The incumbent suppliers surveyed view online reverse auctions as a divisive purchasing tool that damages relationships with long-time customers. This finding is of no consequence for those buyers who believe that relationships with suppliers, whose products typically comprise over 70 per cent of the cost of goods sold, are not important. Negating the importance of having strong collaborative relationships between buyers and sellers, while recently fashionable, will ultimately result in the destruction of value sought by end-use customers (Womack and Jones, 1996).
- Incumbent suppliers that drop out of the bidding process after one or two years reduce the available pool of qualified suppliers, thus making it more difficult to source engineered parts using the online reverse auction process. It will also be more difficult to secure the level of gross savings that was achieved when the online reverse auction process was first applied to the commodity under consideration (CLBM, 2002). If the number of suppliers that drop out of the process is high enough over time, then leverage will eventually return to the sellers and the online reverse auction process will no longer be useful to buyers (Tulder and Mol, 2002). However, suppliers could diminish the buyer's leverage more quickly if many of them refused to participate when the opportunity first arises, or if they dropped out after the first auction event. The implication for market makers is that they risk running out of high gross savings commodity categories, which historically have been the principal sales and marketing feature used to acquire corporate customers. In the future, market makers may be forced to focus on commodity categories that offer lower gross

- savings potential, likely resulting in fewer customers, diminished sales revenue, or both.
- Some suppliers (about 9 per cent) recognize the great threat that online reverse auctions pose and respond with dedicated efforts to improve productivity and overall competitiveness by adopting lean production practices (Ohno, 1988). So there can be a “silver lining” that benefits both the seller and buyer. Ultimately, however, the buyer has to acknowledge that the cost of purchased good is largely determined by their own design practices and specification requirements, which are often determined without supplier input. In other words, buyers create their own problems and later attempt to transfer them, unjustly, to suppliers. Removing cost from engineered products requires close collaboration between buyers and sellers in design and in production (Nishiguchi, 1994; Monden, 1995; Bounds, 1996; Bounds *et al.*, 1996; Cooper and Slagmulder, 1999; Fujimoto, 1999).
  - A few suppliers responded to online reverse auctions with efforts to improve productivity by adopting lean production practices.

Importantly, the gains in productivity achieved by suppliers using lean production practices are not generally used to better position the supplier for future participation in online reverse auctions. Instead, improved productivity is used as a selling point to prospective customers that do not use online reverse auctions.

Published reports in both academic journals and the business press, as well as conversations between the authors and managers in industry responsible for other commodity categories, suggest that similar results will be found among incumbent suppliers from other industries that produce buyer-designed and specified goods and services in other commodity categories. Thus, the general trends illustrated in this paper are judged to be broadly applicable. However, it is possible that more successful outcomes may exist between specific pairs of buyers and incumbent sellers for certain commodities such as bulk materials or non-technical services that can be very easily specified.

These results, as well as previous studies (Emiliani and Stec, 2001, 2002a, b), show that online reverse auctions offer much less savings to buyers than the market makers claim, while the value proposition for incumbent suppliers is largely non-existent and likely dubious even for new sources of supply who have to contend with the “winner’s curse” (Tulder and Mol, 2002). Buyers could achieve similar results (i.e. net savings) more easily and much less expensively by sending letters to suppliers demanding 5 per cent or 10 per cent price cuts or risk losing their business (Kobe, 2001). While we do not recommend this approach either, it simply is used to illustrate the point that online reverse auctions are not an authentic improvement in purchasing practice – at least for certain commodities.

So what should senior managers do to reduce the cost of purchased materials? Alternative solutions based upon collaborative problem solving, rather than power-based bargaining, and leading to long-term organizational capability building and improved

## Summary

This paper examined how aerospace part and sub-component suppliers specializing in producing engineered machined parts and sub-assemblies react to online reverse auctions. The results show that online reverse auctions have numerous serious shortcomings as far as incumbent suppliers are concerned. Key findings include:

- The incumbent suppliers surveyed realized few benefits, if any, from participating in online reverse auctions.
- Over 70 per cent of incumbent suppliers responding to the survey actively seek opportunities to charge their customer higher prices as a direct result of their participation in online reverse auctions when the opportunity to do so arises.
- The incumbent suppliers surveyed view online reverse auctions as a divisive purchasing tool that damages relationships with long-time customers.
- Most incumbent suppliers drop out of the bidding process after one or two years.

competitiveness have been presented in previous studies (Womack *et al.*, 1990; Nishiguchi, 1994; Monden, 1995; Bounds, 1996; Cooper and Slagmulder, 1999; Fujimoto, 1999) and commented upon in relation to online reverse auctions (Emiliani and Stec, 2002a, b).

Future research will focus on extending the present work to other buyer-designed or specified commodity categories, with the intent to identify similarities and differences in how suppliers react to online reverse auctions and understand the domain of successful and unsuccessful application of the online reverse auction tool. Such results will provide further insight into the evolution of buyer-seller relationships, embedded organizational routines promoting power-based bargaining, the overall utility of online reverse auctions, and the long-term viability of the market makers' business model with respect to acquiring new customers, customer retention, and financial performance.

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Discussion

## Commentary on “Reverse auctions for relationship marketers” by Daly and Nath

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### 1. Introduction

Daly and Nath pose an interesting question: “. . . can [online reverse] auctions be made more relational and long-term oriented? . . . yet retain their valuable pricing benefits” (Daly & Nath, 2005). Since the start of business-to-business online reverse auctions around 1995 (Richards, 2000; Tully, 2000), the value proposition for suppliers has been weak or nonexistent (Bartholomew, 2001, 2002; Emiliani & Stec, 2004, *in press*). Thus, expanding the value proposition generally and, specifically, buyer–seller relationships and long-term trade orientation are important improvements that could be made to reverse auction design and deployment. The question is: How to do it? Daly and Nath propose three possible solutions:

- (1) Buyer subsidies of relationship-specific investment in winning seller’s operations
- (2) Price negotiation after auction
- (3) Payment to losing bidders

Solutions (1) and (3) will be nonstarters for most purchasing and finance executives since they view reverse auctions as a means to save money on purchased goods and services and not to spend more money, thereby increasing costs. Solution (2) violates reverse auction terms and con-

ditions between reverse auction service providers, buyers, and sellers. In general, postauction price negotiations are not allowed.

The fact that practical means for improving relational and long-term aspects of trade are scarce simply illustrates the fact that this new purchasing tool is fundamentally misaligned with those objectives. If buyers are truly interested in long-term collaborative relationships and managing costs throughout the value stream (Womack, Jones, & Roos, 1990), then they should seek alternate means that have been proven to be effective (Bounds, 1996; Bounds, Shaw, & Gillard, 1996; Cooper & Slagmulder, 1999; Dyer & Nobeoka, 2000; Fujimoto, 1999; Nishiguchi, 1994; Rother & Shook, 1999; Womack & Jones, 2002).

### 2. Long-term relationships

Over the years, reverse auction service providers, also called “market makers,” have made various qualitative claims regarding the benefits of participating in reverse auctions for new and incumbent suppliers, including:

- Reduce operating, selling, or customer acquisition costs
- Improve buyer–seller relationships
- Compete on a level playing field
- Access to new customers
- Increase sales
- Access to new markets

The validity of these and other claims has been examined in empirical studies of aerospace machined parts and wood pallet suppliers (Emiliani & Stec, 2004, *in press*). The results show that most suppliers fail to realize these key

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benefits. In practice, the value proposition for both new and incumbent suppliers is narrow and largely unchanged since reverse auctions were first deployed: new suppliers may gain new business, while incumbent suppliers risk losing hard-won business.

The history of online reverse auctions to-date clearly shows that, with rare exception—e.g., purchase of industry standard commercial goods (Smart & Harrison, 2003)—reverse auctions are designed and deployed in ways that are hostile to relationship building among incumbent suppliers (Bartholomew, 2001, 2002, 2004; Emiliani, 2004; Emiliani & Stec, 2004, *in press*; Richards, 2000; Sawhney, 2003). Indeed, the purpose of reverse auctions is short-term unit price reduction, enabled by advantages that buyers have over sellers—particularly when buyers own the technical specifications of the goods or services. The likelihood of improved relationship between buyers and incumbent sellers is low given current reverse auction designs and deployment practices, which include both implicit and explicit coercion (Emiliani & Stec, 2002a). In most cases, reverse auctions simply extend power-based bargaining routines long used by buyers that possess leverage in the marketplace over incumbent sellers' interests (Emiliani, 2004; Nishiguchi, 1994; Womack et al., 1990). Buyers that use reverse auctions know this, and so, they do not want their customers to use reverse auctions for the goods or services that they supply (Richards, 2000).

New suppliers that win business may in a few cases experience improved relations, but this can be easily undercut by the buyer's inability to meet suppliers' needs or by the seller's inability to meet the buyer's needs in the execution of the contract. A common result is unanticipated demands made by sellers or buyers that later seek alternate sources of supply due to supplier nonperformance (Emiliani & Stec, 2004, *in press*)—outcomes which will damage relationships.

A few winning incumbent suppliers may also experience good relations. However, the more common outcome is deterioration of the business relationship caused by rapid margin erosion (Emiliani & Stec, 2004, *in press*). This is a significant threat to sellers, and losing work to other suppliers—especially to new suppliers with unproven track records of quality, delivery, and service performance—will also damage buyer–seller relationships.

New or incumbent suppliers whose bids were not selected, despite low prices, will complain of their loss and lament the time they spent preparing for the reverse auction. They may also take legal action against the market maker or buyer for bidding rule violations (Castaldo, 2004), which will introduce additional costs to the seller, market maker, and buyer. This will damage potential future relationships, and may also give buyers a poor image in their industry.

While improved buyer–seller relationships have been cited among first-time bidders (Smart & Harrison, 2003), this outcome is rare among bidders that have experience

with reverse auctions. Also, relationship-specific investments made by sellers do not constitute clear evidence of relationship building (Jap, 2001). For example, it can simply be investment needed to meet the sellers' commitment to get the work done, thus fulfilling requirements related to the “winner's curse” (Tulder & Mol, 2002).

### 3. Pricing benefits

On the surface, the primary benefit of reverse auctions for buyers is substantially reduced prices. Unfortunately, it is not that simple. Reverse auctions measure the reduction in unit prices, despite efforts to characterize “total costs” in the request for quote. Digging deeper, one finds that reverse auctions often lead to higher costs in budget categories owned by purchasing or by other departments (Emiliani & Stec, 2002b). For example, new suppliers that are unable to meet quality or delivery performance targets will lead to unanticipated costs incurred by the buyer, including:

- Returns
- Warranty costs
- Litigation expenses
- Overnight freight charges
- Increased supplier oversight

as well as lost sales and dissatisfied customers. These outcomes are common particularly when the item is complex, or when the buyer owns the design of the goods or services.

Further, incumbent suppliers view reverse auctions as opportunistic behavior among buyers to achieve lower prices (Jap, 2001). This often results in “retaliatory pricing” behaviors, where incumbent sellers that have been exposed to reverse auctions wait—sometimes years—for opportunities to charge buyers higher prices for goods or services, including one-time charges such as expediting fees or new tooling (Emiliani & Stec, 2004, *in press*). This adds to the total cost of procurement, especially since incumbent suppliers rarely lose all the work. Instead, they typically lose some of the work and continue doing business with the buyer, all the while seeking higher prices. Other outcomes that are not accounted for in the so-called “total cost” RFQ's include less cooperative relationships and sourcing work back to the original supplier—sometimes at prices higher than what the buyer originally paid.

While unit cost savings is the key measure of success, it is not an accurate measure, nor is it an appropriate measure because it is easily gamed and leads to higher costs (Emiliani, Stec, & Grasso, *submitted for publication*). When total costs increase, reverse auction results become compromised. Not surprisingly, buyers eventually turn their attention to collaborative approaches with established long-term suppliers for managing costs (Barlas, 2003; Drickhammer, 2004).

In addition, there are often many factors that make it difficult for the buyer to secure the savings identified at the conclusion of the reverse auction (Emiliani & Stec, 2002b; Minahan, 2002). Savings typically erode by 30–75% upon implementation of reverse auction results, depending upon the commodity sourced. General Electric, for example, has reported an average savings loss of 50% across a wide range of goods and services (CLBM, 2004). In the worst cases, the use of reverse auctions could cost buyers more money than they appear to be saving.

#### 4. Solutions

In addition to the shortcomings noted previously, Daly and Nath's solutions have additional weaknesses. They are as follows:

##### 4.1. Buyer subsidies

The capabilities that buyers seek, whether related to equipment, R&D capabilities, etc., will have been evaluated at the time suppliers were selected to participate in reverse auctions, thus negating the need for buyers to subsidize suppliers' investments. Also, given the overcapacity that exists in most manufacturing and service sectors, it is unlikely that buyers would need to make relationship-specific investment in winning seller's operations—other than small investments in information technology to facilitate secure communication between buyer and seller. Further, buyers that have historically relied on power-based bargaining routines to manage suppliers generally do not have the organizational capability to fulfill obligations related to making relationship-specific investments. Lastly, since reverse auctions typically constitute 10–15% of a company's annual purchasing spend (Beall et al., 2003), there are ample opportunities to source work to disadvantaged businesses through the traditional sealed bid method.

##### 4.2. Postauction price negotiation

Reverse auction service providers have long held that one of the benefits of reverse auctions for suppliers is the creation of a level playing field among the suppliers invited to bid (Emiliani & Stec, 2004, *in press*). Postauction price negotiation with selected suppliers—e.g., the few with the best prices—un-levels the playing field. Thus, most reverse auction service providers do not allow postauction price negotiation.

From the buyer's perspective, they likely achieved what they perceive to be a good result: 10–30% reduction in unit prices. That's a big win, and most purchasing managers would decline efforts to achieve a few percent additional savings. The more pressing matter is to implement the

reverse auction results and to begin accruing the savings. This is often an activity that requires significant resources from the buyer, especially if the supplier that won the work is new and the good or services are complex (Emiliani, 2000; Emiliani & Stec, 2002b).

If the range between bids is high, then it is likely that buyers made mistakes with respect to supplier selection. The fact is, most buyers do not understand the true cost of the goods or services that they purchase. Evidence for this is found in the dominant metric used to gage the success of purchasing activities—the purchase price variance metric—which tell buyers nothing about supplier's costs (Emiliani et al., *submitted for publication*). Additionally, buyers' use of online reverse auctions is a tacit admission that they do not understand the true cost of what they are procuring (Emiliani, 2000).

From the supplier's perspective, postauction price negotiation will deepen the pressure they face with respect to margin erosion. This will not make them happier. But it could give suppliers a reason to invalidate their bids if postauction price negotiation is a violation of the reverse auction rules. Furthermore, the threat of margin erosion will discourage suppliers from making relationship-specific investments (Jap, 2003).

##### 4.3. Payment to losing bidders

If compensating suppliers for the time taken to prepare for reverse auctions has any merit, then a method must be devised to track the costs and the payments made to them. The cost will vary widely from supplier to supplier, driven by overhead rates. Suppliers in low-wage countries will have low overhead rates, while suppliers in developed countries will have higher overhead rates. Some suppliers will make earnest efforts to prepare their bids and spend a lot of time reviewing specifications. Others will spend little or no time preparing their bids, preferring instead to simply estimate prices. Some will seek to get compensated for preparing bids that they spent little time preparing for, knowing that they have no intention of being a competitive bidder. For some suppliers, this solution will become a profit improvement program at the seller's expense and thus actively seek to participate in many reverse auctions. The potential for gaming is large.

Determining how much to pay the suppliers for their actual efforts quickly becomes complicated and would likely lead some buyers to impose region-specific flat fees. Again, the main idea behind reverse auctions is to reduce purchase price and not to increase costs by paying possibly dozens of losing suppliers to prepare for bidding. This would simply increase the total cost of the items purchased. Remember, the traditional sealed bid method of procurement is an activity for which suppliers are not compensated.

This proposed solution is an ineffective way to increase the number of suppliers participating in reverse auctions.



The fact that most suppliers do not voluntarily flock to reverse auctions speaks volumes as to what they think of them. Clearly, it is a zero-sum tool designed principally to benefit buyers at suppliers' expense (Emiliani & Stec, in press). Lastly, it is unlikely that losing suppliers receiving payment would enjoy a "renewed sense of respect for the buyer." Instead, it is more likely that suppliers would view buyers making payments to losing bidders with less respect because of their single-minded efforts to reduce costs no matter what the cost and consistently failing to understand value (i.e., price plus nonprice factors)—a common occurrence among buyers focused on price and that rely on power-based bargaining.

Finally, a potential solution that Daly and Nath do not identify is the codes of conduct or trade association guidelines designed to improve trust, fairness, and confidence in reverse auctions. However, careful examination reveals that these have had little or no favorable impact with regard to improving buyer–seller relationships (Emiliani, submitted for publication).

## 5. Conclusion

Reverse auctions are an inherently destructive purchasing tool as far as incumbent suppliers are concerned. Whether it can be made capable of improving buyer–seller relationships and embody a long-term trade orientation remains to be seen. To do that, the value proposition for both new and incumbent must be expanded. The solutions that Daly and Nath identify do not address incumbent suppliers' core interest in expanding sales and margins for the goods or services that they produce. Nor do the solutions support buyers' principal objective of reducing the price of purchased goods or services and avoiding other unwanted costs. Importantly, predicting buyer and seller behaviors using mathematical models is often trumped by factors that cannot be easily accounted for. Thus, the practical utility of such models is extremely limited.

The future of reverse auctions is uncertain. First, their use among industrial buyers appears to flat or declining (Hannon, 2003). Second, there is an oversupply of reverse auction service providers, resulting in business closures, mergers, or sales. Examples include CommerceOne, Cordiem, Covisint, eScout, FreeMarkets, and PurchasePro, to name a few (Barlas, 2004a, 2004b; Ericson, 2003, 2004b). These outcomes are entirely predictable given the poor value proposition for all suppliers (Ericson, 2004a) and particularly for incumbent suppliers.

Today, reverse auction use averages about 10–15% of total corporate purchasing spend, mainly for nonstrategic items where buyers have little interest in long-term supply arrangements or relationship-building. Overall, it is probably not worth any effort to make reverse auctions more relational and long-term-oriented. That, after all, is not its intent. Instead, reverse auctions should be recognized for

what it is: a technologically assisted form of power-based bargaining whose benefits for buyers are grossly overstated and which in the long run compromise the mostly shared interests of both buyers and sellers (Emiliani, 2004).

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# Regulating B2B online reverse auctions through voluntary codes of conduct

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## Abstract

In response to real and perceived abuse by market makers, buyers, and sellers, some industry trade groups representing suppliers have developed voluntary codes of conduct, white papers, and other forms of guidance for online reverse auction participants. The intent of these guidelines is to improve both the reverse auction process and relationships between buyers and sellers. This paper examines the rationale for creating guidelines and codes of conduct, and examines their efficacy in regulating reverse auctions to achieve improved outcomes for market makers, buyers, and sellers. Data from primary and related secondary sources indicate that industry-specific codes of conduct and guidelines have not had a favorable impact.

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## 1. Introduction

Business-to-business (B2B) online reverse auctions, also called “e-reverse auctions” or simply “reverse auctions,” have become a common method to source production and non-production goods and services by Fortune 2000 companies since 1995 (Richards, 2000; Tully, 2000). Widespread use of this tool by buyers is of great concern among incumbent suppliers due to potential negative outcomes such as margin erosion and loss of sales volume to other suppliers (B2BRC, 2003; Berning & Flanagan, 2003; Emiliani, 2000; Emiliani & Stec, 2002a; Kobe, 2001; Leonard, 2004; MHEDA, 2003; Stein, Hawking, & Wyld, 2003; Tulder & Mol, 2002). Additional incumbent supplier concerns relate to whether or not buyers and the “market makers”—companies that provide reverse auction services—give adequate consideration to other important factors such as quality, service, technology, or production capabilities (Bartholomew, 2001, 2002; Brindley, 2000) or total costs (Emiliani & Stec, 2001, 2002a, 2004, 2005b).

Previous studies have shown that reverse auctions—with rare exception; e.g. purchase of industry standard commercial goods (Smart & Harrison, 2003)—damage supplier relationships and create distrust among incumbent suppliers (B2BRC, 2003; Beall et al., 2003; Emiliani & Stec, 2004, 2005b; Jap, 2001, 2003; MHEDA, 2003; Smeltzer & Carr, 2003). There is a widespread perception among incumbent suppliers that reverse auctions are not fair and have been abused by buyers and market makers (Brindley, 2002a; EU, 2004; Glimm, 2003; Morris, 2003). It has been characterized as an unfair bidding process used by large corporations as a substitute for poor purchasing practices (Brindley, 2002b; Emiliani & Stec, 2002a, 2002b). In addition, the value proposition for incumbent suppliers, to this day, remains un-addressed, save for the coercive threat of losing business (Emiliani & Stec, 2002b, 2004, 2005b; Leonard, 2004; Richards, 2000; Stein et al., 2003; Tulder & Mol, 2002). New suppliers, of course, stand to gain important business from new customers, provided they understand customer requirements, their costs, and do not underbid.

Previous studies of simple and complex commodities have also shown that the benefits of reverse auctions for

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both buyers and suppliers do not exist or have been greatly overstated by market makers and buyers (CLBM, 2004; Emiliani & Stec, 2002a, 2004, 2005b). For suppliers, they purportedly include:

- Reduce operating, selling or customer acquisition costs
- Improve buyer–seller relationships
- Compete on a level playing field
- Access to new customers
- Increase sales
- Access to new markets.

While for buyers, they purportedly include:

- Fast return on investment
- Achieve quick savings
- Obtain market price
- Reduce sourcing cycle time from weeks to hours
- Streamline the sourcing process
- Make better buying decisions
- Improve supplier relationships.

In most cases reverse auctions over-promise and under-deliver, whether for complex custom or simple standard goods or services. Not surprisingly, the outcome is:

- The poor financial performance of leading market makers (Ariba, 2004; Butters & Bennett, 2002; Kisiel, 2002a, 2002b, 2003; Ryan, 2003),
- Closure, merger, or sale of market makers such as CommerceOne, Cordiem, Covisint, eScout, FreeMarkets, and PurchasePro (Barlas, 2004, 2004a; Ericson, 2003, 2004)
- Reverse auctions are typically used for less than 15% of total corporate purchases (Beall et al., 2003)
- Flat or declining use of reverse auctions among large industrial buyers (Hannon, 2003a)
- Declining levels of supplier participation (Emiliani & Stec, 2004, 2005b).

Despite this, senior managers of many Fortune 2000 corporations continue to believe in the efficacy of reverse auctions to reduce unit prices (Emiliani & Stec, 2005b; FreeMarkets, 2003; Grant, 2003; Judge, 2001; Reason, 2001). That is partly because the common metric used to determine unit price savings—purchase price variance—is easily gamed (Emiliani, Stec, & Grasso, 2004). Accurate measurement of total cost would reveal that reverse auctions, in most cases, yield unfavorable results (Emiliani & Stec, 2002a).

Reverse auctions have been shown to be a technologically assisted form of power-based bargaining (Carbone, 2004; Emiliani, 2003, 2004; Emiliani & Stec, 2001, 2002a, 2002b, 2004, 2005b; Jap, 2001, 2003; Stein et al., 2003; Tulder & Mol, 2002). As such, it is subject to abuse principally among buyers and market makers (Beall et al.,

2003; OESA, 2002; Sawhney, 2003). The different forms of abuse include:

- Ambiguous or shifting auction rules
- Threatening incumbent suppliers to bid or risk losing the work
- Changing contract terms and conditions between RFQ and award
- Phantom bidding (buyer or market maker pretends to be a supplier)
- Drive down unit prices with no intention of switching sources
- Allowing unqualified suppliers to bid
- Showing the identities of the bidders and their bids
- Post-auction renegotiation
- Awarding only portions of the items in a bid package
- Forcing supplier to honor unreasonably low prices
- Providing incomplete or inaccurate specifications
- Allowing specification relief to winning bidders
- Including internal departments as bidders
- Repetitive re-bidding to drive down prices
- Not informing bidders of outcomes.

However, new and incumbent suppliers could also abuse reverse auctions by:

- Not abiding by auction rules
- Not adhering to request for quote parameters
- Placing bids with no intention of honoring them
- Bidding when the supplier is in fact unwilling or unable to assume the business if it were awarded to them
- Known inability to meet contract terms and conditions
- Collusion (legal or illegal, depending upon country laws)
- Win new business and charge high prices for “extras”.

This has resulted in the creation of voluntary guidelines of conduct for buyers, sellers, and market makers in the U.S. auto industry (OESA, 2002), the European aluminum foil industry (EAFA, 2002), the European flexible packaging industry (EF, 2002), European carton makers (ECMA, 2003), European wire and cable makers (EPC, 2003), Canadian general contractors (CCA, 2001), and British aerospace companies (SBAC, 2003).

It has also resulted in the creation of “white papers” for general contractors in the United States (AGC, 2003), manufacturers of housewares (IHA, 2002), and printers (Stoddard, 2003). In addition, eleven European packaging-related trade associations endorse the European flexible packaging industry code of conduct (EF, 2002). Industry-specific codes of conduct and white papers vary in structure and content, but all share the same basic objective: to help ensure that reverse auctions are used in a manner that supports fair trade and improves trust between market makers, buyers, and sellers.

Non-industry specific recommendations on how to correctly use or improve reverse auctions have also

appeared in the business and trade press (Brindley, 2000; Dougherty, 2002; Goetting, 2002; Sawhney, 2003; Terry, 2002), and in papers written by academics (Beall et al., 2003; Daly & Nath, *in press*; Smeltzer & Carr, 2003; Wagner & Schwab, 2004). These recommendations are separate from voluntary industry-specific codes of conduct or guidelines, and simply illustrate other means by which potential improvements opportunities have been expressed.

This paper examines industry-specific codes of conduct and guidelines intended to eliminate different forms of abuse or improve the integrity of reverse auctions among its participants: market makers, buyers, and sellers. It explores the general nature of the codes of conduct and guidelines, and questions if outcomes designed to diminish power-based bargaining by buyers can indeed be achieved by this means. Findings highlight the challenges faced by market makers and buyers to reduce the many problems associated with reverse auctions. Also briefly presented is an alternative to power-based bargaining that has been shown to result in improved bilateral competitiveness (Dyer & Nobeoka, 2000; Fujimoto, 1999; Liker & Choi, 2004; Nishiguchi, 1994; Nishiguchi & Beaudet, 1998; Womack, Jones, & Roos, 1990).

## 2. Trade association intervention

Responses by incumbent sellers to the threat of online reverse auctions hosted by their customers have taken several forms. On an individual level, some suppliers simply refuse to participate. Others limit their participation by placing one or two bids early in the bidding cycle, then exit the bidding event. Still other suppliers, after one or two years of participation, become disappointed with the results and drop out. Recent studies of aerospace machined parts and wood pallet suppliers have shown that many will seek customers that do not use reverse auctions (Emiliani & Stec, 2004, 2005b). Evidence suggests these responses are driven by the perception that reverse auctions constitute an expansion of destructive power-based bargaining routines, exploitation of market power, devaluation of non-price factors, and unfair or unethical trade practices (Emiliani & Stec, 2004, 2005b).

The same response occurs on a collective basis among suppliers within a given industry segment. If the industry segment has representation through a trade association, then suppliers may engage its support to develop rules and expectations for reverse auction participants. In general, trade associations state that they support either electronic or traditional sealed bidding to improve the efficiency of tendering processes and promote competition. However, reverse auctions are, in many ways, a significant departure from traditional bidding processes, and have compelled some trade associations to take action. Industry-specific “white papers” are intended to

frame the issues, share the results of studies, declare facts or positions, identify challenges, offer guidance to buyers, and suggest opinions or alternatives regarding suppliers’ response to reverse auctions (AGC, 2003; IHA, 2002; Stoddard, 2003).

For example, the Associated General Contractors of America’s white paper judges many of the claims made by proponents of reverse auctions as unproven with regards to the procurement of general contracting services, and includes the following positions (AGC, 2003):

- Reverse auctions seldom provide benefits compared to current sealed bidding practices
- Reverse auctions may encourage imprudent bidding
- Reverse auctions do not guarantee lowest price nor a thorough evaluation of value
- Reverse auctions may contravene Federal or State procurement laws, particularly with regards to disclosing contractor price information.

The Canadian Construction Association is more explicit in its disdain of reverse auctions, which it “strongly opposes” (CCA, 2001). It presents the case why reverse auctions should not be used for construction projects. Guidance to owners (i.e. buyers) and contractors (i.e. sellers) highlights the benefits of traditional sealed bid practices and the shortcomings of reverse auctions, particularly with regards to fairness. Importantly, it notes that “Reverse auctions may be governed by the laws of the location of the auction’s service provider, which is often remote from the actual construction project’s or owner’s location.” In other words, Canadian owners and contractors could be bound by U.S. Federal or State laws in which the reverse auctions are held, which could complicate the fulfillment of contract terms and conditions or the resolution of disputes. Owners and contractors are “. . .encouraged to follow the prevailing, recommended practices of construction procurement in Canada” and reminds contractors “. . .that a reverse auction will not take place unless bidders agree to participate!”

The International Housewares Association’s white paper, in contrast, “. . .is solely intended to make IHA members more knowledgeable about the reverse auction process to enable them to decide on an individual basis whether or not to participate and to make them more effective participants” (IHA, 2002). It identifies “potential benefits” and “potential challenges” for buyers and sellers, and provides information on how to prepare for a reverse auction, participate in a reverse auction, and manage post-auction activities in order to avoid problems. Importantly, it highlights “supplier value-added functions” for manufacturers and distributors of housewares products, such as customer support, variety, delivery terms, collaborative product design, and in-store merchandising support, and recommends that retailers should consider these functions when qualifying suppliers for reverse auctions. It also

provides guidance for retailers contemplating the use of reverse auctions.

An alternative route is to create a “Code of Conduct” or “Guidelines for Conduct” that explicitly state the rules for engagement for reverse auctions (EAFA, 2002; ECMA, 2003; EF, 2002; EPC, 2003; OESA, 2002; SBAC, 2003). These documents are usually much shorter than white papers, typically 1–5 pages, and summarize the expected behaviors and actions of market makers, buyers, and sellers. They typically describe rules for:

- Transparency of bidders
- Acceptance criteria
- Specifying goods or services
- Terms and conditions
- Security and confidentiality
- Supervision
- Auditing.

The primary areas of concern related to buyers include (OESA, 2002):

- Using reverse auctions to obtain market data, with no real intention of awarding the work to bidders
- Accepting bids from suppliers that are not qualified to do the work
- Making side-deals, where work is awarded to bidders that did not participate in the reverse auction
- Not advising reverse auction participants of the outcome in a timely manner
- Not awarding the work as quoted—e.g. unbundling lots and partial lot awards
- Not disclosing if the buyer’s internal operations are bidding on the work.

The primary areas of concern related to sellers include (OESA, 2002):

- Participating in reverse auctions with no real intention to assume the business
- Not honoring quoted prices
- Not honoring other parameters contained in the request for quote.

The guideline developed by the automotive Original Equipment Suppliers Association is noteworthy because it was created with the participation of three market makers: B2eMarkets, Covisint, and FreeMarkets (OESA, 2002). The guidelines “. . . were developed due to a variety of concerns about the conduct of both buyers and sellers during the reverse auction process,” while the intent of the guidelines “. . . is to provide a framework within which buyers and sellers can conduct and participate in a fair and equitable electronic procurement auctioning process.” It describes “responsibilities and commitments” for buyers, sellers, and market makers. It is interesting to

note that eleven points are presented in over two pages regarding “Buyers Responsibilities and Commitments,” indicating that abuse by buyers has been significant or perceived to have been significant. In contrast, “Sellers Responsibilities and Commitments” contain just three points in less than one page, indicating that they have little power.

A recent opinion survey found that buyers, sellers, market makers, and trade associations think that codes of conduct would be helpful for improving trust and building confidence between auction participants (EU, 2002). However, the true effectiveness of white papers and voluntary codes of conduct on modifying the activities of market makers, buyers, and sellers has not yet been studied or reported in the literature. Voluntary conformance typically means there is no official data collection mechanism that can be used to determine the effectiveness of codes of conduct. Details contributing to favorable results, if any have been achieved, likely remain proprietary.

Despite this limitation, a preliminary conclusion can be drawn based upon data from secondary sources cited previously: i.e. the poor financial performance of leading market makers; closure, merger, or sale of market makers; reverse auctions remain limited to a small fraction of total corporate purchases; flat or declining use of reverse auctions among large industrial buyers; and declining levels of supplier participation. If voluntary codes of conduct were effective at improving fairness and trust, then one would expect reverse auction activity to increase and reverse these unfavorable trends. It appears, however, that industry-specific white papers and codes of conduct have had no positive effect in the 2–3 years since most were created. It is possible that improvement has yet to be realized because it takes time for reverse auction participants to fully comprehend how to use the guidelines.

However, the very fact that industry-specific codes of conduct and guidelines have been created indicate that reverse auctions are a contentious purchasing tool and suffer from many serious shortcomings in actual practice. In every case, they are created in response suppliers’ concerns. Industry-specific codes of conduct and guidelines are unlikely to have much positive impact if they appear one or two year years after reverse auctions are first used in a given industry segment. In other words, it may be too late to undo the damage caused by the initial wave of reverse auction activity in a given industry segment.

Industry-specific codes of conduct and guidelines have been the principal form of collective corrective action in response to actual and perceived abuses. However, given that abuse is a real threat to the integrity of reverse auctions,—and possibly the market making industry’s livelihood—and that codes of conduct are important to some industry groups, it is surprising that market makers have not worked together to develop a standard code of conduct for themselves as well as buyers and suppliers for use in any industry.

### 3. Supporting codes of conduct

Often an assumption made is that the buyer's corporate code of ethics or code of conduct is sufficient with regards to the use of reverse auctions. Corporate legal departments typically review the situation and conclude that reverse auctions are an ethical business practice whose use is appropriately addressed by existing ethics or code of conduct policies. This is not surprising, given that attorneys typically do not have first-hand experience in purchasing in general, nor specifically of interacting with market makers and suppliers, managing reverse auctions, or implementing the results. Thus, they are unaware of the ethical issues that their purchasing professionals face day-to-day when pressured by senior management to reduce costs, the results of which typically form the basis of performance appraisal (Emiliani & Stec, 2002b). One buyer, Dow Chemical, reportedly created a code of conduct specific to reverse auctions for itself and suppliers (Staff, 2002a).

The market maker *sorcity.com*, offers buyers its guidelines for ethical e-auctions (Staff, 2002a). It also requires buyers to adhere to the Institute for Supply Management's "Principles and Standards of Ethical Supply Management Conduct" (ISM, 2002; Staff, 2002a). The ISM's Principles and Standards are recommended for any supply management activity and for anyone who influences the supply management process: e.g. people in finance, engineering, quality, sales, etc., as well as senior managers. In general, the Institute for Supply Management discourages power-based bargaining and supports collaboration between buyers and sellers to solve problems related to price or other factors.

Importantly, the Principles and Standards contain language that suggests buyer's should not use reverse auctions, including:

- "Obtain the maximum value for monies expended. . ."
- "Promote positive supplier relationships. . ."
- ". . .ensure this position size, market power is used within the scope of ethical behavior by the supply management professional and the organization."
- "Avoid unreasonable demands."
- ". . .support only those actions and activities that uphold the highest ethical standards of the profession."
- "Enhance the stature of the supply management profession."

Reverse auctions are not consistent with these components of the "Principles and Standards of Ethical Supply Management Conduct," based on recent studies, surveys, and analyses of reverse auctions and related outcomes (B2BRC, 2003; Bartholomew, 2001, 2002; Emiliani, 2003, 2004; Emiliani & Stec, 2001, 2002a, 2002b, 2004, 2005b; Glimm, 2003; Jap, 2001; Kobe, 2001; MHEDA, 2003; Richards, 2000).

### 4. Discussion

Industry-specific codes of conduct, "white papers," and other forms of guidance are generally intended to inform sellers of challenges and opportunities, discourage the use of reverse auctions or clarify domains of appropriate use, or eliminate abuse by market makers, buyers, and sellers depending upon the perspective of the trade group. To date, no systematic empirical study has been undertaken to evaluate the effectiveness of these guidelines at discouraging the use of reverse auctions, eliminating abuse, or increasing trust among participants. However, it is clear from related studies and published reports in the business press that they have not been successful at expanding the use of reverse auctions. This can be attributed to several factors, many of which are likely operating simultaneously:

- Buyers are switching to less expensive do-it-yourself software solutions, thus requiring less involvement from market makers (Ryan, 2003).
- Buyers are learning that the domain of applicability to which reverse auctions can be successfully applied for sourcing goods or services is much smaller than originally thought; e.g. 1–5% of total spend vs. 10–50% or more.
- Buyers are unhappy with the benefits they have achieved; i.e. savings and other benefits are inconsistent with that claimed by market makers (Emiliani, *in press*; Emiliani & Stec, 2002a, 2005b).
- Resistance from people within the buying organization to continue using reverse auctions as a result of negative experiences encountered upon implementation of previous results (i.e. cost of switching sources, quality and delivery problems, etc.).
- Buyers are moving to different solutions such as private trading networks that limit participation to qualified suppliers known to be capable of satisfying their requirements (Staff, 2001).
- Suppliers are learning that the benefits claimed by market makers have been overstated or never existed (Emiliani & Stec, 2004, 2005b).
- New or incumbent suppliers are unwilling to participate in more than one or two discrete rounds of bidding (e.g. reverse auctions every six months).
- Shrinking pool of suppliers willing to bid for work via reverse auctions (Emiliani & Stec, 2004, 2005b).
- Trade group codes of conduct are ineffective at regulating reverse auctions; e.g. buyer abuse remains common, which reduces seller participation.
- Trade group guidelines and related activism have been effective at discouraging the use of reverse auctions among buyers and participation by sellers in some industries (Cardon, 2004; CCA, 2001).

While these factors do not signal the end of reverse auctions, it appears that their use will be limited to narrow

circumstances. Despite a likely future decline in reverse auction activity, suppliers should not be complacent. Instead, they should work vigorously to improve the value offered to buyers in order to reduce their exposure to reverse auctions (Abele, Elliott, O'Hara, & Roegner, 2002).

In the case of European consumer packaging and carton makers (ECMA, 2003), discussion among reverse auction participants about the fairness of reverse auctions has not resulted in actual deployment of the code of conduct. Instead, it precipitated a change in business practices where buyers have moved away from reverse auctions (Cardon, 2004). It has also compelled buyers to move from fixed price contracts to contracts that take into account fluctuating raw material prices. Despite this change, buyers' initial use of reverse auctions has resulted in margin erosion among sellers of consumer packaging and cartons.

For European suppliers of aluminum foil products, the impact of trade association guidelines (EAFA, 2002) has been negligible. (Glimm, 2004). Instead, buyers of non-standard products realize that reverse auctions have many disadvantages and return to traditional sourcing methods. Given the divisive nature of reverse auctions, it is not surprising that many buyers eventually return to collaborative approaches with established long-term suppliers for managing costs and improving quality and delivery performance (Barlas, 2003; Drickhammer, 2004).

For U.S., European, and Japanese automotive parts suppliers, the Original Equipment Automotive Suppliers Associations' "Guidelines for the Conduct of Reverse Auctions" (OESA, 2002) has not received support from most original equipment manufacturers (Hannon, 2003b). Indeed, after a flurry of activity in 2001 and 2002, concerns about reverse auctions have greatly diminished (De Koker, 2004) and have not been mentioned in OESA's monthly newsletter since prior to February 2003 (OESA, 2004). This indicates that reverse auctions have run their course and are no longer a major issue for automotive parts suppliers.

It appears that efforts to create industry-specific codes of conduct and guidelines signals to buyers there is a major problem. Their main benefit, however, is not as a mechanism for voluntarily regulating reverse auctions, but as a source of unified, high-profile, collective feedback from suppliers that challenge the fairness and effectiveness of reverse auctions (Cardon, 2004; De Koker, 2004; Glimm, 2004). This, along with unfavorable outcomes that buyers may have experienced previously, compels buyers to reconsider their position on the use of reverse auctions. These findings support the relevancy of data obtained from secondary sources cited previously.

Abuse among buyers since the inception of reverse auctions in 1995 appears to have given reverse auctions a bad reputation from which it will not soon recover. It is noteworthy that industry-specific codes of conduct and other types of guidelines first appeared starting in 2001, and may have arrived too late to reverse the negative perceptions that have been established among buyers and suppliers. This,

coupled with intense price competition among hundreds of market makers, indicates the reverse auction service and software industry will shrink within the next few years.

Importantly, some large industrial buyers have never been drawn to reverse auctions for sourcing production materials, though there may be some spot use for non-production goods and services. These include Toyota Motor Corporation, Honda Motor Corporation, Harley-Davidson, and International Business Machines (Hannon, 2003b; Nikkei, 2000; Staff, 2002b; Teresko, 2002). They dislike reverse auctions, with or without voluntary codes of conduct, for one or more of the following reasons:

- The focus is on price, not cost
- Does not correctly account for total costs
- Damages supplier relationships and teamwork
- Buyers and sellers don't learn how to jointly solve problems
- Focuses people on short-term, rather than long-term results
- Power-based bargaining blocks or corrupts information flow between buyers and sellers
- They are suspicious of easy answers: i.e. if it looks too good to be true, it probably is

These buyers do not view reverse auctions as an effective solution to cost problems, which begin with product or service design-inputs usually controlled by the buyer. To them, the best practice for cost management is not power-based bargaining regulated with voluntary codes of conduct, but collaborative problem solving in order to deliver greater value to customers (Abele et al., 2002; Dyer & Nobeoka, 2000; Jackson & Winkler, 2004; Nishiguchi, 1994; Salimando, 2003; Womack et al., 1990). Value is understood to be a function of price, quality, service, technology, production capability, and management attitude (Bounds, 1996), attributes generally reflected in ISM's Principles and Standards (ISM, 2002). Suppliers are recognized as important contributors to ongoing quality improvement, cost reduction, sources for new product and process ideas, and valuable resources that will help in time of emergency if treated fairly (Nishiguchi & Beaudet, 1998).

However, for most senior managers, collaborative problem solving is an unfamiliar method of improvement whose benefits are uncertain, despite their exhortations for teamwork and the existence of overwhelming evidence to the contrary (Bounds, 1996; Bounds, Shaw, & Gillard, 1996; Cooper & Slagmulder, 1999; Dyer & Nobeoka, 2000; Nishiguchi, 1994; Nishiguchi & Beaudet, 1998; Womack et al., 1990). It is incorrectly perceived as too slow to respond to urgent demands to reduce cost in competitive marketplaces and to increase short-term shareholder value (Emiliani, 2004; Jackson & Winkler, 2004). In addition, it is incorrectly viewed as restricting flexibility—i.e. the ability to quickly switch sources to obtain better prices—when in fact it helps develop much needed interorganizational discipline



and cooperation in the value chain. Buyers that impose unilateral solutions to cost problems forego important opportunities to improve their own competitive capabilities. In essence, they assume their supplier's knowledge and capabilities are so limited that they have essentially nothing to offer. While that may be true in some cases, the long-term success of companies that practice collaborative problem solving tells a different story (Bremner & Dawson, 2003; Dyer & Nobeoka, 2000; Inoue, 2003; Jackson & Winkler, 2004; Liker & Choi, 2004).

The reductions in purchase price that buyers seek, as well as improved quality and service, can be better achieved using traditional disciplined sourcing and collaborative cost reduction processes. This results in bilateral continuous improvement without marginalizing supplier's interests, which are typically more aligned with buyers interests than not. In addition, both buyers and sellers learn new ways to expand competitive capabilities and deliver greater value to end-use customers. Buyers that view suppliers as interchangeable adversaries to perpetually bargain with risk reducing the long-term competitiveness of both parties (Emiliani, 2004).

## 5. Summary

This paper examined how voluntarily codes of conduct, white papers, and other forms of guidance for market makers, buyers, and sellers have been developed and deployed. Results from primary and related secondary sources indicate that they have not been successful at expanding the use of reverse auctions. They also appear to have had little impact on regulating buyers to achieve improved outcomes, such as less abuse and greater trust, because reverse auctions are, by their very nature, a destructive power-based bargaining tool whose application may not be correctable through codes of conduct, guidelines, etc. (Emiliani & Stec, 2005a).

Codes of conduct for reverse auctions do not constitute a "best practice" in supply chain management. They are essentially an afterthought intended principally to placate supplier's concerns and improve strained relationships between buyers and sellers. In addition, this form of e-procurement has had a negative impact on supply chain management because it strongly reinforces the "price-only" focus typically associated with large-scale industrial purchasing. It is perceived by incumbent suppliers as an attack on profit margins, unfair use of buyer power, and devalues non-price factors such as quality, service, technology, or production capabilities. Therefore, reverse auctions do not "Promote positive supplier relationships..." nor do they "Enhance the stature of the supply management profession" (ISM, 2002).

Whether in the context of e-supply chains or not, collaborative problem solving does constitute a "best practice." Remarkably, only a small number of large

companies practice collaborative problem solving effectively, due in part to the disciplined use of established processes and decades-long commitment over generations of senior managers. This yields improved results with respect to interorganizational capability building, process improvement, cost reduction, innovation, and long-term competitiveness. However, to be strong at collaborative problem solving with external suppliers, buyers must first learn how to cooperate internally.

The effect of industry-specific codes of conduct and guidelines on reverse auction usage, abuse, and trust among participants presents opportunities for future research, including:

- How have industry-specific codes of conduct and guidelines been put into practice, how often have they been used, and which elements have been difficult to apply?
- Have they been successful at reducing market maker, buyer, and seller abuse? If so, how, and for what goods or services?
- How have violations by reverse auction participants been addressed?
- What other actions have market makers and buyers take to reduce abuse and improve trust? If successful, then why?
- Why didn't the market makers proactively collaborate in the mid-to-late 1990s to establish a uniform code of conduct applicable to any industry segment? Would it have made any difference?

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# Wood pallet suppliers' reaction to online reverse auctions

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### Abstract

**Purpose** – The purpose of this paper is to quantitatively assess wood pallet suppliers' reaction to online reverse auctions and its impact on their business policies and practices.

**Design/methodology/approach** – Survey method was used to determine how pallet suppliers react to online reverse auctions.

**Findings** – Determines that pallet suppliers do not realize the benefits claimed by online reverse auction service providers. Identifies new sources of costs which accrue to buyers and are not accounted for in so-called "total cost" request for quotes including: retaliatory pricing practices, less cooperative relationships, and sourcing work back to the original supplier. The qualitative benefits identified for suppliers by third-party online reverse auction service providers are overstated or false.

**Research limitations/implications** – The present work can be extended to other commodity categories to identify similarities and differences in how suppliers react to online reverse auctions, understand the domain of successful and unsuccessful application of the online reverse auction tool, and provide further insight into the evolution of buyer-seller relationships, including embedded organizational routines such as power-based bargaining.

**Practical implications** – Findings mirror the results found in a previous study that examined aerospace parts suppliers' reaction to online reverse auctions, and indicates that market makers have consistently overstated the benefits of online reverse auctions to both sellers and buyers, and the use of this tool will typically result in unfavorable outcomes for both buyers and sellers.

**Originality/value** – This paper will be of interest to buyers, sellers, and market makers, as it identifies important problems with online reverse auctions, and suggests questions that buyers should ask market makers to ensure better sourcing decisions.

**Keywords** Electronic commerce, Auctions, Pallets, Purchasing

**Paper type** Research paper

### Introduction

Online reverse auctions, also called "e-reverse auctions" or "downward price auctions," have in recent years become a common method to source production and non-production goods and services by *Fortune* 2,000 companies. Among the commodities sourced are new and recycled wood pallets (SIC code 2448; NAICS 321920) used to transport and store materials. Pallets range in unit price from US\$4 to US\$20 depending upon durability (e.g. single use vs. heavy duty reusable) and other requirements. Over 700 million new and repaired or recycled wood pallets are produced annually in the USA and Canada, with an aggregate annual sales volume of US\$5-6 billion (Deomano, 2003).

The principal purchasers of pallets are manufacturers of consumer and durable goods, with the majority of total annual purchases made by large corporations. Since the pallet

supply base is large and fragmented, corporate buyers can easily source pallet manufacturing and related services using the online reverse auction process. The use of online reverse auctions for sourcing pallets to achieve lower prices began in earnest in 1999, facilitated by third party "market makers" such as FreeMarkets Inc. (*Pallet Enterprise*, 1999; Brindley, 2000; Richards, 2000; FreeMarkets, 2003).

The online reverse auction process, including careful scrutiny of the benefits and shortcomings for buyers and sellers, has been described previously (Emiliani, 2000; Emiliani and Stec, 2001, 2002a, b, 2004; Beall *et al.*, 2003). Importantly, the "gross" savings identified at the conclusion of the online reverse auction is often just a fraction of what is actually achievable upon post-auction implementation (Emiliani and Stec, 2002a). The net savings – the savings achieved after implementation, incorporating both "direct" and "indirect" losses – is an average of at least 50 percent less when measured across a broad market basket of product and service commodity categories (The Center for Lean Business Management, 2004). Thus, the amount of savings that buyers can actually achieve is, in most cases, much less than that portrayed by online reverse auction service providers or buying organizations (Tully, 2000; FreeMarkets, 2001; Judge, 2001).

In addition, online reverse auctions are widely perceived by incumbent suppliers as a divisive purchasing tool designed principally to drive down unit prices with no real intention of

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switching sources (Emiliani, 2000; Kobe, 2001; Tulder and Mol, 2002; Emiliani and Stec, 2002b; B2BRC, 2003; MHEDA, 2003), and without adequate consideration given to other important measures of service performance or production capability (Brindley, 2000; Bartholomew, 2001, 2002; Beall *et al.*, 2003) or total costs (Emiliani and Stec, 2001, 2002a, 2004). Recent studies have shown that online reverse auctions can damage a buyer's long-term performance by creating distrust among its incumbent suppliers (Jap, 2001, B2BRC, 2003; Beall *et al.*, 2003; Emiliani and Stec, 2004). Widespread perceptions among sellers that online reverse auctions are unfair and have been misused by buyers and market makers has resulted in the creation of a voluntary guidelines for conduct in the US auto industry (OESA, 2002), the European aluminum foil industry (European Aluminum Foil Association, 2002), the European flexible packaging industry (Flexible Packaging Europe, 2002), and European carton makers (European Carton Makers Association, 2003), as well as recommendations regarding the correct use of online reverse auctions (Goetting, 2002; Smeltzer and Carr, 2002, 2003; Beall *et al.*, 2003; Sawhney, 2003).

Corporate buyers unfamiliar with wooden pallets may assume they are non-technical items and that the many sources of supply – inclusive of design capabilities, materials used (softwoods and hardwoods, fasteners, etc.), manufacturing methods, and pre- and post-sale services – are largely interchangeable. However, pallets are load-bearing structures that are engineered to meet specific requirements, and are therefore better characterized as a “customized commodity” rather than a pure commodity (Brindley, 2000). Mechanical failure of wooden pallets can result in damage to valuable goods, delays in material movement, injuries, customer returns, legal claims, additional transactions, and ultimately higher costs for both buyers and sellers.

While it may be convenient to think that pallets are simple non-technical items, easily procured, the reality is different. Pallets are important functional products that must be damage tolerant and meet performance expectations of the people that use them throughout their specified design life (NWPCA, 2003). In addition, there are requirements and services related to effective pallet supply that buyers value yet are likely unaware of (Brindley, 2000; Richards, 2000). In other words, technical specifications and other requirements contained in the so-called “total cost” request for quote (RFQ) may not actually represent the cost of reliable service and supply (Richards, 2000; Brindley, 2002a).

Importantly, purchasing agents are usually measured on their ability to achieve lower unit prices and not the lowest total cost (Emiliani and Stec 2001, 2002a, 2004; Brindley, 2002a). Online reverse auction service providers know that most large corporations measure purchasing effectiveness using the “purchase price variance” (PPV) or “purchase order variance” (POV), i.e. standard or budgeted price minus actual price paid. The online reverse tool caters to this common metric, despite the “total cost” characterization portrayed by market makers (Emiliani and Stec, 2001, 2002a, 2004). As a result, buyers and market makers claim substantial price savings despite the fact they usually incur additional costs assignable to budget categories unrelated to purchase price – and therefore invisible in PPV calculations (Emiliani and Stec, 2002a, 2004).

The use of online reverse auctions by buyers have clearly been of great concern to pallet suppliers because of margin erosion among successful incumbent bidders and potential loss of sales volume to other “qualified” suppliers (Richards, 2000; Brindley, 2000, 2002a, b, 2003; LeBlanc, 2002). Pallet suppliers typically generate 3–5 percent pre-tax profits, with some having margins of 10 percent, while the cost of goods average nearly 85 percent (Brindley, 2000). Many pallet suppliers participated in online reverse auctions in the beginning with the hope of winning large contacts to offset lower margins (Brindley, 2000; Richards, 2000). However, pallet suppliers later reported that unqualified bidders were allowed to participate in online reverse auctions, and specifically cited the lack of verification by the buyer or market maker of the bidders' capability to deliver pallets to the requirements specified in the RFQ (Brindley, 2000). Some pallet suppliers allege that due diligence was purposefully not performed by the buyer or market maker in order to increase the number of bidders and thus drive down prices (Brindley, 2000).

In addition, pallet brokers have been allowed to participate in the reverse auctions, despite having no pallet production capability or manufacturing source identified at the time bids were placed (Brindley, 2000, 2002b, 2003). It was only after the reverse auction that brokers would seek pallet producers to fulfill orders, usually at prices below manufacturing cost. Brokers that won the work but were unable to source the work walked away from the contact – a benefit not available to manufacturers due to the market maker's bidding terms and conditions (Brindley, 2000). As a result of these reported shortcomings, online reverse auctions have been characterized as an unfair bidding process used by large corporations as a substitute for poor purchasing and supply management practices (Brindley, 2002a; Emiliani and Stec, 2002a, b). Over time, wooden pallet suppliers learned the issues related to online reverse auctions and have either refused to participate or are more selective in what they bid on (Brindley, 2002b).

The quantitative impact of online reverse auctions on wood pallet suppliers' specific business policies, practices, relationships with sellers, and the purported benefits to pallet suppliers has not been previously reported. This paper contributes to the literature by examining these aspects, which should be of interest to buyers and sellers, academics, and those who invest in market makers because it may foretell the sustainability of online reverse auctions within the buying company or in certain commodity categories.

## Research method

A 20-question survey was used to determine how pallet suppliers react to online reverse auctions, including changes to strategy and operating practices and the impact on relationships with their customers (Table I). The same survey instrument was used in a previous study to determine aerospace parts suppliers' reaction to online reverse auctions (Emiliani and Stec, 2004).

The authors solicited the editor of *Pallet Enterprise* magazine to support this study on a pro bono basis because they have access to pallet suppliers across the USA and Canada through subscription databases and participation by pallet suppliers on its online message board (*Pallet Enterprise*, 2003). Calls for responses to the survey were made through three channels:

Table I Summary of online reverse auction survey findings

Survey question	Median response value 1-5 scale (scale description)	Capsule result/analysis
1. Has your business strategy changed as a result of online reverse auctions?	1 (no change in strategy)	Will no longer participate in ORAs ( $n = 4$ )
2. Has your company's participation in online reverse auctions resulted in changes to your operating practices?	1 (no change in operating practices)	Won't perform an "extras" for customers that use ORAs ( $n = 1$ )
3. What has been the effect of online reverse auctions with regards to your production capabilities?	3 (no change in capabilities)	Most suppliers reported no change in production capabilities; capabilities have been eroded ( $n = 5$ ); capabilities have improved ( $n = 1$ )
4. What has been the effect of online reverse auctions with regards to your long-term competitiveness?	3 (no change in competitiveness)	Most suppliers reported either a reduction or no change in long-term competitiveness. Deterioration of long-term competitiveness due to lower margins ( $n = 3$ ); price-only buying ( $n = 2$ ); prices bid below cost ( $n = 1$ )
5. What has been the effect of online reverse auctions on your company's overhead burden?	3 (no change in overhead burden)	Most suppliers reported no increase in overhead burden. Increase in overhead burden due to lost sales volume and people and time working on RFQ and bidding
6. What has been the effect of online reverse auctions on your company's gross margins?	1 (decrease in gross margin)	Most suppliers reported a decrease in gross margin
7. What has been the effect of online reverse auctions with regards to relationships with your customers?	1 (less cooperation)	Most suppliers reported less cooperative relationships with customers
8. Do you feel that online reverse auctions are an ethical business practice?	1 (no)	Most suppliers judged ORAs as an unethical business practice
9. Do you feel that online reverse auctions create a "level playing field?"	1 (no)	Most suppliers judged ORAs as being ineffective at leveling the playing field
10. As a result of your experience with customers using online reverse auctions, do you actively seek opportunities to charge them higher prices?	3 (sometimes)	ORAs compel most suppliers to retaliate with respect to pricing when the opportunity arises with their customers. 17 suppliers reported a score of 4 or more
11. List a few key benefits of online reverse auctions for suppliers	–	20 suppliers said there were no benefits.
12. List a few key drawbacks of online reverse auctions for suppliers	–	Poor data quality, unqualified suppliers, price-only bidding, unilateral terms and conditions
13. How could the online reverse auction process be improved to deliver greater benefits to suppliers?	–	ORAs can't be improved ( $n = 16$ ); poor data quality and unqualified suppliers
14. Has work that you lost as a result of online reverse auctions come back to you? If "Yes," what percent of the total lost has returned?	–	Yes ( $n = 9$ ); average amount of work returned = 78 percent
15. When was the first and last time you participated in an online reverse auction? Give month and year	–	First 6/98; last 6/03; average duration = 21 months
16. About how many online reverse auctions events (not individual lots) have you participated in?	2 (11 to 25)	The level of participation in ORAs is low or suppliers are selective regarding the extent of their participation
17. How many new customers have you won as a result of online reverse auctions?	1 (zero to two)	77 percent of suppliers won no new customers
18. How much has your sales increased as a result of online reverse auctions?	1 (0 to 5 percent)	90 percent of suppliers reported no increase in sales
19. How many new markets have you gained access to as a result of online reverse auctions?	1 (zero to one)	93 percent of suppliers reported no access to new markets
20. Total number of full-time employees?	1 (10 to 50)	All suppliers responding to the survey can be classified as small businesses

editorial columns and notices in *Pallet Enterprise* magazine, editorial columns and notices in the newsletter *Pallet Profile Weekly*, and notices placed on the *Pallet Enterprise* online message board. Surveys were obtained from US and Canadian pallet suppliers producing new and recycled wooden pallets.

It should be noted that the editorial position of *Pallet Enterprise* magazine and the newsletter *Pallet Profile Weekly* with regards to reverse auctions has been critical based upon feedback the editors and writers received from the pallet supplier community at large, as well as the editorial team's own analysis of the merits of using online reverse auctions to

facilitate pallet sourcing – both independent of this study. However, these channels are not believed to have resulted in responses biased against reverse auctions because surveys conducted by independent third-parties in other commodity categories have yielded similar findings (B2BRC, 2003; Beall *et al.*, 2003; Stoddard, 2003a; Emiliani and Stec, 2004).

A total of 30 usable surveys were received in the first quarter of 2003, constituting about 5 percent of the US and Canadian pallet suppliers that have participated in one or more online reverse auctions since June 1998. This sample size yielded results that are consistent with a much larger supplier survey (B2BRC, 2003), as well as surveys of smaller numbers of suppliers (Beall *et al.*, 2003; Stoddard, 2003a; Emiliani and Stec, 2004).

The authors' interest in the use of online reverse auctions for sourcing pallets is to extend prior work to other commodity categories and identify similarities and differences in how suppliers react to online reverse auctions, as well as understand the domain of successful or unsuccessful application of the online reverse auction tool. The results presented here contribute to the literature by providing further insight into the evolution of buyer-seller relationships, embedded organizational routines favoring power-based bargaining (Womack *et al.*, 1990; Nishiguchi, 1994; Emiliani, 2003; Emiliani and Stec, 2004), the overall utility of online reverse auctions, and the long-term viability of the market makers' business model with respect to acquiring new customers, customer retention, and financial performance.

## Results

Survey participant responses were measured on a 1-5 Likert scale. Some questions were asked that required respondents to provide written details. In these cases, the non-repeating responses are grouped under various categories. Question-by-question analyses of the survey results are presented in the Appendix, while a summary of the findings is shown in Table I.

Finally, the following unsolicited comments were received from pallet suppliers. They illustrate the depth of their dissatisfaction with online reverse auctions and the customers that use them:

I, and many others in this industry, are losing significant business to the "price-only" mentality of online auctions. Our certified quality and world class customer service is no longer [as] important as it was not too long ago.

I tell my [customers] that if they want to find the absolute worst supplier in the pallet industry, they will do it with the reverse auction. He will be the low bidder.

Reverse auction [service] providers have NO product knowledge [emphasis original]. Why would you pay for a service to purchase a product for you when they know nothing about it? ... The providers claim to qualify suppliers, but they do not. The current supplier is often subject to lower bids from competitors who have no intention or ability to perform the actual work. They simply want to drive the price down. What a poor way of doing business. Greed, Greed, Greed.

What kind of relationship can one company have [with] another when your customer simply whore's your product, service, and company commitment to the lowest bidder?

## Comparison to previous results

The findings presented in this paper compare favorably to a previous study examining aerospace parts suppliers' reaction to online reverse auctions using the same survey instrument (Emiliani and Stec, 2004). Overall, the results are very consistent for questions 1-10 and 16-20. Findings for

questions 11-15 are also consistent and discussed in greater detail to compare results:

- *Question 11.* Of aerospace parts suppliers, 39 percent (compared to 66 percent of pallet suppliers) found there were no benefits associated with online reverse auctions. The benefits identified by aerospace parts or pallet suppliers were not specific to online reverse auctions; i.e. they could be achieved using traditional strategic sourcing processes. These results further support the view that market makers have failed to establish a meaningful value proposition for most suppliers.
- *Question 12.* Both pallet and aerospace parts suppliers found the drawbacks of online reverse auctions to be more numerous than the benefits. This indicates that online reverse auctions possess severe structural problems – deficiencies that will negatively impact both buyers and sellers. Online reverse auctions do not effectively address important intangible aspects of buyer-seller relationships (both business and personal).
- *Question 13.* Of aerospace parts suppliers, 43 percent said that online reverse auctions cannot be improved or don't know how they can be improved, but also identified a wider range of potential improvement opportunities than did pallet suppliers. The authors are aware of one change made by market makers in response to supplier suggestions: to reduce the quantity of part numbers (i.e. line items) in a lot.
- *Question 14.* Aerospace parts suppliers said an average of 19.5 percent of the work returned to them. That pallet suppliers had a much greater amount of work returned to them (average of 78 percent) compared to aerospace parts suppliers – who make much more difficult products – is surprising. However, it may be that pallet buyers belatedly value local sources of supply to better meet demanding service requirements and reduce shipping costs. In contrast, aerospace parts supply has globalized in recent years, even for bulky parts, principally to take advantage of lower labor costs in developing countries which partially offset higher shipping costs (Emiliani, 2004).
- *Question 15.* Aerospace parts suppliers participated in online reverse auctions for an average duration of 23.2 months and a standard deviation of 15 months (compared to an average duration of 21 months and a standard deviation of 16 months for pallet suppliers). These findings indicate the useful life span for conducting online reverse auctions in a given commodity category is about two years, and represents the average time it takes for both buyers and sellers to learn the benefits and limitations of this new purchasing tool. Of aerospace parts, 35 percent suppliers were engaged in online reverse auctions at the time the survey was conducted compared to 23 percent of pallet suppliers. Pallet suppliers appear to become less interested over time in participating in online reverse auctions than aerospace parts suppliers. This could be due to a more intense focus on the shortcomings of online reverse auctions among pallet suppliers, and less interest in being subjected to power-based bargaining routines used by their customers.

## Discussion

The purported benefits of online reverse auctions for suppliers as described by the market makers are shown in

Table II (Emiliani and Stec, 2004). Note that they express the benefits qualitatively, not quantitatively. Thus, suppliers must take it on faith that there are benefits they can actually realize by participating in online reverse auctions. Since the market makers do not distinguish to whom the benefits are available – i.e. incumbent or new suppliers – the benefits are presumably available to any “qualified” supplier.

Items a through f were directly addressed in this study: questions 5, 7, 9, 17, 18, and 19, respectively. Most pallet suppliers surveyed indicated that they failed to realize these key benefits. No mention was made of items j through q as being beneficial to suppliers. Indeed, much has been written in recent years advising suppliers of the perils of online reverse auctions (Dougherty, 2002; IHA, 2002; Terry, 2002; Glimm, 2003; Morris, 2003; Salimando, 2003; Stoddard, 2003a, b; Altman, 2003), rather than illuminating its purported benefits.

The picture that has clearly emerged from the authors' extensive work, and that of others who have closely scrutinized online reverse auctions, is that the market makers have consistently overstated the benefits for both sellers and buyers. Indeed, if a buyer normally achieves 2 percent annual cost reduction through traditional negotiation processes, but suddenly, through online reverse auctions, identifies savings of 15-30 percent or more, then is that not too good to be true? In most cases it is. In addition, the return on investment has been reported to be ten times and as high as 20 times in just four to six months (FreeMarkets, 2001, 2002; Reason, 2001), despite the inability to accurately capture total costs or calculate net savings inclusive of both direct and indirect losses.

The evidence suggests that thousands of senior managers in many of the world's largest corporations, some with MBA's from the best business schools, have been misled. As this study illustrates, the common result is poor sourcing decisions, higher costs, and less cooperative supplier relationships – the opposite of what senior management hoped to achieve. How could this happen? The answers, we believe, are centered around nine main points:

**Table II** Purported benefits for suppliers

Item	Benefits
a	Reduce operating, selling or customer acquisition costs
b	Improve buyer-seller relationships
c	Compete on a level playing field
d	Access to new customers
e	Increase sales
f	Access to new markets
g	Focus on total cost
h	Improved market intelligence (relative to pricing)
i	Long-term (e.g. two- to three-year) contracts
j	Reduce the complexity of the bid process
k	Reduce the bid cycle time
l	Process efficiencies
m	Improve customer service / customer satisfaction
n	Save time
o	Fewer geographic boundaries
p	Share critical information
q	Improved supplier communication

Source: Emiliani and Stec (2004)

- (1) Tremendous pressure for cost reduction due to global competition, particularly from low wage countries.
- (2) Pressure from large investors to quickly increase shareholder value (Emiliani, 2003).
- (3) Widespread existence of the “confirming-evidence trap” among senior managers (Hammond *et al.*, 1998), in which information that supports a viewpoint or critical need is accepted, while that which contradicts it is quickly rejected.
- (4) Strong desire among senior managers to use technology-based tools that can help them achieve what appear to be “quick hits.”
- (5) Finance and accounting systems that do not capture total costs.
- (6) Common use of the purchase price variance metric, which can be easily give the appearance of large savings.
- (7) A pervasive view among CEOs, Presidents, and CFOs that the purchasing function is non-technical and simple to understand, cost savings are easy to achieve, suppliers are interchangeable (presumably the market makers as well), and differences between commodities are minimal or unimportant.
- (8) Online reverse auctions support embedded power-based bargaining routines that have long-existed between most buyers and sellers (Emiliani, 2004).
- (9) Senior managers do not know what questions to ask to determine if online reverse auctions are as effective as market makers and other buyers claim them to be.

In other words, online reverse auction service providers have successfully exploited extant competitive pressures and several key weaknesses in current management thinking and practice.

Given these findings, as well as those found in previous studies (Emiliani and Stec, 2001, 2002a, b, 2004), we suggest that senior managers of buying organizations ask market makers 11 key questions before they start using online reverse auctions. Sellers can use these same questions to help educate buyers considering the use of online reverse auctions:

- (1) The relevant figure to discuss is the net savings, not gross savings. Ask the market makers: “What is the net savings for this commodity category, inclusive of both direct and indirect losses, achieved by other buyers that you have worked with?” The market makers have the data based on direct losses; insist that they share it. However, the data will have to be discounted by 25-75 percent or more to account for indirect losses.
- (2) Do contract terms and conditions (T's&C's) help both buyer and seller understand the root cause of cost problems and encourage the buyer and supplier to collaborate to solve cost problems? Ask the market makers: “How do the T's&C's help us and our suppliers improve financial and non-financial performance?” Don't be convinced by the one or two isolated success stories.
- (3) Does the market maker accurately portray the significant time and effort required by the buyer to secure the savings? Ask the market makers: “What is the average amount of time it has taken other customers of yours to secure the net savings for this commodity?”



Can better results be achieved as fast or faster through collaborative cost reduction activities?

- (4) Does the market maker suggest new, typically small suppliers to participate in the reverse auction? In most cases, new small suppliers will not actually be able to satisfy the buyer's requirements compared to current suppliers, and may be included in the reverse auction simply to drive down the price and give the appearance of a large gross savings opportunity. Ask the market makers: "How frequently does a new small supplier win the work for this commodity and perform acceptably?" Senior managers can contact other users of reverse auctions to better understand this issue.
- (5) Look at your corporate ethics policy regarding supplier relationships. Ask yourself and the market maker: "Do online reverse auctions violate our ethics policy?" If the ethics policy contains specific references to fairness or fair competition, building long-term relationships, trust, respect, or conducting business free of deception or coercion, then using online reverse auctions likely violates your code of ethics (Emiliani and Stec, 2002b).
- (6) Online reverse auctions often result in opportunistic behavior among suppliers; principally retaliatory pricing. Ask the market makers: "How prevalent is retaliatory pricing in this commodity?" and "Show me the data that supports your claim that reverse auctions improve relationships between buyers and sellers." Again, don't be convinced by the one or two isolated success stories.
- (7) Regarding benefits for suppliers, ask the market makers: "What are the quantitative benefits to suppliers for participating in online reverse auctions?"
- (8) Ask the market makers: "Exactly how do online reverse auctions reduce our total costs?" Ask this while keeping in mind the other ten questions, especially questions 1, 3, 4, 6, 7, 9, 11.
- (9) Ask the market makers: "What percent of the work is eventually sourced back to the original supplier?" If they don't know, then be prepared to incur additional costs associated with sourcing the work back to incumbent suppliers.
- (10) Ask the market makers: "If reverse auctions are so good, then how come you don't want reverse auctions applied to the services you offer?" and "You're a supplier, and you want long-term relationships with your customers – isn't that inconsistent?" (FreeMarkets, 2002).
- (11) Finally, ask the market makers: "How do online reverse auctions improve our organization's overall competitive capabilities? Does it help engineering, operations, purchasing, marketing, finance, etc., learn how to avoid high costs from the start?"

Asking these and appropriate follow-up questions may reveal that online reverse auctions offer no substantive benefits for either buyers or sellers for most commodities. The price reductions that buyers seek, as well as improved quality and service, are often better achieved using disciplined sourcing and collaborative cost reduction processes that result in bilateral continuous improvement (Womack *et al.*, 1990; Monden, 1995; Nishiguchi, 1994; Bounds, 1996; Bounds *et al.*, 1996; Cooper and Slagmulder, 1999; Fujimoto, 1999; Dyer and Nobeoka, 2000). Most suppliers are valuable resources that can help buyers improve their

competitiveness, rather than interchangeable adversaries to perpetually bargain with – and potentially reduce the long-term competitiveness of both parties (Chin, 2002; Emiliani, 2004).

## Summary

This paper examined how wood pallet suppliers reacted to the use of online reverse auctions by their customers. Findings are reported for suppliers that have participated in online bidding, and include:

- suppliers surveyed realized few benefits, if any, from participating in online reverse auctions;
- 60 percent of suppliers actively seek opportunities to charge their customer higher prices as a direct result of their participation in online reverse auctions when the opportunity to do so arises;
- suppliers viewed online reverse auctions as a divisive purchasing tool that damages relationships with long-time customers;
- most suppliers drop out of the bidding process after one or two years; and
- most suppliers consider online reverse auctions to be an unethical business practice.

These results closely parallel that found in a previous study further reinforce earlier findings that show online reverse auctions have numerous serious shortcomings for both buyers and sellers (Emiliani and Stec, 2001, 2002a, b, 2004; B2BRC, 2003). This, as well as previous studies (B2BRC, 2003; Beall *et al.*, 2003; Stoddard, 2003a; Emiliani and Stec, 2004), suggest the findings are broadly applicable to pallet suppliers that participate in reverse auctions, and that similar results will be realized by suppliers of other technically specified goods and services. However, it is possible that more successful outcomes may exist between specific pairs of buyers and sellers for certain commodities such as bulk materials or non-technical services that can be easily specified and where switching costs are negligible.

The results also indicate that market makers have consistently overstated the benefits of online reverse auctions to both sellers and buyers. This is attributed to several factors including competitive pressures and important weaknesses in current management thinking and practice among buyers. A total of 11 questions are presented which buyers should ask to determine if online reverse auctions are as effective as market makers and other buyers claim them to be. The same questions can be used by sellers to help educate buyers considering the use of online reverse auctions. In addition, senior managers should consider alternate approaches to cost reduction known to result in valuable intra- and interorganizational capability building, are more responsive to short- and long-term competitive pressures, and help build relationships.

Future research will continue to focus on extending the present work to other commodity categories, with the intent to identify similarities and differences in how suppliers react to online reverse auctions and understand the domain of successful and unsuccessful application of the online reverse auction tool. This will provide further insight into the evolution of buyer-seller relationships, embedded organizational routines promoting power-based bargaining, and the overall utility of online reverse auctions.

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## Appendix. Question-by-question analyses of the survey results

### Question 1. Has your business strategy changed as a result of online reverse auctions?

(Scale: 1 = no change in strategy; 3 = minor change in strategy; 5 = major change in strategy). Suppliers mainly answered this question consistently with a "no change on strategy" response. However, those that did indicate a change in strategy ( $n = 4$ ) noted that the change made was to not participate in reverse auctions, or avoid the "standard pallet" market segment in reverse auction activity is greatest. A few suppliers ( $n = 3$ ) also mentioned their discomfort with a "price-only" auction. They believe that quality and service also play an important role in the value they provide to their customers.

### Question 2. Has your company's participation in online reverse auctions resulted in changes to your operating practices?

(Scale: 1 = no change in operating practices; 3 = minor change in operating practices; 5 = major change in operating practices). The survey results show there has been no change in operating practices resulting from online reverse auctions. One supplier ( $n = 1$ ) described a specific change in operating practice as being that they will no longer perform any "extras" for their customers who use online reverse auctions.

### Question 3. What has been the effect of online reverse auctions with regards to your production capabilities?

(Scale: 1 = erosion of capabilities; 3 = no change in capabilities; 5 = improvement in capabilities). Most suppliers reported no change in production capabilities as a result of online reverse auctions. Those that noted either an erosion ( $n = 5$ ) or improvement ( $n = 1$ ) in capabilities did not specify which capabilities were affected.

### Question 4. What has been the effect of online reverse auctions with regards to your long-term competitiveness?

(Scale: 1 = reduction of competitiveness; 3 = no change in competitiveness; 5 = improvement in competitiveness). Most suppliers reported either a reduction or no change in long-term competitiveness as a result of their participation in online reverse auctions. A few suppliers provided information on how their long-term competitiveness has deteriorated including: lower margins ( $n = 3$ ); price-only buying with no consideration of quality or service by customer ( $n = 2$ ); prices bid below costs ( $n = 1$ ).

### Question 5. What has been the effect of online reverse auctions on your company's overhead burden?

(Scale: 1 = increase in overhead burden; 3 = no change in overhead burden; 5 = reduction in overhead burden). Most suppliers reported no increase in overhead burden. However, those indicating an increase in overhead burden ( $n = 8$ ) said it was due to business volume lost to other competitors via online reverse auctions ( $n = 1$ ) and an increase in overhead expenses associated with staff of people and time required to work on the RFQ and bidding process ( $n = 4$ ). They specifically noted that incomplete or inaccurate RFQs and

specifications from customers consumed large amounts of time.

**Question 6. What has been the effect of online reverse auctions on your company's gross margins?**

(Scale: 1 = decrease in gross margin; 3 = no change in gross margin; 5 = increase in gross margin). Most suppliers reported a decrease in gross margin. Reasons specifically noted included business lost to competitors and higher operating expenses.

**Question 7. What has been the effect of online reverse auctions with regards to relationships with your customers?**

(Scale: 1 = less cooperation; 3 = no change in level of cooperation; 5 = more cooperation). Most suppliers reported less cooperative relationships with their customers as a result of online reverse auctions. Comments included: personal relationships have deteriorated in favor of the Internet; reverse auction mandates driven by corporate headquarters strain local plant-supplier relationships; customers ignore the value-added services of pallet suppliers and now treat pallets as a "commodity." Note that the costs associated with less cooperative relationships are not accounted for in so-called "total cost" RFQ's.

**Question 8. Do you feel that online reverse auctions are an ethical business practice?**

(Scale: 1 = no; 3 = don't know or neutral; 5 = yes). Of 30, 26 suppliers (87 percent) reported a score of 3 or less. Four suppliers replied with a value of 5 indicating this is an ethical business practice, but noted that the process of how customers used the tool is unethical. Most suppliers judged this new purchasing tool as an unethical business practice.

**Question 9. Do you feel that online reverse auctions create a "level playing field?"**

(Scale: 1 = no; 3 = don't know or neutral; 5 = yes). Of 30, 29 suppliers (97 percent) reported a score of 1. One supplier gave this question a score of 3, noting that the bidding atmosphere reflected a "game" rather than a serious business bidding activity. Most suppliers judged this new purchasing tool as being ineffective at leveling the playing field.

**Question 10. As a result of your experience with customers using online reverse auctions, do you actively seek opportunities to charge them higher prices?**

(Scale: 1 = not at all; 3 = sometimes; 5 = all the time). A total of 18 suppliers (60 percent) reported a score of 3 or more; nine suppliers (30 percent) reported a score of 4 or more; and eight suppliers (27 percent) reported a score of 5. A total of 12 suppliers (40 percent) reported a score of 1. This indicates the use of online reverse auctions compels most suppliers to retaliate with respect to pricing when the opportunity arises with their customers that use online reverse auctions (i.e. spot buys, expedited orders, etc.). Note that the costs associated with opportunistic behavior by suppliers are not accounted for in so-called "total cost" RFQ's.

**Question 11. List a few key benefits of online reverse auctions for suppliers**

The responses are clustered into two groups (see Figure A1). A total of 20 suppliers (66 percent) said there were no benefits associated with online reverse auctions. Four suppliers noted benefits related to "markets or customers." The remainder made the following comments:

- "Lowers costs without the corporate red tape needed to lower quality standards."
- "You learn how little competitors value what they provide their customers."
- "You find out which customers are willing to stab you in the back for a nickel."
- "You get to see how much the lots go for. It makes you laugh."
- "Current vendor has knowledge of correct specifications."
- "An opportunity to learn what a potential customers is using to bid on AFTER the low bidder doesn't deliver" (emphasis original).

**Question 12. List a few key drawbacks of online reverse auctions for suppliers**

The drawbacks of online reverse auctions for suppliers were much more numerous than the benefits. The majority of the responses to this question centered on "RFQ," "intangibles," and "process management" aspects (see Figure A2). The responses again highlight the fact that there is no rational framework for determining costs, setting prices or profits, and that buyers continue to use power-based bargaining to lower suppliers' prices (Emiliani and Stec, 2004). The responses grouped under "RFQ," "intangibles," and "process management" reflect concerns regarding data quality, poor communication, bidders capabilities, and that the use of reverse auctions is promoting adversarial relationships between the buyer and supplier. These responses indicate buyers are not considering total costs, despite the market maker's characterization of RFQ's as "total cost."

**Question 13. How could the online reverse auction process be improved to deliver greater benefits to suppliers?**

A total of 16 respondents (53 percent) said the online reverse auction process can not be improved or don't know how it can be improved, indicating that buyers should re-evaluate the use of this purchasing tool and its long-term effect on suppliers rather than trying to improve the process. The responses grouped under "RFQ" and "process management" indicates the principal issues are data integrity and the elimination of unqualified suppliers (see Figure A3). The following comments were made regarding how online reverse auctions could be improved to benefit suppliers:

**Figure A1**



- Opportunity for new business
- Gain market share (but a lower margin)

Figure A2

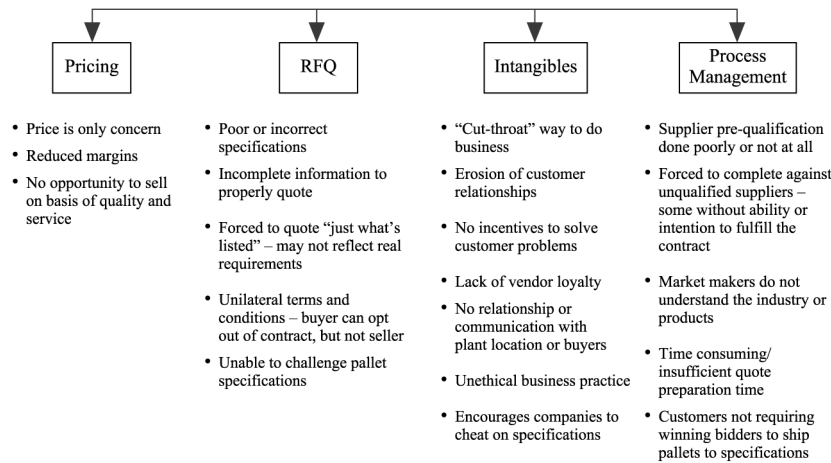
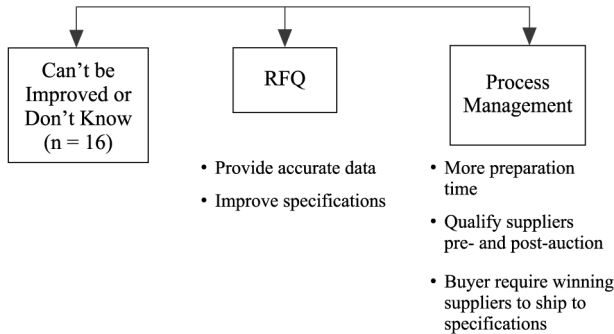


Figure A3



- "Eliminate them." or "Use the traditional bidding process" ( $n = 5$ ).
- "Buyers ... are not interested in making [online reverse auctions] beneficial to the supplier."
- "Let each bidder visit the [customer's] plant and review ALL pallets and how they are used" (emphasis original) ( $n = 3$ ).
- "Weed out the brokers that don't understand pallet design."

**Question 14. Has work that you lost as a result of online reverse auctions come back to you? If "Yes," what percent of the total lost has returned?**

- Yes ( $n = 9$ ).
- Percent of work returned ( $n = 8$ ): high = 100 percent; low = 30 percent; average = 78 percent.

Nine supplies said that work had not returned to them. The suppliers that responded "yes" cited an average of 78 percent of the work returned to them later on, presumably due to non-performance by the new source of supply. This is an important finding because buyers entering into online reverse auction service agreements are likely unaware that such outcomes will be encountered. It indicates that some suppliers are not as interchangeable as the buyer might believe them to be, and that some suppliers may have more power than they or their customers realize. Note that the costs associated with

sourcing work back to the original supplier are not accounted for in so-called "total cost" RFQ's.

**Question 15. When was the first and last time you participated in an online reverse auction? Give month & year**

- First: June 1998; Last: April 2003 ( $n = 25$ ).
- Average duration of participation: 21 months ( $n = 25$ ). Standard deviation: 16 months.
- Participating in online reverse auctions in 2003 ( $n = 7$ ).

This data shows that most pallet suppliers participate at some level for periods of up to two years in duration, and then drop out of the process. The average duration of supplier participation indicates the life cycle of the online reverse auction process for wood pallets is relatively short. The coefficient of variation (standard deviation  $\div$  mean = 0.76) indicates that the process has low variability and is tightly distributed around the mean of 21 months. Within that time period, suppliers learn the issues surrounding online reverse auctions and gain insight into its potential benefits. If the benefits are tangible, then it should result in sustained commitment among suppliers to participate in the online reverse auction process. However, the results indicate that the benefits (presented in the "Discussion" section) are not realized by most of the suppliers surveyed and so they drop out of the process. Only 23 percent of the suppliers responding were engaged in online reverse auctions at the time the survey was conducted. One supplier said: "We are declining to participate in online auctions unless forced to by an existing customer." (italics added).

This statement supports previous findings where incumbent suppliers are usually coerced by buyers into participating, likely in violation of company ethics policies (Emiliani and Stec, 2002b; B2BRC, 2003; MHEDA, 2003).

**Question 16. About how many online reverse auction events (not individual lots) have you participated in?**

(Scale: 1 = 1-10; 2 = 11-25; 3 = 26-50; 4 = 51-75; 5 = over 75). This data shows that level of participation or auction activity is low, or that suppliers are very selective with regards to the extent of their participation. This finding indicates that most suppliers approach online reverse auctions cautiously and do not view them as a desirable opportunity.

**Question 17. How many new customers have you won as a result of online reverse auctions?**

(Scale: 1 = 0-2; 2 = 3-5; 3 = 6-9; 4 = 9-12; 5 = over 12). This data shows that suppliers win few new customers as a result of their participation in online reverse auctions. A total of 23 of 30 suppliers (77 percent) said they won no new customers.

**Question 18. How much has your sales increased as a result of online reverse auctions?**

(Scale: 1 = 0-5 percent; 2 = 6-10 percent; 3 = 11-15 percent; 4 = 16-20 percent; 5 = over 20 percent). Most suppliers reported that their sales did not increase. Three suppliers (10 percent) reported a 1-5 percent increase in sales.

**Question 19. How many new markets have you gained access to as a result of online reverse auctions?**

(Scale: 1 = 0-1; 2 = 2; 3 = 3; 4 = 4; 5 = 5 or more). Most suppliers (93 percent) reported no access to new markets as a result of their participation in online reverse auctions. Two suppliers (7 percent) said they gained access to one new market.

**Question 20. Total number of full-time employees?**

(Scale: 1 = 10-50; 2 = 51-100; 3 = 101-200; 4 = 201-500; 5 = greater than 500). All of the suppliers responding to the survey can be classified as small businesses, most with less than 100 employees.

# Unintended responses to a traditional purchasing performance metric

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### Abstract

**Purpose** – To describe the tactics that buyers often use to avoid unfavorable purchase price variance (PPV) and identify alternate approaches that will improve purchasing performance and also help achieve company objectives.

**Design/methodology/approach** – Descriptive: presents for the first time 12 dysfunctional tactics used by buyers of industrial goods use to avoid unfavorable PPV.

**Findings** – The tactics are shown to increase costs rather than decrease costs and lead to organizational dysfunction. Findings are broadly applicable to large corporations that use legacy software systems or newer enterprise requirement planning (ERP) software systems to track purchasing costs and transactions, and also have a strong management focus on price-based purchasing performance.

**Research limitations/implications** – Findings are limited to organizations that measure the success of purchasing and supply management activities using price-based metrics.

**Practical implications** – Should propel managers to identify alternative metrics or processes for managing purchasing performance, reduce system-wide costs, and improve day-to-day work in purchasing organizations.

**Originality/value** – This paper will be helpful to academics researching operational or behavioral aspects of purchasing, practitioners managing supply chains, auditors assessing the integrity of material cost reporting and management controls, and persons concerned about ethics in business.

**Keywords** Business ethics, Pricing, Manufacturing resource planning, Purchasing techniques

**Paper type** Research paper

### Introduction

Various features, benefits, and limitations of performance measures used in purchasing and supply management have been reported (Kleijnen and Smits, 2003; Tangen, 2003; Morgan, 2004), including linkages to corporate culture and behavioral factors (Franco and Bourne, 2003; de Waal, 2003). However, a key metric that is widely used in durable goods industries, but often overlooked or understated in the academic literature is “purchase price variance” (PPV), also called “purchase order variance” or “material cost variance.” This metric measures the difference between the current unit price and an earlier unit price figure.

The relationship between the PPV metric and actual, specific workplace actions among the people responsible for the metric have not been previously reported. We present an insider’s look

at 12 tactics that many purchasing and supply management personnel regularly used to avoid unfavorable purchase price variances. This paper is based in part upon the authors’ (Emiliani and Stec) recent experiences as supply and commodity managers while working at a large company in the aerospace industry. A few of the tactics were later revealed to the author (Emiliani) by students in a classroom setting while teaching graduate courses in supply management. In each case, the tactics do not illustrate business at its best. Instead, they highlight serious issues with regards to management controls, business ethics, management education, and even corporate purpose (Emiliani, 2003) – all of which are beyond the scope of this paper.

The tactics presented are judged to be broadly applicable to other major aerospace companies, in particular those that have used or are using similar types of software systems to manage purchase transactions. Due to the widespread penetration of this type of purchasing software system in large corporations since the mid-1960s, it is our judgment that the tactics presented exist in many other purchasing organizations that procure durable goods. It is important to recognize that because these software systems are produced and sold by only a few large global corporations, people assume – mistakenly – that all features, including the PPV metric, are appropriate to use and deliver benefits. Most buyers simply reason that credible suppliers would not sell software with features that could cause significant problems.

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Empirical evidence of the existence of such tactics in other companies or industries could not be obtained because this type of “insider” information is sensitive and potentially problematic with regards to the accuracy of financial reporting or management controls: e.g. Sarbanes-Oxley Act in the USA (SEC, 2002; SOA, 2002). Evidence for the existence of these tactics is the result of industry experience in managing purchasing operations. It should be noted that contemporary enterprise software systems still focus on measuring PPV, but they apparently contain features that preclude some of the twelve tactics from being deployed. However, the PPV metric is, in general, easily subject to abuse. Thus, it is likely that other tactics will be invented to avoid the problems and pain associated unfavorable PPV.

This paper contributes to the literature by describing 12 common tactics that buyers use to manage the PPV metric, often with the aid of people in related areas such as finance, engineering, and materials management, and goes on to show that it results in negative consequences with regards to cost management, the timely delivery of goods to customers, and supplier relations. In addition, the tactics used to manipulate the PPV metric are shown to result in waste (Ohno, 1988), which is defined as activities that add cost but do not add value, instead of creating value for end-use customers (Womack and Jones, 1996). Alternatives to the local optimization routines that the PPV metric inspires are presented, and which instead lead to capability-building and improved long-term competitiveness of both buyer and sellers.

## Performance measurement

Purchasing and supply management organizations use many different measures to track their performance including purchase price, on-time delivery, quality, inventory dollars (or forward days supply), etc. In some companies, the measures are appropriately balanced, while in others there is a strong emphasis on purchase price. Is it not surprising that purchasing organizations would emphasize price since purchased production materials can account for 50–80 percent of the cost of goods sold (Dobler and Burt, 1996; Monczka *et al.*, 1998a, b; Nicolle, 2003). Chief executive officers expect the purchasing organization to contribute to profitability through price reduction, particularly in markets with flat or low top-line growth. A year-over-year price reduction target of 3–7 percent for goods purchased is common (Dobler and Burt, 1996; Monczka *et al.*, 1998a, b; Shirouzu, 2003; Useem, 2003; Mayne, 2004).

The “purchase price variance” (PPV) or “purchase order variance” (POV) is used by management to evaluate purchased material cost performance against budgets (Monczka *et al.*, 1998a). This metric measures the difference between a “standard cost” and the current unit price. Standard cost is an estimate of the unit purchase price contained in a computerized database that is typically owned by the finance organization or jointly with the purchasing organization. Purchase price variances are calculated as follows:

$$\text{PPV} = (\text{standard cost/unit} \times \text{actual purchase volume}) \\ - (\text{actual cost/unit} \times \text{actual purchase volume})$$

The standard cost is usually the “official” price. Often, the standard cost is based on the prior year’s price, though for

some items the standard price may be several years old. Sometimes the standard cost is adjusted from the prior year’s price (or the previous standard) based on anticipated inflation or changes in volume. A final adjustment is often made to incorporate management’s price reduction target into the standard cost, so that achieving standard performance across the organization will yield the profit desired by management. It is common for price reduction targets to be applied on an across-the-board basis. Because of obsolete standards or adjustments imposed during the annual budgeting process, standard costs or actual prices previously paid do not accurately represent the current prices of purchased materials.

The PPV metric, based on standard cost, is widely used because it is a very simple number to calculate precisely. It supports the conventional approach to managerial control, relying heavily on financial-based responsibility accounting to achieve local optimization. This approach assigns responsibility to functional organizational units, and avoids holding managers responsible for performance they cannot directly influence. Maximizing local operating efficiency of each organizational unit is expected by management to result in efficient overall organizational performance. Only financial outcomes are measured (Hansen and Mowen, 2003).

Emphasizing the PPV metric can indicate to people internally (i.e. purchasing personnel) and externally (i.e. suppliers) that quality and delivery are less important relative to the goal of reducing costs, and also likely reflects the fact that the company, and the purchasing organization in particular, do not understand the cost structure of the goods that they purchase in each value stream (Womack, 2003; Maskell and Baggaley, 2004). The accounting system does not encourage a better understanding of costs because it does not recognize that actions and decisions made in one functional area affect costs in other functional areas. The primary focus of the accounting system regarding material acquisition is unit price.

If the current price is higher than the standard cost, then the purchase price variance is unfavorable. The objective, of course, is to ensure that the PPV metric is favorable, which would indicate that unit cost savings have been achieved. For example, a buyer (i.e. purchasing agent) with a budget of \$1,000,000 is doing a great job if he or she can obtain the required materials for \$900,000 and a poor job if the materials are purchased for \$1,100,000. The buyer’s performance is considered poor if their PPV is unfavorable on a monthly, quarterly, or annual basis. Persistently unfavorable PPV performance usually has a negative impact upon a buyer’s annual performance appraisal. Thus, there is strong personal incentive to avoid unfavorable outcomes.

In addition, while most companies espouse teamwork, part shortages and unfavorable PPV are typically the sole responsibility of individual buyers. They are often blamed for having unfavorable variances. For a buyer with responsibility for hundreds or a few thousand part numbers, the possibility of getting blamed on a regular basis becomes uncomfortably high. Importantly, the root cause of problems usually lay elsewhere, but organizational routines instead focus on blaming people because it is quick and easy to do so.

## PPV tactics

Buyers, like any other people, seek to avoid blame when problems arise. To do so they will manipulate or “game”



business measures to achieve more favorable outcomes for themselves (Pfeffer and Sutton, 2000; Cunningham and Fiume, 2003; Steele and Albright, 2004), even though they almost certainly lead to higher costs – the opposite of what the PPV metric is intended to do. Importantly, individual buyers are not to blame. They are simply seeking to survive in a stressful environment that contains many contradictions over the relative importance of price, on-time delivery, quality, and other factors.

Many purchasing executives that have risen through the ranks know the tactics identified in this paper first-hand. Remarkably, few seek to eliminate the PPV metric. Rather than switch from standard costs to more meaningful business metrics based on actual costs (Maskell and Baggaley, 2004), most purchasing executives instead favor the status quo because they too know how to manipulate the PPV metric. They also know it does not accurately reflect actual costs, and therefore permits obfuscation. The fact that this metric is embedded in purchasing information systems makes change even more difficult, and is thus a structural impediment to real improvement.

The tactics identified do not represent every possible tactic that could be used. Rather, they simply illustrate the variety of tactics that are often used to manipulate the PPV metric. While the ethics of such manipulations are obviously questionable, the fact remains that people do manipulate business metrics to avoid unfavorable outcomes (Emiliani, 2000; Pfeffer and Sutton, 2000). Our intent is not to portray buyers as bad people, nor to imply that companies using the PPV metric condone the use of such tactics. Instead, we simply highlight a common problem and present alternate solutions that are known to result in better outcomes.

#### **Tactic No. 1**

For new parts, combine the unit price and tooling cost, amortized over the number of pieces required, for the current year. In the following year, use last year's unit price minus the tooling cost to create the appearance of favorable PPV from one year to the next.

#### **Tactic No. 2**

For new work, quote only high-priced suppliers. Source new work to one of the high priced suppliers to establish a high standard cost the first year, then switch to a slightly lower price supplier in the second year. Repeat as necessary.

#### **Tactic No. 3**

Buyer moves parts with high unfavorable PPV to a different buyer or buying group. Buyer will create a plausible story for why the part should not belong to them. May be done with or without approval (i.e. surreptitiously).

#### **Tactic No. 4**

A part has chronically unfavorable PPV – i.e. the standard cost is much less than the actual part price. Buyer works with an engineer to discontinue current part number, replace with a new part number, and then establish a new standard cost. Buyer will input a high unit cost to build a cushion that absorbs cost reduction demands in future years.

#### **Tactic No. 5**

A part has chronically unfavorable PPV – i.e. the standard cost is much less than the actual part price. Buyer works with

an engineer to determine if the same part design exists as a different part number. Discontinue current part number and instead use another existing part number (or vice versa). Leverage purchase volumes from both part numbers to obtain a lower price.

#### **Tactic No. 6**

Buyer orders a large quantity of an item to obtain a low unit price that closely matches the standard cost, receives 25-75 percent of the quantity of material requested, and then cancels the balance of the order. Settlement of outstanding purchase order requirements accrue to a different budget category. May use in conjunction with Tactic No. 8.

#### **Tactic No. 7**

Buyer will have some parts with favorable PPV – i.e. standard cost is much higher than the actual purchase price. Buyer protects these parts to gain favorable variance that is used to offset unfavorable variance from other parts. May receive entire year requirement in January to book the favorable variance. Buyer changes the standard cost only when forced to do so – i.e. when management discovers the driver of unusually high favorable PPV.

#### **Tactic No. 8**

Buyer asks a friend in the materials planning department to increase the requirement to obtain a lower unit price. May use in conjunction with Tactic No. 6.

#### **Tactic No. 9**

Buyer has a part with unfavorable PPV – i.e. standard cost is much lower than the actual purchase price. Buyer convinces supplier to take the part at the standard cost, then offers the supplier one or more different parts whose standard cost is higher than the quoted price. The parts with higher standard cost offset the supplier's losses from the part with lower standard cost. May use in conjunction with Tactic No. 8.

#### **Tactic No. 10**

Supplier identifies a cost reduction opportunity in the 3rd or 4th quarter. Buyer and supplier agree to defer implementation to obtain favorable PPV in the upcoming year. The buyer will typically budget 50-75 percent of the anticipated savings to achieve both favorable PPV and establish a cushion in case some of the cost reduction is not achieved, or to apply the savings in future years.

#### **Tactic No. 11**

Online reverse auctions take advantage of management's strong interest in trendy technological solutions and to achieve what appears to be quick savings (Emiliani and Stec, 2002, 2004, 2005). First qualify several new suppliers on delivery and quality performance, then compete them on price in real-time dynamic bidding via the Internet. PPV metric eclipses efforts to reduce total cost.

#### **Tactic No. 12**

Buyer switches sources of supply, from an incumbent supplier to new supplier. The price of the part purchased from incumbent supplier was \$1000, for example. New supplier agrees to supply the parts at zero cost to the buyer for new equipment sales, in exchange for promise of future sales through other distribution channels (e.g. higher volume aftermarket). Buyer's information system requires a price

associated for each part number in the bill of materials. A price of \$0.01 is input into the information system, and purchasing organization then claims \$999.99 in favorable purchase price variance for all parts received in the budget year. Buyer may accelerate delivery schedule to maximize favorable PPV. Similar to Tactic No. 9.

The value of the PPV metric is obviously questionable because it can be easily manipulated (Cunningham and Fiume, 2003; Pfeffer and Sutton, 2000), as these real-world examples illustrate. Senior management, who owns the metrics, has a responsibility to ensure that they and others use business metrics appropriately, or discontinue the use of metrics that are easily manipulated or do not accurately represent performance. This is a facet of corporate responsibility and financial reporting that can be improved upon (SEC, 2002; SOA, 2002).

Abandoning business metrics that drive dysfunctional behaviors is, in general, hard to do because they are institutionalized, and top managers are usually unwilling to change well-established routines even though they often cite the importance of change and the need for improvement (Pfeffer and Sutton, 2000). In other cases, management may want to replace the PPV metric, but they are not sure what measures to use in its place. Thus despite the propensity for misuse documented in the tactics described, many senior managers continue to rely on the PPV metric as a key measure of purchasing performance.

### Creating waste or creating value?

In conventional management practice, PPV tactics are just a normal part of daily business activities. It is certainly not the only metric that is quietly manipulated. In manufacturing, the “earned hours” metric, based on standard direct labor cost, is often skillfully manipulated to meet budgets by producing goods that “earn” the most labor hours instead of making the specific goods that customers ordered. This is just one of many examples (Emiliani, 2000). The question is: who benefits from using these tactics? Individual buyers, purchasing managers, and purchasing executives are the primary beneficiaries, as they survive another month, another quarter, or another year. Since PPV is a simple-to-calculate cost reduction metric, it would seem implausible that costs could actually increase. But they do. The reasons become clear only when viewed from a different perspective.

In the Lean management system (Emiliani *et al.*, 2003), senior managers recognize the existence of eight different types of waste, called *muda* in Japanese (Ohno, 1988; Emiliani, 1998):

- 1 overproduction;
- 2 waiting;
- 3 transportation;
- 4 processing;
- 5 inventories;
- 6 movement;
- 7 defects; and
- 8 behaviors.

In addition, they also recognize the need to eliminate unevenness (e.g. uneven work loads, called *mura* in Japanese) and unreasonableness (e.g. unreasonable work requirements, called *muri* in Japanese) (Lu, 1989). The eight wastes, plus *mura* and *muri*, increase costs (Ohno, 1988;

Emiliani *et al.*, 2003; Maskell and Baggaley, 2004). Importantly, business is viewed as a human-centered activity – not solely as a machine to make money – and people are considered valuable resources. Therefore, management takes seriously its responsibility to ensure that people do not spend time creating or managing *muda*, *mura*, and *muri*. Instead, people spend their time eliminating *muda*, *mura*, and *muri* and focus on creating value for end-use customers (Womack and Jones, 1996; Emiliani *et al.*, 2003). Kaizen is the process for differentiating between value-added work, non-value added but necessary work, and waste – including *mura* and *muri* (Ohno, 1988; Lu, 1989). Two key principles are “continuous improvement” and “respect for people” (Toyota, 2001).

Conventional management practice does not recognize *muda*, *mura*, or *muri*, nor does it view business as a human-centered activity in the same way that lean businesses do. Instead, the purpose of the business is to make money – to maximize shareholder value, usually in the short term – and people are viewed as a cost to be eliminated if possible. Management, often unknowingly, allows people – e.g. individual buyers – to spend time on waste, unevenness, and unreasonableness, as shown in Table I.

The PPV metric, in conjunction with an environment that blames people when they miss their objectives, drives wasteful work activities and behaviors. In addition, four of the tactics shown in Table I result in inventories and overproduction, which in the lean management system are among the greatest wastes of all because they add unnecessary cost to the business – which reduces competitiveness and is thus bad for employees, customers, suppliers, investors, and the community.

In addition, the PPV metric and associated variance analysis activities do not help people understand the root cause of cost problems. Instead, the focus is on price, and valuable human labor and thinking are spent on gaming the PPV metric. Time is spent managing waste, unevenness, and unreasonableness rather than eliminating it. Conventional management practice does not recognize or value “continuous improvement” and “respect for people” (Emiliani *et al.*, 2003)

The PPV metric can misrepresent actual cost savings in both internal financial reports and external financial reporting to shareholders because it does not represent the total cost of purchasing decisions (Emiliani and Stec, 2002). The exclusive focus on invoice price ignores other costs related to the purchasing function such as ordering and transaction costs, storing and transporting materials, and supplier certification and communication. These costs can be considerable, and the 12 PPV tactics listed will increase these costs. Importantly, problems associated with poor purchasing decisions are paid for by budgets in departments that are external to the purchasing organization, such as quality, warranty or after-sales service, or materials management. Perhaps a bigger problem with the PPV metric is that it does not help the purchasing organization develop inter-organizational problem-solving capabilities (Womack *et al.*, 1990; Fujimoto, 1999; Womack, 2003), which will improve long-term competitiveness (Emiliani, 2004).

While senior managers may utter words that indicate the importance of quality and on-time delivery, the use of the PPV metric typically drives behaviors that focus on unit price reduction. Further, it demonstrates that senior managers lack broad awareness of the tools and processes that achieve lower

Table I Unfavorable outcomes caused by manipulating the PPV metric

PPV tactic	Type of waste ( <i>muda</i> )	Unevenness ( <i>mura</i> )	Unreasonableness ( <i>muri</i> )
1	Behaviors	✓	✓
2	Behaviors	✓	✓
3	Behaviors		✓
4	Behaviors		✓
5	Behaviors		✓
6	Behaviors, inventories, overproduction	✓	✓
7	Behaviors	✓	✓
8	Behaviors, inventories, overproduction	✓	✓
9	Behaviors		✓
10	Behaviors	✓	✓
11	Behaviors, inventories, overproduction	✓	✓
12	Inventories, overproduction	✓	✓

prices without making trade-offs against quality and delivery – and also develop capabilities and long-term competitiveness (Ohno, 1988; Monden, 1995; Womack and Jones, 1996; Fujimoto, 1999; Womack, 2003; Emiliani, 2004; Maskell and Baggaley, 2004).

So what should senior managers do to reduce the cost of purchased materials? Alternative solutions based upon collaborative problem solving, rather than power-based bargaining, and leading to long-term intra- and inter-organizational capability building and improved competitiveness have been presented in previous studies (Womack *et al.*, 1990; Nishiguchi, 1994; Monden, 1995; Bounds, 1996; Bounds *et al.*, 1996; Cooper and Slagmulder, 1999; Fujimoto, 1999; Womack, 2003).

A better approach for measuring purchase price performance is to compare the actual price paid to the target or goal for a period, usually monthly (Emiliani *et al.*, 2003):

$$\text{Current cost (target)} - \text{current cost (actual)}$$

At first glance, this may appear to be no different than the PPV metric. What, after all, has changed, other than replacing the standard or budgeted cost with a target cost? The difference may be subtle, but it is more than mere semantics. If the standard has been adjusted to incorporate desired savings, the PPV metric implies that cost improvement is expected to occur instantly. This is unrealistic, and individual buyers faced with an unrealistic goal and no means to avoid unfavorable variances have incentive to manipulate the measure. If the standard has not been adjusted to incorporate a desired cost savings, then the PPV metric encourages people to maintain the status quo.

The target cost, on the other hand, is a goal to aspire to. Buyers are not expected to immediately achieve the target. What is expected is a trend of continuous improvement in actual costs, reducing the gap between the actual cost and the target cost. This measure of purchase price performance is unambiguous, unlike the standard cost based PPV metric, and reveals the gap that must be closed to achieve the planned price. Importantly, it compels buyers to understand the source of the cost gap, which they can address only if they understand manufacturing processes, and then assist suppliers in the use of various methods and tools such as cellular production, set-up reduction, value analysis, etc., to

eliminate waste, unevenness, and unreasonableness (Ohno, 1988; Lu, 1989; Monden, 1995; Imai, 1997).

Implementation of accounting systems and performance measures consistent with lean principles and practices (e.g. based on value streams) have been previously reported (Emiliani *et al.*, 2003; LEI, 2003; Maskell and Baggaley, 2004). The only measure directly applicable to the purchasing function is total material cost. The goal is not to obtain the lowest price for materials or optimize the purchasing function. Instead, the goal is to reduce the overall cost of value creation by eliminating waste throughout value streams. Similar approaches, such as the “total cost of ownership, have been extensively reported in the literature (Carr and Ittner, 1992; Ellram and Siferd, 1993; Ellram and Siferd, 1998; Ferrin and Plank 2002).

The findings presented in this paper point to numerous avenues for future research, including:

- Conduct empirical studies to identify additional PPV tactics in use.
- Obtain field data to validate the PPV tactics across a larger spectrum of companies in one or more industry segments.
- Determine the impact of efforts to manipulate the PPV metric on the integrity of financial statements.
- Compare extent of use of PPV tactics in legacy purchasing information systems versus modern ERP systems.
- Identify and test improvements that could be made to management education to help eliminate the use of metrics that drive inappropriate behaviors.

## Summary

This paper presented 12 tactics that buyers often use to obtain favorable purchase price variance in efforts to avoid unfavorable outcomes for themselves and their work unit. Each tactic results in higher costs and expansion, rather than the elimination of, waste, unevenness, and unreasonableness. For many businesses, ongoing commitment to the PPV metric indicates that manipulating this metric and spending time on related variance analyses are more highly valued skills for people to possess than specific methods used to eliminate cost at the source (AT Kearney, 2003; Womack, 2003).

Most purchasing executives know the tactics identified in this paper first-hand, yet do not seek to eliminate the PPV metric. Operations and finance executives should find the tactics listed extremely unsettling and will hopefully become

catalysts for needed change for this and other business metrics that do not accurately represent performance. Engineering executives should take note because some of the tactics used are directly attributable to engineering design practices that create high cost products and indicate the absence of formal target costing processes (Monden, 1995; AT Kearney, 2003).

The PPV metric is characteristic of a conventional approach to management control that relies on faulty assumptions. It assumes that emphasizing financial outcomes in each functional area leads to operating efficiency. It further assumes that achieving maximum operating efficiency in each functional area will lead to system-wide efficiency. The PPV metric and others like it support this management approach.

However, this conventional approach does not recognize the effect actions taken in one functional area have on cost and efficiency in other functional areas. Local optimization typically does not lead to system-wide efficiency. In contrast, lean management achieves system-wide efficiency through intra- and inter-organizational efforts to eliminate waste. Retaining dysfunctional measures such as the PPV metric creates major obstacles to the implementation of lean management practices.

An alternative measure for purchase price performance, the trend in actual costs compared to a target cost, provides purchasing with better information for understanding cost reduction challenges. Used in concert with operational measures of supplier performance on critical dimensions that affect costs throughout the value stream (LEI, 2003; Womack, 2003; Maskell and Baggaley, 2004), the alternative measure will direct buying organizations to reduce costs in collaboration with suppliers using well-established problem-solving methods and tools.

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# Executive decision-making traps and B2B online reverse auctions

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### Abstract

**Purpose** – The purpose of the paper is to describe common decision-making traps experienced by senior managers when considering the use of online reverse auctions as a means for sourcing goods and services and to reduce purchase prices.

**Design/methodology/approach** – The paper examines the information evaluated and decision-making process used by senior managers in relation to common decision-making traps.

**Findings** – Decision-making traps are shown to lead to poor decisions related to the use of online reverse auctions.

**Research limitations/implications** – Exceptions to observations and findings presented may exist. The paper provides a foundation for further investigation on how strategic sourcing processes are evaluated and selected by senior managers.

**Practical implications** – The paper is useful for managers as a guideline to evaluate sourcing options and avoid errors that can interrupt supply, reduce product or service quality, extend lead times, increase costs, or impair buyer-seller relationships. It is helpful for academics to understand industrial decision-making processes regarding the evaluation of sourcing options.

**Originality/value** – The paper explains decision-making traps and provides the rationale for their existence in decisions to use online reverse auctions.

**Keywords** Auctions, Internet shopping, Purchasing, Sourcing

**Paper type** Research paper

### Introduction

Business-to-business (B2B) online reverse auctions, also called “e-reverse auctions” or “e-auctions,” have been used since 1995 to source production and non-production goods and services principally among *Fortune* 2,000 companies (Richards, 2000; Tully, 2000; Judge, 2001; Stein *et al.*, 2003). A recent study showed the amount of savings that can be achieved is much less than that claimed by “market makers” – the companies that provide reverse auction services (Emiliani and Stec, 2002; CLBM, 2004). Related studies have shown that the many benefits for buyers and sellers as claimed by the market makers are greatly overstated, if not false (Emiliani and Stec, 2004, 2005).

Previous studies have also shown that online reverse auctions damage supplier relationships and create distrust among incumbent suppliers (Jap, 2001; Kobe, 2001; Tulder and Mol, 2002; Beall *et al.*, 2003; MHEDA, 2004; B2BRC, 2003; Smart and Harrison, 2003; Smeltzer and Carr, 2003; Emiliani and Stec, 2004, 2005). A common result is poor sourcing decisions, higher costs, and less cooperative supplier relationships – the opposite of what senior managers hope to achieve from online reverse auctions (Emiliani, 2004; Emiliani and Stec, 2004, 2005).

While the use of online reverse auctions has leveled off and may be decreasing (Butters and Bennett, 2002; Kisiel, 2002; Hannon, 2003; Ryan, 2003), the extent of its use by large industrial buyers since 1995 is remarkable given its many shortcomings. Despite this, senior managers of many *Fortune* 2,000 corporations continue to believe in the efficacy of online reverse auctions to reduce purchase prices (Judge, 2001; Reason, 2001; Grant, 2003; FreeMarkets, 2003; Emiliani and Stec, 2005). This is due in part to the common metric that is used to determine unit price savings – purchase price variance[1] – which is easily manipulated (Emiliani *et al.*, 2004). Accurate measurement of total costs would reveal that online reverse auctions, in most cases, yield unfavorable results (Emiliani and Stec, 2002).

More successful outcomes may occur between specific pairs of buyers and sellers for certain commodities such as bulk materials, stock commercial goods, or non-technical services that can be easily specified, and where switching costs are negligible (Smart and Harrison, 2003). Overall, it is likely that the use of online reverse auctions will be limited to narrower circumstances in the future if buyers and market makers do not adequately address current shortcomings.

Senior managers have many reasons for using online reverse auctions. The most common are tremendous pressure for cost reduction due to global competition, particularly from low wage countries, pressure from influential investors to increase shareholder value quickly, and a strong desire to use technology-based tools that can help them achieve what appear to be quick results. However, this does not represent the totality of the decision-making process.

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Table I Online reverse auction decision-making traps

Decision-making trap (Hammond <i>et al.</i> , 1998)	Rationale
<b>Anchoring</b> Giving disproportionate weight to the first information received	Senior managers are anchored in the savings and many other purported benefits of online reverse auctions offered by the market makers (e.g. Procuri, 2004), who are usually the first persons they meet with. Senior managers do not typically seek information that contradicts the market makers' claims Senior managers may have heard that large savings have been achieved by competitors or in related industries through trade press reports or from other executives they meet. Senior management usually discounts concerns expressed by lower level employees regarding problems with online reverse auctions
<b>Status quo</b> Preference for solutions that preserve the current state	Most large purchasing organizations have a historical preference for basing purchasing decisions on the unit lowest price. From this perspective, online reverse auctions preserve the <i>status quo</i> , and do not compel buyers to change organizational routines, such as collaborating closely with suppliers to manage cost problems Online reverse auctions perpetuate power-based bargaining, principally related to price, which is often the dominant historical practice in large industrial purchasing organizations A key measure of the effectiveness of many purchasing organizations is "purchase price variance," and the senior purchasing official seeks to meet performance targets relative to this metric. Online reverse auctions are very effective at supporting the continued use of this metric by the buyer
<b>Sunk cost</b> Decisions that support past decisions	Most online reverse auction activities start out as pilot projects. The savings identified at the conclusion of the initial online reverse auctions is usually large (e.g. 10-30 per cent). However, if the savings are not preserved on implementation (i.e. switching sources), the use of online reverse auctions may still continue due to the considerable effort required by the buyer to conduct the pilot project. Typically, a significant investment has been made by the buyer in money, time, and people – as well as the personal reputation of the VP of purchasing or the chief financial officer who supported the use of online reverse auctions – which makes it more attractive to convert the pilot project into a routine sourcing activity. Most senior managers are loath to admit errors The savings estimate anchor planted by the market maker is often confirmed at the conclusion of the initial online reverse auctions. This makes it easy for senior managers to authorize continued use of online reverse auctions
<b>Confirming evidence</b> Seeking information that supports a viewpoint (while that which contradicts it is quickly rejected)	Low prices bid by suppliers will confirm senior management's suspicion that they have been overcharged in the past
<b>Framing</b> Making a decision based on how a question or problem is framed <sup>a</sup>	Market makers frame online reverse auctions as having numerous benefits for buyers, which they find difficult to resist. The key benefit is cost savings. For example, online reverse auctions are marketed as a fast way to achieve cost savings that drop to the bottom line, which increase earnings-per-share in a predictable way over time, and thus contribute favorably to stock price performance. Since a large portion of executive compensation is often tied to stock price, using online reverse auctions is viewed as a "no-brainer"
<b>Estimating/forecasting</b> Making estimates or forecasts of uncertain events, which are often faulty due to the three decision-making traps listed	The savings that market makers usually disclose are end-of-auction results, not the savings achieved after implementation of auction results by the buyer. Thus, the savings estimate is overstated, and in some cases the use of online reverse auctions may actually increase the buyer's total costs, as problems that arise are paid for with budgets from other functional areas (e.g. quality problems, legal disputes, or warranty claims) Realizing end-of-auction results depends on the buyer's ability to secure the savings through disciplined re-sourcing activities (i.e. switching sources). If the buyer is not organizationally equipped to manage re-sourcing activities effectively, then the savings will slip away. Thus, savings, if any, are achieved over time, and may not be accrued in accordance with the financial forecast The prices that suppliers bid in online reverse auctions are based on forecast quantities of goods or services. Since lead-times are often long for many goods-producing companies (e.g. months), forecast accuracy is typically low. Supplier may then seek to re-negotiate prices with the buyer
<b>Overconfidence</b> Believing that the estimate or forecast is accurate	Senior managers tend to view production forecasts as accurate, when in fact they are not if lead-times are long Senior managers are overconfident in the amount of savings that can actually be achieved, and often include end-of-auction savings results in the financial plan Surprisingly, top executives in many organizations think that good quality and on-time delivery performance are "a given" if a supplier is to be viable in a particular industry. Implementation of online reverse auction results often face significant quality and delivery performance issues, especially if the seller has never supplied the buyer before When work moves from one supplier to another, the incumbent supplier often continues to do at least some work for the buyer. Since most suppliers view online reverse auctions as opportunistic behavior among buyers, they will seek opportunities to charge higher prices. Thus, executives are overconfident (in the general sense) if they think that incumbent suppliers that have been subjected to reverse auctions will not try to get even at some point in the future (e.g. charging large expediting fees or large tooling costs when the buyer is in a jam)

(continued)

Table I

Decision-making trap (Hammond <i>et al.</i> , 1998)	Rationale
<b>Prudence</b> Adjusting estimates or forecasts to “be on the safe side”	Some market makers give guidance to buyers on the percent savings they can expect to secure on implementation. For example, if 20 percent savings was achieved end-of-auction for a category of machines parts, the market makers’ work with other clients will indicate that 70 percent of this savings can be achieved ( $0.2 \times 0.7 = 14$ per cent). This prudence trap creates a frame and anchor that gives an impression that most of the savings can be realized. However, the savings are based on the purchase price variance metric alone, and do not consider costs that will accrue to other budget categories if quality, delivery, or other problems occur
<b>Recallability</b> Predictions about the future based on memory of past events	Senior managers are often present at the initial online reverse auctions, and dramatic, favorable end-of-auction results may be remembered as the norm, rather than as an exception revealed in future reverse auctions that they do not attend Senior managers often forget the costs and difficulties associated with re-sourcing work from one supplier to another

**Note:** <sup>a</sup> Frames are particularly dangerous because they can lead to other decision-making traps such as *status quo* or anchoring, and can emphasize sunk costs or provide confirming evidence. For example, a director of purchasing from a large multi-national soft-drink company contacted the author for information, on behalf of the vice president of purchasing, regarding the savings that can be achieved using online reverse auctions. When informed that savings may not be as great as that claimed by the market maker, the director of purchasing stated that she was only interested in information that supported the market maker’s savings estimate – which was what her boss wanted. The market makers framed the benefits of reverse auctions in a favorable light – discounting possible negative consequences – which then anchored senior managers into a savings figure (i.e. an estimate or forecast) whose validity would later be confirmed as more-or-less accurate at the conclusion of the reverse auction events. It would only be later on, on implementation of reverse auction results, that the multiple hidden traps in decision making are fully revealed in the form of reduced savings, and delivery, quality, or other problems

This paper provides additional insights into why online reverse auctions have been so widely used by large industrial buyers, beyond the three primary reasons cited by senior managers. The decision to use online reverse auctions is typically favorable, despite the existence of negative outcomes reported in the literature, as well as unreported negative outcomes commonly known among lower-level purchasing professionals that have had experience conducting online reverse auctions and implementing the results. This suggests that senior management’s decision-making process is flawed. But in what ways is it flawed?

## Decision-making traps

Hammond *et al.* (1998) identified nine major “hidden traps in decision-making” commonly experienced by executives: anchoring, status quo, sunk cost, confirming evidence, framing, estimating/forecasting, and overconfidence, prudence, and recallability. The authors note that decision-making traps lead to a failure to evaluate alternatives, and that decisions often result in unfavorable outcomes for both the business and the executives making the decisions. If poor decisions are to be avoided (Finkelstein, 2003), then senior managers must first become aware of these decision-making traps.

The sale of online reverse auction services is generally made to the vice president of purchasing or the vice president of finance. The market makers know their audience well with regards to corporate financial objectives and the measures typically used to gauge success in the purchase of goods and services. Thus, there is a simple convergence of need with a service provider’s capability to meet that need. While intentions may be wholesome, unintended consequences may arise that can temporarily compromise the buyer’s ability to meet customer needs.

Table I summarizes the decision-making traps, and provides the rationale for their existence in decisions made by senior

managers to use online reverse auctions. The rationale presented should be understood as common occurrences based upon the authors’ first-hand experiences with managing several online reverse auctions and subsequent research findings (Emiliani, 2004; Emiliani and Stec, 2002, 2004, 2005), but also recognizing that specific circumstances may be different.

## Summary

This paper examined how decision-making traps – anchoring, status quo, sunk cost, confirming evidence, framing, estimating/forecasting, and overconfidence, prudence, and recallability – can favorably affect decisions made by senior managers to engage in online reverse auctions. In general, buyers’ process for evaluating online reverse auction services fails to consider these decision-making traps, while the market makers will no doubt find these decision-making traps to be quite helpful in selling their services. The presence of decision-making traps in purchasing and supply chain management is a topic that must be further understood in practice, and should also be presented in business school courses that focus on sourcing strategic and non-strategic of goods and services. Doing so will help improve future decision making with regard to purchasing and supply chain management.

## Note

- 1 Purchase price variance is usually calculated as follows:  $PPV = (\text{standard cost/unit} \times \text{actual purchase volume}) - (\text{actual cost/unit} \times \text{actual purchase volume})$ . For organizations that do not use standard costs, the PPV (often volume adjusted) is calculated as follows:  $PPV = \text{last purchase price paid} - \text{current purchase price quoted}$ .



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# Coercion and reverse auctions

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### Abstract

**Purpose** – The paper seeks to examine the presence of coercion in the common use of reverse auctions for industrial procurement and spend management activities, and to illustrate the many problems that arise when purchasing and supply management is viewed by powerful buying organizations as a simple dyadic relationship with sellers.

**Design/methodology/approach** – The paper takes the form of a literature review, and analysis of the meaning of coercion, and supplier survey data.

**Findings** – Reverse auctions, as commonly used, are shown to be *fundamentally* coercive, with coercion being *essential* for achieving the outcomes that buyers seek.

**Research limitations/implications** – Survey responses and findings that can be drawn from them are limited due to the small sample size. Reflects the dyadic nature of buyers' corporate codes of conduct in relation to the day-to-day practice of purchasing and supply management.

**Practical implications** – The existence of coercion indicates that reverse auctions are inconsistent with corporate codes of ethics or codes of conduct with respect to supplier relationships (e.g. fairness, honesty, and integrity). Reverse auctions are also shown to be inconsistent with US federal procurement standards and the Institute of Supply Management's "Principles and standards of ethical supply management conduct".

**Originality/value** – The paper brings to the forefront the existence of psychological and economic coercion in the common use of reverse auctions, and discusses how this creates difficult problems for both buyers and sellers. It also presents alternative strategies that managers in buying and selling organizations can use instead of reverse auctions.

**Keywords** Business ethics, Purchasing, Auctions, Sourcing

**Paper type** Research paper

### Introduction

Business-to-business reverse auctions (RAs) are commonly used by the procurement organizations of *Fortune*<sup>®</sup> Global 2000 corporations as a means to source goods and services ranging from buyer-designed components to pure commodity items, and to obtain lower unit prices. Reverse auction service providers, known as "market makers", arrange for new and incumbent suppliers to compete in real time for their clients' business. The auction is "reverse" because unit prices descend over time, rather than increase. The price-bidding portion of the reverse auction is conducted via a private computer network or over the internet, and is usually completed in 30-90 minutes for each group of items auctioned. Leading providers of reverse auction services include SAP, Oracle, A.T. Kearney, Ariba<sup>®</sup>, Procuri, Orbis Online, and Iasta. Details of the reverse auction process and its theoretical foundations have been described previously (Klemperer, 1999; Emiliani, 2000, 2004; Jap, 2001; Beall *et al.*, 2003; Carter *et al.*, 2004).

First introduced by FreeMarkets Online, Inc. in 1995, reverse auctions were soon hailed as an innovative tool that

would fundamentally change industrial procurement (Aepfel, 1999; Baatz, 1999; Tully, 2000; Richards, 2000). The key benefits cited by market makers include a significant reduction in the time it takes to source goods and services, and large cost savings – an average of 15 percent or more (Beall *et al.*, 2003), which is three to five times greater than that achieved through traditional sealed bidding processes. The business press has typically presented reverse auctions in a favorable light (Tully, 2000; Richards, 2000; Judge and How, 2001; Reason, 2001; Carbone, 2005; Moody, 2006), without engaging in careful fact-checking to determine whether the benefits claimed by the market makers are genuine. Many academic studies support these benefits for buyers (e.g. Jap, 2001; Smeltzer and Carr, 2003; Beall *et al.*, 2003), though careful analysis reveals that in fact they too repeat the market maker's claims, as well as claims made by buyers, and have not engaged in critical inquiry.

Studies challenging the savings figures have shown the amount of savings that can actually be achieved are greatly overstated (Emiliani and Stec, 2002a, 2003, 2005). These and other studies have questioned the many other benefits of reverse auctions claimed by the market makers. In general, buyers and sellers do not realize the benefits, and instead must often contend with unfavorable and costly outcomes (Emiliani and Stec, 2003, 2005; Tassabehji *et al.*, 2006). Despite this, market makers continue to promote reverse auctions as an innovation in modern procurement practice

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that saves buyers both time and money. Many manufacturing and service sector businesses, as well as government agencies, will continue to use reverse auctions because managers are not aware of or simply ignore the many pitfalls (Emiliani, 2006).

Critics have described reverse auctions as “coercion or e-mugging” (*Information Age*, 2002), “bid shopping” (Angelo, 2002; Lehner, 2002), and a “technologically-assisted form of traditional power-based bargaining” (Emiliani, 2004). A common supplier response to reverse auctions is: “We are declining to participate in online auctions unless *forced* to by an existing customer” [italics added] (Emiliani and Stec, 2005). As a result of incumbent suppliers’ negative perceptions of reverse auctions, many industry trade associations have questioned or denounced the use of reverse auctions. In response to real and perceived abuse by market makers, buyers, and sellers, trade associations have created voluntary codes of conduct to regulate the information and activities of the parties engaged in reverse auctions (Associated General Contractors of America, 2003; Canadian Construction Association, 2001a, b; Construction Products Association, 2003; European Aluminium Foil Association, 2005; International Housewares Association, 2002; National Electrical Contractors Association, 2002; Original Equipment Suppliers Association, 2002). A recent study (Emiliani, 2005) has shown that the main benefit of codes of conduct is not as a mechanism for voluntarily regulating reverse auctions, but as a source of unified, high-profile, collective feedback from suppliers that challenge the fairness and effectiveness of reverse auctions. This, along with unfavorable outcomes that buyers may have experienced previously, compels buyers to reconsider their use of reverse auctions and return to long-established collaborative methods.

Reverse auctions have been widely criticized by incumbent suppliers, in part because they pose an immediate, significant, and credible threat to near-term profitability and sales volume, as well as customer relationships. A typical view among suppliers is that reverse auctions are “unhealthy, if not unethical” (Lehner, 2002). Recent studies consistently indicate that suppliers have a strong negative view of reverse auctions (Emiliani and Stec, 2002a, 2003, 2005; Jap, 2000, 2002; Paulson, 2004; Smeltzer and Carr, 2003; Tassabehji *et al.*, 2006; Tulder and Mol, 2002), in part because reverse auctions damage existing business relationships and undercut best practices in supply management practice, such as collaborative problem solving, developing trusting long-term business relationships, and joint capability-building (Womack *et al.*, 1990; Bounds *et al.*, 1996; Nishiguchi and Beaudet, 1998; Dyer and Nobeoka, 2000; Liker and Choi, 2004).

Reverse auctions have been argued to be a poor purchasing tool and also bad for business in general because they contradict the outcomes that buying organizations seek to achieve, namely reducing the cost of goods sold and improving supply chain efficiency. Reverse auctions have been characterized as a zero-sum power-based bargaining tool that will likely result in a slow decline in competitiveness and financial performance among the buyers and sellers that use them extensively (Emiliani, 2004).

The objective of this paper is to examine reverse auctions to determine whether they are coercive and, if so, in what ways this is problematic for buyers and sellers. It will also highlight aspects of the way in which reverse auctions have been discussed, which indicate presuppositions stemming from current and accepted business practice that promote and

perpetuate adversarial relationships between business partners predicated on leveraging a power position (Womack *et al.*, 1990; Nishiguchi, 1994). In addition, this paper will seek to answer three questions:

- 1 Are RAs merely an extension of traditional business practices?
- 2 What are the sources and methods of coercion?
- 3 Are RAs *fundamentally* coercive?

The paper is organized beginning with a presentation of coercion from practical and theoretical perspectives, presentation of supplier survey data that further inform their perceptions of reverse auctions, an examination of corporate codes of conduct in relation to buyer-seller relationships and the use of reverse auctions, and a discussion of the findings which includes implications for managers in buying and selling organizations.

## Coercion

A recent study argued that reverse auctions are coercive – i.e. “To force [someone] to act or think in a certain way by use of pressure threats, or intimidation” (*American Heritage Collegiate Dictionary*, 1997) – and likely inconsistent with corporate codes of conduct (Emiliani and Stec, 2002b). It cites the existence of explicit and implicit coercion in two varieties, human and electronic, that are both integral components of the reverse auction process as perceived by incumbent suppliers.

Incumbent suppliers commonly complain that reverse auctions are coercive. Is this simply a biased perception among suppliers who may not be competitive in a global marketplace and who stand to lose sales to competitors? Or is it in fact accurate? If so, should anything be done about it? In contrast, it is not obvious to most large buying organizations that reverse auctions are coercive, in part due the very fact that their use is so widespread, as well as explicit or implicit approval of their use by corporate legal departments (Emiliani, 2005).

To facilitate this analysis, an understanding and definition of coercion must be developed that helps differentiate between feelings of coercion and unintentional or intentional coercive behavior by market makers and buyers that use reverse auctions. Important related interests include whether or not reverse auctions are consistent with typical corporate codes of ethics or codes of conduct with respect to supplier relationships, US federal procurement standards of conduct (Federal Acquisition Regulation, 2006; General Services Administration, 2006), and the Institute of Supply Management’s “Principles and Standards of Ethical Supply Management Conduct” (Institute of Supply Management, 2002).

Words such as “coerced”, “forced”, “no choice”, and others with similar connotation are common throughout the trade and academic literature with reference to how incumbent suppliers view reverse auctions. For example:

- “... the nature of the reverse auction tends to force a supplier to progressively reduce its asking price” (Moser, 2002);
- “... suppliers view [...] the auction process as exploitative” (Jap, 2001);
- “... Sellers tend to perceive it [RAs] as a coercive tool” (Thomas and Wilson, 2001);

- “One tactic used by buying firms to overcome this issue [resistance to RA use] was simply to leave suppliers no choice but to participate” (Carter *et al.*, 2004);
- “Suppliers [...] are often reported to be unhappy with the reverse auction process, having been coerced into significant price reductions” (Tassabehji *et al.*, 2006);
- “[There are] accusations that they [buyers] were using the bids as a ‘pressure to conform’ [lower their price]” (Smeltzer and Carr, 2003); and
- “This perceived conflict is primarily caused by the tool’s emphasis on awarding business based on aggressive price competition – the classic arm’s length coercive/competitive model” (Beall *et al.*, 2003).

Examining coercion in reverse auctions requires defining both a general understanding of the term and what is meant when it is used in the context of statements about reverse auctions. While the legal aspects of coercion in buyer-seller business relationship is beyond the scope of this paper, understanding decisions related to contract law can be helpful. The primary focus of this paper is the political or philosophical dimensions that entail freedom, rights, and morality. This is relevant because it helps form the basis of United States Uniform Commercial Code (2003), which governs transactions between buyers and sellers, and from which corporate codes of conduct are partially derived.

According to Wertheimer (1993), “There is no univocal account [...] of the word ‘coercion’ [...] Terms such as coercion, voluntariness, autonomy and the like are best understood as terms of art that do not admit of tight specifications”. These terms are often used loosely, and so our understanding of them depends greatly on context. The relationships of people involved in an activity and the statements they make using these terms helps us understand the nature of the situation.

The theme of coercion, as the antithesis of free will, has received extensive examination in theological, philosophical, and political writings. We make no claim to have exhausted even a fraction of the literature on the topic, but instead cite relevant works to establish a clear understanding of the backdrop to claims of coercion that appear in the reverse auction literature. It will also help to understand the claims themselves and inform the meanings attached to them.

Much of the discussion of liberty and coercion has surrounded the issue of responsibility for one’s actions. For example, is culpability for stealing a loaf of bread mitigated by the starvation that one’s children are experiencing? Is a person legally bound to surrender title to their property if he or she signs the bill of sale at gunpoint? The former is a free will choice, while the latter is the result of coercion. These are simple and clear examples that illustrate the issue in general terms. Other real-life examples may be less obvious and must be examined more closely. To do this, the question of “choice” is often raised. If one’s children are starving, then there is *no choice* but to steal food if there truly is no other means of feeding them. My choice in the case of surrendering property is not free; it is made under duress.

Contract case law can be helpful for understanding coercion. Court cases in which claims of coercion have been made argue that the contract in question should be voided (Wertheimer, 1987). These decisions reveal contextual relevance. For example, what would be considered coercive employment practices during the Great Depression would not

be viewed in the same way during good economic times when *choices* of employment are readily available. The relative power of litigants also has bearing on legal decisions. A case concerning the federal government versus a small company could be said to be coercive simply because of the fact that the alleged coercer, the federal government, had a significant power advantage over the small company. The company has legitimate fear that the government will exercise its vast power.

These decisions are pragmatic and subject to “what works” from a public policy standpoint rather than resting on an ethical or philosophical basis. There have been two basic approaches to the question of freedom, liberty, and coercion views frames the discussion. (Wertheimer, 1987):

One view maintains that a claim of coercion is essentially *empirical* or value-free. A second view maintains that the truth of a coercion claim is fundamentally *moralized*. An empirical theory maintains that the truth of the claim rests on ordinary facts: Will B be worse off than he now is if he fails to accept A’s proposal? Is there great psychological pressure on B? Does B have any reasonable alternative? Would virtually all rational persons accept such a proposal? By contrast, a moralized theory holds that we cannot determine whether A coerces B without answering the following sorts of questions: Does A have the *right* to make his proposal? *Should* B resist A’s proposal? Is B *entitled* to recover should he succumb to A’s proposal?”.

If there is a situation where there is literally no choice but to do X, then the matter is self-evident and coercion is clear. This is rarely the case. Even in the classic “your money or your life” scenario there is a choice – though many would say an impossible one. We must consider the *quality* of the choice options. The discussion turns on a question of degree – a question of “voluntariness”. In arguing against the rights-based or moralized definition of coercion, “a choice is voluntary if and only if it is not made because there is no acceptable alternative” (Olsaretti, 1998). This seems correct, but, what is an “acceptable alternative”? The question of whether another rational person, or even most persons, would choose the same way may limit the discussion to what is legal or enforceable. The question “will involve considerations of freedom, rights, equality, or justice at some stage” (Fabienne, 2004). “Coercion has to do with freedom not enforceability” (Wertheimer, 1987). It is not necessary that choices be made at the point of a gun. Sometimes, informal pressures are enough to coerce (Wertheimer, 1987). Threats need not be explicitly expressed (Nozick, 1969).

And yet *feeling* pressure is not enough. There must be some objective standard that will help avoid a purely subjective understanding, because subjective feelings of coercion are insufficient to analyze and substantiate claims. This is the domain of a moralized, or at least ethics-based, view of coercion. Where does the pressure originate? What is the context in which it is experienced? What *ought* to be the situation? What are the *norms* of behavior among business buyers and sellers that can provide a guideline for evaluation?

In describing the social construction of markets Samuels (2004) calls them “a structure of mutual coercion in which economic agents are exposed to decisions made by other agents”. Fabienne (2004) mentions that other economic theorists “saw coercion as an inevitable consequence of the price system’s purpose to convey the scarcity of resources and to direct them to their most beneficial use”. One can go one step further to say that all negotiation is, in fact, a process of encouragement or inducement of another to carry out a task or perform a service that one needs or wants achieved or completed. Based on the relative power or resources at one’s

disposal, there are advantages or disadvantages experienced in the negotiation process. “Party A’s power over B is determined by B’s dependence on A for valued resources [...] Thus, concessions are granted or obtained as a result of power brought to bear in bargaining” (Dwyer *et al.*, 1987). Are any and all uses of advantage and power in a business relationship valid? Clearly the answer is “no”. Antitrust lawsuits promulgated by the federal government, for example, are brought on the basis of improper use of market power.

It seems easy to see that an unjust use of advantage can be exploitative (Nishiguchi, 1994). Can it likewise be said to be coercive? “Exercise of an unjust power source would control or influence the action of B to promote A’s own goals without B’s consent [...] Exercise of a just power source [...] implies voluntary compliance and behaviors for the promotion of collective goals” (Dwyer *et al.*, 1987). To speak of “control or influence” is to speak of coercion – the negotiation has moved beyond encouragement or enticement to *control*.

Strictly speaking, in all negotiation one has a choice. In some instances the choice has clear consequences that render the alternative unacceptable. This is called this a “hard choice” – “a choice situation in which rejecting a proposal means remaining in dire straits, but accepting the proposal is also unpalatable” (Wertheimer, 1987). These choices can be termed coercive if they are brought about through injustice. Further, the simple fact of someone having chosen a particular option does not mean they would choose the same way without the unpalatable constraint.

Fabienne (2004) raises this question with examples of “significantly constrained volition” that are not instances of downright exercise of force. He questions whether the *presence* of a choice in a market transaction makes it automatically consensual and legitimate. The choice-based conception in economics distinguishes between threats and offers on the basis of whether an “exit” is available. It does not deal with the *quality* of the exit alternative – it suffices that the “exit option” is present. Fabienne (2004) says further: “the possibility of choosing between alternatives does not [...] guarantee absence of coercion”. The choice someone makes between alternatives of another’s determination says nothing about the constraints under which the choice is made: “rather than inferring consent [...] one should expect [latent] dissent” (Fabienne, 2004).

Understanding these facets aids in the development of a working definition of coercion that can be used to examine the claims made by incumbent suppliers in the context of reverse auctions. Theoretically, suppliers can choose to participate or not. While not all suppliers are faced with “hard choices”, *incumbent* suppliers do face “hard choices” because reverse auctions pose an immediate, significant, and credible threat to near-term profitability and sales volume.

Thus, we create a formal definition of coercion with regard to choices made in business-to-business purchasing transactions involving reverse auctions (Dwyer *et al.*, 1987):

Coercion is present in a reverse auction when A (buyer), having a “power advantage,” proposes to B (incumbent supplier) a choice option wherein:

- 1 either choice results in a net loss or less favorable standing for party B and,
- 2 results in a net gain, benefit, or the furthering of party A’s own internal goals and objectives and,
- 3 not choosing results in a loss to party B.

## Suppliers’ perceptions of coercion

An anonymous five-question survey of 24 incumbent suppliers who sell a wide range of goods and services was conducted to identify the sources and methods of coercion in reverse auctions (Table I). The only requirement for responding to the survey was that they must be an incumbent supplier and have participated in one or more reverse auctions. Detailed supplier demographic information was not sought because suppliers have, in past surveys, been very reluctant to provide this information. Clearly the survey responses and findings that can be drawn from it are limited due to the small sample size. However, it does provide useful preliminary insights into which party exerts coercion and at what phase during the reverse auction process.

Significant preliminary findings include:

- most incumbent suppliers view reverse auctions as coercive;
- the dominant role that buyers play in coercing suppliers;
- that most coercion appears to occur prior to the auction; and
- the overwhelming perception that reverse auctions do not promote positive supplier relationships.

With regards to question 4, the following supplier responses were given:

- “Was put in position of: ‘If you want business, you will compete under our terms for it’”.
- “We were told that if we did not participate we would no longer receive orders from them”.
- [Were told by customer] “We will move all of your work”.
- “For an existing business you are forced to accept all (newly invented) sales conditions, or you are not allowed to participate, and hence threatened to lose all of your business. During the auction, sometimes you get phone calls to say that you’re not aggressive enough”.
- [Customer said]: “Failure to participate means no business”.
- “We were coerced by being informed that this was the only way to get new work”.
- “Customer tells you if you do not participate you are out”.
- “We had to participate or lose our business [...] I will not do reverse auctions unless I am forced to”.
- “If you want to keep this business you will participate and you need to be low bid”.
- “I was told that I’ll lose the business if I don’t participate in the auction. In the end, they were begging me to bid. They finally cancelled the auction for lack of bidders. I still have the business”.
- “You need to bid if you want to remain as a supplier. A call during reverse auction reminding you that you were not low supplier and could lose business if lower bid not made”.
- “Before auction: Forced to agree to price reduction or customer would *HAVE* auction. After auction: Customer had auction anyway. After auction we had to match prices on every product of lowest bidder in addition to total value”.
- “We are told if you do not participate you will be dropped as a supplier, as an approved source and will not be invited to provide proposals in [the] future”.
- “The customer putting on the auction typically puts in a frantic call as soon as the bidding opens to make sure we

Table I Supplier survey of coercion in reverse auctions

Question	Answer	Supplier response <sup>a</sup> (percent)
1. Using the definition provided, do you feel that you were coerced into participating in online reverse auctions? Definition: To force to act or think in a certain way by use of pressure, threats, or intimidation.	Yes	83
	No (If No, go to question 5)	17
2. If yes, please indicate by whom (check all that apply)	Customer	79
	Market maker	21
	Yourself, boss, owner	4
	Other	0
3. In what part of the reverse auction process were you coerced? (Check all that apply.)	Prior to the reverse auction	83
	During the reverse auction	25
	After the reverse auction	25
4. Briefly describe the way in which you were coerced. What was said or done?	–	Supplier comments listed below
5. Do reverse auctions promote positive supplier relationships? (Check one)	Yes	8
	No	92

Note: Questions 2 and 3 do not add up to 100 percent due to multiple responses

(and everyone else) are participating [...] That customer called us three times during the auction”.

- “... we and our competitors were recently *coerced* by a major corporation to spend three full days bidding against each other in competition for a three year assignment”.

Notable aspects of these comments include the buyers’ direct involvement in the reverse auction after bidding has begun to purposely manipulate supplier’s actions and to direct outcomes, and the use of force – threat of losing current business or withholding future business – to gain compliance to the buyer’s demands for significantly lower unit prices.

Based upon these findings and previous studies, reverse auctions serve the buyer’s narrow interests by facilitating and extending (likely) pre-existing beliefs about the purpose of business – e.g. to make money (Emiliani, 2003) – and patterns of behavior that are tantamount to intentional, well-orchestrated psychological and economic coercion resulting in *price harassment*.

## Corporate codes of conduct

Corporate codes of ethics or codes of conduct typically have a section that contains guidelines for how employees should engage in business relationships with suppliers. Of course, these codes are intended to apply to people at all levels in an organization. The following excerpts from US-based large multinational corporations illustrate the language typically contained in corporate codes of conduct:

As Dell employees, we are committed to acting responsibly, honestly and with integrity in all dealings with our suppliers [...] Vendor selection and purchasing decisions must be made objectively and in Dell’s best interest, based upon evaluation of suitability, price, delivery, quality, and other pertinent factors (Dell, 2006).

GE’s relationships with suppliers are based on lawful, efficient and fair practices [...] Following GE guidelines helps ensure that our supplier relationships will not damage GE’s reputation (General Electric Corporation, 2006).

Suppliers are valued partners. We must be honest and fair in dealing with them. They are selected competitively based on quality, service, technology, and price (General Motors Corporation, 2005).

Conduct business with honesty and integrity and in a professional manner that protects GSK’s good public image and reputation. Build relationships with [...] vendors, suppliers [...] based on trust [...] with respect and dignity (GlaxoSmithKline, 2004).

HP suppliers are of great strategic importance [...] you have a duty to deal with suppliers fairly (HP Corporation, 2005).

Building quality relationships with other companies gives Motorola a competitive advantage [...] Subcontractors play a vital role in fulfilling many of our contracts [...] Purchasing decisions must be made based solely on Motorola’s best interests. Suppliers win Motorola business based on product or service suitability, price, delivery and quality (Motorola, 2004).

We will deal fairly with our suppliers and partners. We will seek long-lasting business relationships, without discrimination or deception (United Technologies Corporation, 2006).

Each of these corporations has been heavy a user of reverse auctions, according to press releases and trade industry reporting. In general, squaring the use of reverse auctions with corporate codes of conduct, and in particular, aspects such as fairness, honesty, integrity, etc., would seem difficult.

Indeed, a comprehensive legal analysis sponsored by the European Commission (2006) found that several aspects of reverse auctions, as they are commonly used, constitute unfair trade practice relative to commercial law in European Union member states. Thus, multinational corporations with codes of conduct that cite fairness in business dealings with suppliers are likely affected by these findings. Corporations, whether or not they reside in Europe or source goods or services from European suppliers, can proactively re-examine their codes of conduct with respect to their use of reverse auctions and in relation to country laws governing commerce in order to eliminate inconsistencies. Senior managers who do this should achieve closer alignment with the spirit and intent of corporate policy, and also yield outcomes that are better for the company and its employees, suppliers, investors, and especially customers.

The US federal government has also used reverse auctions extensively (Harris, 2001; Burton, 2004). Relationships between federal officials and contractors are governed by Federal Acquisition Regulation. The “standards of conduct” states:

3.101-1. Government business shall be conducted in a manner above reproach and, except as authorized by statute or regulation, with complete impartiality and with preferential treatment for none. Transactions relating to the expenditure of public funds require the highest degree of public trust and an impeccable standard of conduct (Federal Acquisition Regulation, 2006).

The General Services Administration’s “Get it Right” plan for excellence in acquisition activities states the federal procurement personnel’s main objective:

Secure the best value for federal agencies and American taxpayers through an efficient and effective acquisition process, while ensuring full and open competition, and instilling integrity and transparency in the use of GSA contracting vehicles (General Services Administration, 2006).

While the nature of this standard of conduct differs somewhat from corporate codes of conduct, they retain a common thread of ensuring fairness and integrity in procurement activities.

Finally, the Institute for Supply Management (ISM), a nationally recognized 501(c)(3) non-profit organization located in Tempe, Arizona, has as its mission “to lead supply management”. Their “Principles and standards of ethical supply management conduct” (Institute of Supply Management, 2002) state that persons engaged in sourcing activities – whether a purchasing agent, CEO, engineer, HR manager, etc. – should, among other things:

- *Item 6.* “Promote positive supplier relationships”; and
- *Item 12.* “Enhance the stature of the supply management profession”.

It is clear that reverse auctions do not support either statement because they damage supplier relationships and degrade the stature of the supply management profession by compelling buyers to remain strongly focused on unit price, versus total cost. The following comment from a supplier further illustrates this point:

Procurement Departments have been given too much power to buy services about which they have little or no understanding. Rather than admit this, they proceed to “commoditize” everything, thus reducing complicated service delivery variables to the only thing they truly understand – price.

In addition, ISM’s detailed explanation of Item 6 includes requirements for fairness. Therefore the use of reverse auctions should be explicitly discouraged by ISM and similar organizations.

## Discussion

The results of current and previous studies indicate that it is common for buyers to coerce suppliers into participating in reverse auctions and to reduce their unit prices. The question is: why do buyers coerce suppliers to do this? What is driving buyers to take actions that represent worst practices in supply chain management and also unfavorably impinge upon their own codes of conduct? The simple answer is that few suppliers would volunteer to lose sales or give up a large portion of their profit margins – they have to be forced to do it.

But the more important answer is related to senior management compensation and investor expectations. Reverse auctions have been used most widely by large

publicly owned corporations, particularly in the USA, where management’s focus tends to be on stock price – usually short-term (Eisinger, 2006). Market makers know this is one of management’s principal interests, and so that is how they sell reverse auction services to prospective customers. Every dollar saved in a 20 percent gross margin business is equivalent to increasing sales by \$5. So the bottom-line contribution of cost savings achieved through unit price reductions is enormous compared to the time and expense needed to significantly grow sales.

The savings translate directly into higher earnings per share in a simple, predictable way, which in turn leads to higher stock prices. In addition, the financial metric that is used to measure the success of purchasing activities, purchase price variance (PPV), is easily gamed (Emiliani *et al.*, 2005). This leads to financial outcomes that will in most cases *appear* to be favorable, but in fact are likely problematic with regards to internal controls and the accuracy of financial reporting – i.e. the Sarbanes-Oxley Act (2002) in the USA (Engel, 2006). This should be a significant concern among publicly owned corporations because purchased goods and services typically comprise 50-80 percent of the cost of goods sold.

Reverse auctions have been promoted as an innovation in strategic sourcing. Many have criticized its use as merely an extension of traditional power-based bargaining – a more efficient way to achieve unit price concessions from incumbent suppliers who typically have little opportunity to resist or quickly gain new customers. For them there is a history to contend with – assets have been allocated and knowledge has been acquired over the course of many years, so the choices they face carry potentially long-term negative consequences. New suppliers, on the other hand, make short-term, limited investments into efforts to acquire a new customer. While new suppliers may be manipulated against incumbent suppliers, they are not coerced in the reverse auction process – at least not in the same way that incumbent suppliers are. Thus, the relationship and tenor of the transaction is very different for incumbent suppliers compared to new suppliers.

Market makers have long presented reverse auctions as a tool that can be used in conjunction with collaboration or, as it is called today, “supplier relationship management” (Prema, 2006). This view has been proffered by market makers for over ten years, and goes as follows: buyers should use reverse auctions to determine which suppliers are more competitive (i.e. lower unit price than the incumbent). Then, once the switch is made from incumbent to new supplier, the buyer can work with the supplier to jointly develop a long-term relationship. Or, the buyer can continue to do business with the incumbent if they prove themselves to be competitive.

The obvious inconsistency, which many apparently fail to see, is that the prerequisite for developing a fruitful long-term relationship between buyer and seller is participation in destructive short-term cost cutting – and doing it in a threatening way that exposes or creates strong negative feelings, especially among incumbent suppliers (Jap, 2000; Emiliani and Stec, 2003, 2005; Paulson, 2004; Tassabehji *et al.*, 2006). Recent studies note that buyers switch to new suppliers only 20-30 percent of the time (Iasta, 2006; Tassabehji *et al.*, 2006). Therefore, reverse auctions are most commonly used by buyers to reduce incumbent suppliers’ unit prices (Emiliani and Stec, 2002a; Tassabehji *et al.*, 2006), and also avoid the costs associated with switching to new suppliers (Beall *et al.*, 2003).

Further, the approaches found to be most effective for achieving collaborative relationships in actual business settings never argues for a two-step process wherein the first step is for the buyer to exploit current or potential suppliers (Womack *et al.*, 1990; Bounds *et al.*, 1996; Nishiguchi and Beaudet, 1998; Dyer and Nobeoka, 2000; Liker and Choi, 2004). That is because the central concept is to overcome deeply ingrained zero-sum power-based bargaining routines and avoid reverting back to it when pressure to reduce costs return at a later date. While it is possible there are a few cases where this approach has achieved favorable outcomes – likely with new suppliers, not incumbents – the use of reverse auctions as part of an overall approach to improve supplier relationships is fundamentally flawed.

What both new and incumbent suppliers learn very quickly is that reverse auctions offer them little or nothing, while the benefit to buyers is substantial. Buyers learn a great deal about suppliers' capabilities, processes, and cost structure, yet suppliers have little or no visibility into the buyer's capabilities, processes, and cost structure. This one-way transparency contributes to the feeling among suppliers that buyers are exerting their power in an unfair way, which can undercut future efforts to collaborate. Worse yet, it can lead to retaliation among incumbent suppliers who retaliate for real or perceived injustices (Emiliani and Stec, 2003, 2005; Paulson, 2004; Tassabehji *et al.*, 2006). They do this by charging higher prices for new work, charging buyers for change orders, reducing investment for customers that use reverse auctions, withholding cost savings, or relegating the buyer's order to a secondary status when production capacity is constrained. This perpetuates adversarial relationships, which in turn builds-in unnecessary costs and inefficiencies in supply chains (Womack *et al.*, 1990; Nishiguchi, 1994). Mutually assured opportunism can hardly be considered a good start to a long-term collaborative relationship, and it will in fact degrade the long-term competitiveness of both buyer and seller (Emiliani, 2004).

For at least a decade, the value proposition for suppliers has been missing (Emiliani and Stec, 2003, 2005; Tassabehji *et al.*, 2006), and there has been little or no effort by market makers to correct this glaring deficiency (Iasta, 2006). Consequently, overall usage of reverse auctions has declined from 20-30 percent or more of total corporate spend in the late 1990s to less than 5 percent of the total corporate spend today (Hannon, 2003; CAPS, 2006b; Iasta, 2006), even though the number of companies using reverse auctions is increasing (Hannon, 2004; CAPS, 2006a). This has been driven in part by a substantial reduction in supplier's willingness to participate in reverse auctions. Despite these facts, there remain many die-hard supporters of reverse auctions who insist on its efficacy despite incomplete or misleading supporting data.

Reverse auctions greatly magnify the power asymmetry that already exists between buyers and sellers in ways that do not typically occur when traditional sealed bid processes are used. Suppliers and the trade associations that represent them perceive the sealed bid process as imperfect but generally fair and largely free of coercion (Associated General Contractors of America, 2003; Canadian Construction Association, 2001a, b; Construction Products Association, 2003; European Aluminium Foil Association, 2005; International Housewares Association, 2002; National Electrical Contractors Association, 2002; Original Equipment Suppliers Association, 2002) – though exceptions are not difficult to find (Kobe, 2001; Bartholomew, 2002; Rozhon, 2005; Simon, 2006). In most

cases, the traditional arms-length approach to purchasing and supply management can be improved by shrinking the power asymmetry through disciplined application of collaborative organizational routines in buying organizations (Nishiguchi, 1994; Dyer and Nobeoka, 2000; Emiliani, 2004; Liker and Choi, 2004). In addition, most suppliers can do much more to improve their business processes (Emiliani *et al.*, 2003), differentiate their products and services, and offer their customers a better value proposition (Abele *et al.*, 2002).

Acknowledging the theoretical economic view that all markets and all business transactions are on some level "mutually coercive" (Samuels, 2004) does not offer any practical remedy. To say it is "just the way business is" is unacceptable. Codes of conduct exist because of the reality that business is a human activity in which coercion is likely to exist somewhere, sometime. Every new business practice should be evaluated and critically questioned periodically with regards to coercion and its potential effects on business relationships. If it does harm, then how good can it really be?

Based on the definition of coercion developed in relation to reverse auctions, we conclude that reverse auctions, as commonly used, are coercive with regards to incumbent suppliers who are buyers' main target. Incumbent suppliers are put in the position of having to choose to do business for less money or not do business at all so that the buyer may satisfy his own goal of unit price reduction. The exit option of non-participation yields the same result of lost business and is thus not acceptable. Incumbent suppliers who choose to participate in reverse auctions also face unacceptable outcomes. Buyers should expect "latent dissent" (Fabienne, 2004) from suppliers, and all dissent has costs associated with it (Emiliani and Stec, 2003, 2005; Paulson, 2004; Tassabehji *et al.*, 2006). But, remarkably, most managers that use reverse auctions seem to prefer to ignore such real-world outcomes.

## Conclusion

The objective of this paper was to examine reverse auctions to determine whether they are coercive. A review of the literature, analysis of the meaning of coercion, and preliminary survey data indicate that reverse auctions are indeed coercive, which accounts in part for the strong negative reaction to reverse auctions among suppliers – particularly those that have had long-standing trading relationships with their customers. Powerful buying organizations that narrowly view purchasing and supply management as a dyadic relationship with sellers will favor the use of zero-sum price-based bargaining tools such as reverse auctions. While this tool delivers greater buying power, senior managers appear to give little attention to the many problems that can arise as a result of this.

This paper also set out answer three questions:

- 1 Are RAs merely an extension of traditional business practices? No, because the use of reverse auctions represents an aggressive expansion of buyer power that re-cast supplies from long-term business partners to instruments whose purpose is to help buyers achieve short-term cost reductions. Further, reverse auctions magnify power asymmetries that typically exist between buyers and sellers that are detrimental to business relationships. This compels many incumbent suppliers to quietly retaliate when the opportunity to do so presents itself.



- 2 What are the sources and methods of coercion? Feedback from a small group of suppliers provides preliminary insight into the sources and methods of coercion: buyers are seen as the main source of coercion, followed by market makers. Coercion occurs principally prior to the auction through threats of loss of future business or the establishment of preconditions for participation such as the loss of current business. Remarkably, sometimes buyers insert themselves directly into the bidding process in real-time by communicating with suppliers as they bid to further drive down prices.
- 3 Are RAs *fundamentally* coercive? Yes. Prior studies of reverse auctions, suppliers' reactions to them, and the philosophical and economic literature related to coercion all indicate this purchasing tool is *fundamentally* coercive. Indeed, psychological and economic coercion is *essential* for achieving the outcomes that buyers seek – namely, unit price reduction, especially from incumbent suppliers. Buyers force suppliers to conform using credible threats, both human and electronic, to advance a coordinated strategy of price harassment.

In addition, reverse auctions, as currently used, are inconsistent with corporate codes of ethics or codes of conduct with respect to supplier relationships (e.g. fairness, honesty, and integrity). Reverse auctions are also shown to be inconsistent with US federal procurement standards and the Institute of Supply Management's "Principles and standards of ethical supply management conduct". Based upon this and other studies, reverse auctions, as they have been commonly used, are an illegitimate method for sourcing goods and services and reducing unit prices.

Business-to-business reverse auctions have long been a controversial means to source goods and services. There are many avenues for future research that can further illuminate why reverse auctions are so controversial, including:

- survey larger numbers of suppliers to learn more about the sources, methods of coercion, and how these effect reverse auction participation, outcomes, and business relationships;
- survey buyers (e.g. purchasing agents, supply managers, executives) to determine their views of the use of reverse auctions in relation to their corporate code of conduct and coercion;
- explore the legal and contractual issues and consequences of coercion in the use of reverse auctions under US commercial law;
- examine circumstances under which a buyer's use of reverse auctions could be an abuse of market power as a monopsony, or if reverse auctions are a monopolistic abuse of market power in the specific case where buyers own the intellectual property (e.g. product designs).

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# Historical lessons in purchasing and supplier relationship management

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## Abstract

**Purpose** – The purpose of this paper is to examine the key recommendations of early practitioners of purchasing management regarding supplier relationships and how policies and practices for obtaining lower unit prices affect buyer-seller relationships.

**Design/methodology/approach** – The paper reviews the seven earliest books published on purchasing in the period 1915-1940, and contrasts with common purchasing practices currently used by large corporations.

**Findings** – The logical, practical recommendations made by purchasing managers in the early 1900s differ markedly from the imprudent practices used by the managers of most large corporations today.

**Research limitations/implications** – Research is limited by the inability to speak to deceased authors/purchasing practitioners cited to gain their venerable insights on the longevity of value-destroying dysfunctional purchasing practices.

**Practical implications** – This paper shows how the common purchasing performance metric and the zero-sum policies and practices used to obtain lower unit prices degrade buyer-seller relationships and contribute to regression in the practice of purchasing and supply chain management, as well as in business overall.

**Originality/value** – This paper will be helpful to academics who study purchasing history as well as current purchasing and supplier relationship management practices. Practitioners will benefit by becoming reacquainted with sensible practices long known to result in more favorable outcomes.

**Keywords** Purchasing, Supplier relations, Buyer-seller relationships, History

**Paper type** Research paper

## Introduction

Modern industrial purchasing and supply chain management is normally taught to students in the context of current business practices. The purchasing practices used today are assumed by academics and students to have evolved in an orderly manner from past practices. Therefore, there is little perceived need to return to primary sources of information to validate, assess, or critique current practices compared to past practices, or vice versa. Not surprisingly, it is uncommon to find academics who teach purchasing from a historical perspective or who include historical reference to past purchasing practices in their teaching, though there are some exceptions (Giunipero, 2005; Leenders and Fearon, 2008).

Practitioners of modern industrial purchasing and supply chain management also lack historical perspective in the execution of their strategic and day-to-day procurement activities. They too assume that current practices are favorably grounded in past practices, which may not be true. As a result, purchasing organizations tend to avoid questioning their own practices with respect to effectiveness, ethics, or corporate



social responsibility. When changes to purchasing practices are made, it is often by copying the new methods used by other leading companies or their competitors. These new methods, such as reverse auctions (Tully, 2000), almost invariably become widely adopted, but without any frame of reference to historical practices. The assumption is simply “newer must be better,” and that “old is bad.” Thus, new developments in industrial purchasing practices are made which ignore history and its hard-won lessons.

For over 100 years, purchasing departments have generally suffered from poor perceptions by other internal departments. The most common perceptions are that purchasing agents, today known as “buyers,” are concerned only with obtaining the lowest price. Purchasing is often perceived as a static, rules-bound organization that places barriers in front of others who are trying to get their work done. It is also commonly seen as a low-skill job where the workers spend their time doing clerical work, placing orders, and chasing parts. Hence, the derogatory characterization of buyers’ day-to-day work as: “place and chase.”

The six earliest trade books and textbooks on industrial purchasing, all of which were written by purchasing professionals, cite purchasing’s poor standing in the business community in general, and also within companies. The following excerpts are representative of the view that purchasing is neither understood by senior managers nor seen as important to overall business success. Rindsfoos (1915, p. v) characterized it as follows:

Realization of the importance of the art of purchasing, coupled with an almost total lack of literature on the subject, has been the incentive to prepare this text. Books without end have appeared for the benefit of the producer and his salesman. The current publications are not slow to record the latest methods employed in the operating and sales departments. But how about the man who buys and who pays for the goods? Is it not of importance to the purchaser to classify and study the principles which govern his work? Would it not be a benefit to one buyer to know what methods a fellow buyer pursues?

It is noteworthy that purchasing was so backward a topic that there was scarcely any literature prior to 1915 (Leenders and Fearon, 2008). The lack of literature suggests that purchasing was generally viewed as a non-specialized knowledge area that could be performed by almost any person with little or no training. This perception would continue to plague the discipline of purchasing for decades to come.

Twyford (1919, pp. 11-12) laments those who belittle purchasing and focus their attention on other parts of the business:

There is too great a tendency in some concerns to belittle the purchasing and treat it in a negligent and offhand manner, but this is a very narrow view. It is, however, held by the heads of many of the medium sized and smaller industries who have perverted ideas as to the relative importance of the various sections of their business.

They will not spare expense in any endeavor to increase the results obtainable from the sales department, or to develop the effectiveness of the production division. There they can see tangible results, whereas their vision does not penetrate far enough in the other direction to appreciate the benefits to be derived from the scientific control of purchases [...]

Many thousands of manufacturers hold views of buying which are detrimental to their interests, but fortunately opposite views are held by our national “captains of industry” and by all men who give business organization close attention. Studious reflection and

investigation by others cannot fail to bring to them a realization of the importance and relative standing of this vital function of their business.

Hysell (1923, pp. 1-2) notes the narrow, clerical role of purchasing agents that has long been in existence:

In past years it was the practice to take too narrow a view of purchasing. The purchasing agent or manager was popularly supposed to be an individual who warded off salesmen and played one seller against another in order to get a low price. Unfortunately, there was a large measure of truth in this assumption. A few years ago the purchasing executive was without vision or broad training and usually without authority. In consequence, it became a byword that purchasing executives were merely 'figure-heads' – the real purchasing authority being vested in others. Sellers, as a result, went higher up whenever possible.

This understanding of the function of purchasing held within the organization and even more than without. The purchasing executive was looked upon as an order writer and, as such, was ignored by the heads of other departments. Executive conferences almost never included him [ . . . ]

These characterizations are typical of the time and also remain common today. However, in the last 15 years purchasing has begun to emerge yet again from the back-office and is now viewed by some senior managers in large corporations as a strategic function, principally due to the enormous amount of money that it is responsible for – typically 50-90 percent of the cost of goods sold.

The purpose of this paper is to examine the business relationship, often the result of unwritten corporate policy, between buying organizations and their suppliers with respect to the unit prices paid for goods and services. How unit price affects business relationships, which is actually human relationships, is of great importance because it is a key factor in determining system-level costs. Further, the nature of the relationship between buyers and sellers with respect to price determines whether or not opportunistic behaviors develop in order to gain temporary advantage. These opportunistic behaviors can easily become routinized in both buying and selling organizations and result in long-term tension between parties whose fundamental interests are more similar than different.

For example, buyers who opportunistically seek lower unit prices risk antagonizing sellers who may retaliate in various ways and opportunistically seek higher prices. The effect is to increase system-level costs for the buyer, which is opposite the outcome it seeks. It also forces the buyer to apply additional downward price pressure on the seller, which is opposite the outcome that it seeks. In general, buyers and sellers seek non-zero-sum (win-win) outcomes, but they instead often realize zero-sum (win-lose) outcomes. Buyers who possess a power position over sellers invariably succumb to the lure of zero-sum power-based bargaining in order to reduce unit prices quickly typically in response to short-term financial problems.

### **Methodology**

The fundamental framework for understanding buyer-seller relationships as driven by unit price was established by the people who wrote the first trade books and textbooks dedicated to the practice of purchasing. Seven books were selected from the time period in which purchasing was first recognized as a separate, specialized

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knowledge-based discipline (Rindsfoos, 1915; Twyford, 1919; Dinsmore, 1922; Hysell, 1923; Gushée and Boffey, 1928; Harriman, 1928; Lewis, 1940).

The pre-World War II time period was selected for study because books written in that era would be expected to inform subsequent generations of academics and practitioners engaged in study and practice of purchasing. Journal papers from that era were not included in this study because they are topical and thus lack the comprehensive treatment of purchasing that is found only in the early books. The context provided by this broader perspective improves comprehension of important but narrower issues such as supplier relationships, role of unit prices, purchasing performance metrics, and purchasing ethics.

These seven books represent the earliest purchasing literature written by the leading purchasing practitioners and authors of their time. The authors whose work is presented here, with the exception of Lewis who was a Professor of Marketing at Harvard Business School (Crimson, 1941[1]), were all full-time practicing purchasing agents with decades of industry experience. Some authors also taught a course in purchasing at their local college or university. Thus, their focus is the practical, not theoretical aspects of purchasing, a perspective that is carried forth throughout this paper.

While the coverage of purchasing in the seven books was wide-ranging, each author provided clear guidance on how to develop and maintain good relationships with sellers. A large part of that centered on the buying organizations', or the individual buyer's, view of unit price. This forms the basis for the literature survey and analysis of past purchasing practices in comparison to current-day purchasing practices.

### **Historical perspective**

The authors of the early books on purchasing were uniformly in agreement about the importance of developing and maintaining good supplier relationships. They also advise individual purchasing agents and their employers to not be obsessively focused on unit price because it will damage relationships with current and even prospective sellers, and will also make the purchasing agent's job much more difficult. They recognize that "price beating" by buyers is perceived by suppliers as a major threat to profitability and possibly their very existence, and thus is a key determinant of buyer-seller relationships. The following excerpts highlight their concerns.

Rindsfoos (1915, p. 1) criticizes purchasing agents, and by implication, their management, who view unit price as the most important consideration in purchasing:

The most important object in making any purchase is to obtain the right article, that is to say, that article which is best suited to meet the buyer's requirements [...] yet ninety-nine purchasing agents out of ninety-nine work on the theory that price is the most important consideration.

Rindsfoos notes that purchasing materials that meet specifications is more important than unit price because materials that do not meet specifications results in costly errors, quality problems, re-work, and also results in many additional administrative transactions.

Twyford (1919, pp. 4-5) also emphasizes the importance of procuring material that meets requirements:

Too often the question of price is made the determining factor in making a purchase without due consideration being given to the other phases of the transaction. Price and quality must be considered together. One sometimes bears an inverse relation to the other [...]

The prime essential therefore is to purchase at the lowest possible price, the material which answers most fully to these requirements [engineering specifications].

Thus, purchasing agents who focus on a single metric, unit price, and give less attention to quality and other “phases of the transaction,” will not be able to do their job with excellence.

Dinsmore (1922, pp. 111, 118) suggests that suppliers should be treated fairly in order to obtain reciprocal fairness from suppliers:

If you treat them [suppliers] fairly, they will treat you fairly [...]

He [the buyer] must be scrupulously fair and impartial [...] he must establish relationships of good will [sic] and mutual confidence with manufacturers, merchants, and brokers [...]

Buyers who operate according to zero-sum rules in purchasing, that the buyer must win at sellers' expense, reduce trust and cooperation among the various trading partners. He is making the sensible, practical argument that it is smarter to have people work with you rather than against you.

Hysell (1923, pp. 10, 32, and 39) suggests that common sense, not short-term expediency, should guide decision-making to achieve successful outcomes in purchasing:

[...] the purchasing executive is dependent upon his innate common sense for the successful accomplishment of his duties.

Refuse to be a party to price beating. Avoid any method that even verges on sharp practice [...]

No longer is buying a leisurely process of obtaining goods at a low price, but a scientific system of securing quality, service, delivery and a fair price.

Hysell recommends that buyers should not engage in “price beating” and avoid any form of “sharp practice,” not for theoretical reasons but for practical reasons. Experience shows zero-sum tactics used to reduce unit prices, while they may seem effective in the short-run, will compromise the buyer's ability to reliably obtain quality products and supporting service, on time, and at a fair price.

Harriman (1928, pp. 16-17) also criticizes those who intensely focus on unit price while giving little attention to quality or other relevant factors:

Strange as it may seem, the actual prices paid for material, equipment, and supplies, frequently are of relatively minor importance. It is necessary to explain a statement so revolutionary, for, generally, price is about the only thing considered to be worthy of attention, and a difference of but a fraction of a cent per unit between two bids will shift the order or contract from one vendor to another, without proper evaluation of quality or utility with price.

Obtaining goods and services at low unit prices, but with poor quality or late delivery, does not constitute sound purchasing practice – then or now.

Gushée and Boffey (1928, pp. 48-50) comment at length on the importance of “fair dealing” and the consequences to industry and markets when zero-sum tactics and power-based bargaining are used by buyers:



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[...] fair dealing requires that strictly ethical methods be followed by the purchasing agent. To intimate to a salesman that his price is high when it is actually low, to introduce imaginary competition in order to coax an extra discount from the salesman, to misrepresent directly or by implication to bidders for the purpose of exacting concessions which would not otherwise be allowed – these are tactics which belong to the past era of buying.

It is incumbent on him [the buyer] to obtain requisite quality and adequate service at the lowest price consistent with fair dealing. The combination represents value, the aim of all efficient buying.

Fair dealing requires also that the buyer shall not take advantage of the seller when he knows that the latter has erroneously presented an estimate which will mean a loss to him on the transaction [...] the buyer should expect the seller to make an adequate profit. That desire need not be altruistic; the experienced buyer is inherently shrewd and knows he must have dependable sources of supply. He knows, too, that a concern which makes no profit will not long continue as a source of supply.

[...] [using] purchasing power to force prices below the cost of production [...] is a short-sighted policy, resulting in incalculable harm to industry and causing ill effects which greatly offset the temporary advantage to the buyer. The various branches of industry are interdependent on each other, and all industry is dependent on the ultimate customer, for prosperity. Any condition which curtails the normal profits and throttles the prosperity of any branch of industry, ultimately affects all business because it destroys a market.

A fair price, which permits the seller to make a reasonable profit on the basis of economical production and have funds available for development, is essential in modern business; not merely from the standpoint of the golden rule, but as a matter of self-interest to buyers as well as sellers.

This brief but comprehensive explanation of the importance of fair dealing is remarkable in its logic and simplicity. Yet, most large industrial purchasing organizations have great difficulty controlling themselves and easily succumb to “price beating” and other “sharp practices.”

Lewis (1940, p. 251) extends the tried-and-true dictum that sellers should behave responsibly towards their customers, and says that buyers must behave responsibly towards their suppliers:

It has long been considered an essentially sound sales policy to develop goodwill on the part of customers toward the seller [...] Goodwill between a company and its suppliers needs to be just as assiduously cultivated [...] Failure to maintain these relations is often more serious than is sometimes believed.

If it makes sense to seek good relationships with customers, then it also makes sense to seek good relationships with suppliers. After all, both customers and suppliers are part of the same value stream (Rother and Shook, 1999).

A recurring theme in these books is that purchasing agents must exercise common sense and good judgment. This means, simply, that purchasing agents must not deny or ignore reality and that they must use sound reasoning. More specifically, they must recognize and respond to cause-and-effect. If “price beating” results in bad outcomes, then purchasing agents must recognize “price beating” is a problem and stop doing it. If being unfair to sellers cause problems, then purchasing agents must strive to be fair.

Each author, in their own way, makes passionate pleas for readers – purchasing agents, purchasing managers, and corporate executives – to move away from zero-sum power-based bargaining, also known as “price beating” and other “sharp practice.” These authors put enormous efforts into their books, training and education activities, and professional practice of purchasing. But did anyone listen to their practical advice?

### **Measuring purchasing performance**

Measuring the performance of individual purchasing agents and buying organizations as a whole has long been a challenge. While differences in unit prices paid can be easily calculated, purchasing’s contribution to on-time delivery, quality, service and other factors are harder to calculate because they encompass difficult-to-measure intangible factors. Thus, it can become very complex to measure purchasing’s actual contribution to a business.

Substantial efforts have been made by various companies and academics to measure purchasing’s performance (Lewis, 1939; Ellram and Siferd, 1998). However, management’s attitude is generally that purchasing is expected to meet on-time delivery, quality, service and other requirements – as if it is a given. So the only variable left that purchasing must respond to, and which management typically deems most important to measure, is unit price. Thus, complex measures which can more accurately reflect purchasing’s contribution gave way long ago to one simple measure which does not accurately reflect purchasing’s overall performance.

The metric that has been widely used for over 100 years in durable goods industries is “purchase price variance” (PPV), also called “purchase order variance” or “material cost variance.” This simple metric measures the difference between the current unit price and an earlier unit price figure. Often the PPV metric is adjusted to take into account changes in the volume or mix of products purchased, which can be great for seasonal products or when customer demand changes rapidly.

PPV is the preferred metric because it is simple to understand and easy to calculate. Prior to computerization of purchasing transactions, the large volume of purchases made it difficult to track individual unit prices. So accountants come up with “standard costs,” which are simply estimates or averages of the unit price paid over a period of time, to calculate PPV (Gardner, 1954; Huntzinger, 2007).

The PPV metric is used by management to evaluate purchased material cost performance against budgets by measuring the difference between a “standard cost” and the actual current unit price. In today’s real-time computing environment, the standard cost may instead be the most recent price paid. Top company executives expect the purchasing organization to contribute to profitability through unit price reduction of purchased goods and services, and typically seek year-over-year unit price reductions of 3-5 percent. PPVs are calculated as follows:

- $PPV = (\text{standard cost/unit} \times \text{actual purchase volume}) - (\text{actual price/unit} \times \text{actual purchase volume})$ .

The PPV metric supports the conventional approach to managerial control, relying heavily on financial-based responsibility accounting to achieve local, department-level optimization.

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Management's preference for a simple metric belies the dysfunctionality that ensues. The PPV metric is easily gamed by individual purchasing agents and the top managers of buying organizations (Emiliani *et al.*, 2005). The results of purchasing's efforts can appear favorable from a unit price perspective, when in fact they have increased system-level costs to the business. In essence, the PPV metric forces purchasing people to optimize their activities at the expense of other departments. It is a metric that invites zero-sum behaviors and practices. The simplest example is when the purchasing department is challenged by senior management to reduce costs and dutifully finds suppliers who offer lower unit prices. Only later does production find out that the quality is inferior, which results in higher levels of scrap and re-work, thus negatively impacting manufacturing's quality and productivity metrics. The PPV metric obviously undercuts teamwork.

It is very important to recognize that purchasing agents are driven to conform to the PPV metric by senior management: the head of purchasing, the head of finance, and the president of the company. These executives own the PPV metric, and only they can change it. Most purchasing people know that PPV is a bad metric, but they have no other choice because it is what management tells them to use. In addition, most purchasing executives know that PPV is a bad metric, but finance execs and company presidents usually do not. In general, it appears that most purchasing executives are unwilling to eliminate the PPV metric, preferring instead to maintain the status quo, meet their targets, and preserve self-interest.

The PPV metric has carried forward from the late 1800s to post-modern times, having been incorporated into purchasing software in 1960s-era IBM System/360 mainframe computers which were used by most large corporations world-wide. Despite its many obvious shortcomings, the PPV metric lives on in today's enterprise software systems, such as those sold by SAP and Oracle, which reveals the extent to which the metric has been institutionalized.

In recent times, purchasing is increasingly viewed by senior managers as a financial activity (Arenth *et al.*, 2008; Truel, 2008), one which should be managed and controlled by finance executives, and where prior experience in purchasing is not relevant (Varmzais, 2006). Having long been familiar with the PPV metric, these finance managers continue to accept it as an appropriate and helpful measure. In addition, the proliferation of third party purchasing spend analytics software illustrates how purchasing has evolved into more of a corporate financial activity (Ariba, 2008; Proactis, 2008).

Rindsfoos, Twyford, Dinsmore, Hysell, Harriman, Gushée and Boffey, and Lewis would be disappointed to learn of today's continuing and amplified focus on unit price, the narrow view of purchasing, and the general disregard among top managers for the knowledge and skills of purchasing professionals. However, they might be gratified to see its standing greatly elevated in many large corporations, but this seems to have come at a significant cost to the profession.

### **Current-day perspective**

The focus on unit price reduction continues to this day and is thriving (Oliver, 2006; Arenth *et al.*, 2008) and even glamorized in the press (Bulkeley, 2003), despite what purchasing professionals have long said about the shortcomings of "price beating" and the use of unit price-based metrics such as PPV. No doubt there are some companies

that do a much better job than others in balancing price, delivery, quality, services, etc. just as Rindsfoos and the other purchasing book authors recommend.

However, in most large corporations, senior management's directive to increase shareholder value, usually short term and in large part through reduction in unit prices paid for goods and services, coupled with the continuing use of the PPV metric. This ensures that purchasing organizations will remain strongly focused on unit prices and must endure the resulting conflict with suppliers and other problems (Emiliani, 2003).

Up until the mid-1990s, most large corporations relied on various person-to-person methods to reduce the unit prices of purchased goods and services. Non-zero-sum, win-win methods include:

- request lower prices and hope that suppliers would comply;
- order larger quantities of goods or services to reduce unit prices;
- include suppliers in design stage to reduce future production costs; and
- use joint problem-solving methodologies to mitigate high costs.

Zero-sum, win-lose methods, which are clearly aligned with "price beating," "sharp practices," and coercive tactics, include:

- demand unit price reductions or risk losing future work;
- threaten to move current work if the supplier does not comply with the requested unit price reduction; and
- unilaterally debit the supplier's accounts payable to secure the desired savings.

These and other "sharp practices" are much more widespread than is generally realized (Maremont and Berner, 1999; Fishman, 2003; Stecklow *et al.*, 2003; Stephens, 2006).

"Price beating" is common in many industries, including retail (Hays, 2003; Wilke, 2004). For example, some department stores in the USA have had a long-term practice of reducing payments to its clothing suppliers for merchandise that did not sell at the prices which the retailer expected them to sell at (Rozhon, 2005a, b, c; Byron and Agins, 2005). For example, if a jacket retailed for \$200, but the retailer discounted it 25 percent to sell it, then the jacket supplier was forced by the retailer to pay the retailer up to \$50. Thus, it became the supplier's responsibility to ensure the retailer profits from the supplier's clothing line. Normally, it is the retailer's responsibility to buy what it thinks it can sell and to manage its own profitability.

The "price beating" that has gone on in the US auto industry between Ford Motor Company, General Motors Corporation, and Chrysler LLC and their respective suppliers is truly legendary and has resulted in a ongoing series of bad outcomes for both parties. Ford, General Motors, and Chrysler have dabbled from time-to-time with non-zero-sum methods to reduce unit prices for automobile components. But in the main, they have consistently used zero-sum methods, especially when times are tough. Unfortunately, times have been tough on-and-off since the early 1970s for Ford, General Motors, and Chrysler. The negative effects of long-term institutionalized corporate psychopathic "price beating" are astounding in their scope, just as Gushée and Boffey said it would be:

- unilateral contracts (Sherefkin, 2003a, b; Wernle, 2004);
- poor supplier relationships (Hannon, 2003; McCracken, 2004; Terlep, 2007; John, 2008);

- loss of supplier technology to competitors (Webster, 2003; Porretto, 2004); and
- bankrupt suppliers (Mayne, 2004; McCracken and Glader, 2007).

Detroit auto executives, while cheering for teamwork, have long viewed cooperation as a luxury that it cannot afford, and with devastating consequences for market share, profitability, growth, and stock price. The human toll due to pay cuts, layoffs, etc. are equally astounding.

Traditional methods of zero-sum “price beating” are unscrupulous and have many limitations. As suppliers consolidate and grow in size, they become much less willing to succumb to the buyers’ interests. However, a new, impersonal, machine-to-machine tool would eventually come along and create new opportunities for buyers to continue their narrow quest for unit price reductions from their suppliers – big or small.

The advent of easy-to-use software and low cost computing in the mid-1990s led to the development of new tools to help corporations negotiate lower unit prices with their suppliers. Foremost among them were online reverse auctions, also called e-reverse auctions, e-auctions, or e-sourcing (Richards, 2000; Tully, 2000; Judge, 2001).

The companies that provide reverse auction services are also known as “market makers.” The market makers assist the buyer in creating detailed request for quote (RFQ) packages that categorize products or services into logical groupings to facilitate price estimating and online bidding. These so-called “total cost” RFQ’s, which are said represent an accurate depiction of all the costs associated with doing business, are then sent to potential suppliers for evaluation and price estimating. The process culminates in real-time, dynamic, open bidding conducted over the Internet between tens of suppliers versus the traditional static three-quote closed bidding process. The dynamic bidding process typically results in significantly lower unit prices than the buyer had previously paid, usually between 10 and 30 percent. Upon conclusion of the reverse auction, the buyer must implement the results to secure the savings (Emiliani, 2000).

Extensive research by durable goods industry supply management practitioners turned academics has shown that reverse auctions do not, in most cases, deliver the intended benefits (Emiliani, 2004, 2006; Emiliani and Stec, 2001, 2002a, 2004, 2005a, b). Further, suppliers are typically coerced by buyers and market makers into participating in reverse auctions (Giampietro and Emiliani, 2007). In addition, careful analysis shows the use of reverse auctions is facilitated by faulty executive decision-making (Emiliani, 2006). It is unambiguous: reverse auctions are a technology-assisted form of zero-sum power-based bargaining. Note that the companies that use reverse auctions on their suppliers take great pains to ensure that their customers do not use reverse auctions on them (Colvin, 2008).

Reverse auctions are scorned by suppliers because they view their use as opportunistic behavior among buyers to reduce their own costs short term at suppliers’ expense. Dell Inc. has used reverse auctions for purchasing computer components and professional services, but has found, like many others, that it can have unintended consequences (Byrnes *et al.*, 2006):

[CEO Rollins said in 2003] ‘Being a hero at Dell means saving money’ [e.g. cutting the unit prices of purchased goods and services] [...]. Three respected headhunters contacted by *BusinessWeek* said they would rather recruit from Dell than for it because working with the company is so difficult and unprofitable. About two years ago, says one, Dell began an online bidding process for determining which firms would get its recruitment work. ‘They’re trying

to extend the process they use for buying memory chips and LCD screens to professional services,' says the headhunter.

The key point is that suppliers who participate in reverse auctions find the experience so galling that they begin to work against their customers. Previous research identified the common unintended consequence of supplier retaliation in 2001 (Emiliani and Stec, 2004, 2005b).

Remarkably, there is widespread support among academics who teach purchasing and supply chain management for corporation's to use reverse auctions (Jap, 2002; Beall *et al.*, 2003; Smeltzer and Carr, 2003; CAPS, 2006; Kumar and Chang, 2007; Amelinckx *et al.*, 2008). They judge it to be an acceptable purchasing practice, and typically characterize it as one tool of many that managers should make use of to control costs, but which must be used properly. However, it appears their research is not informed through their own industrial purchasing practice. If it were, then they would experience the many problems first-hand that others have identified. There is even support for reverse auctions by non-governmental organizations such as the United Nations (UN, 2008).

The use of reverse auctions and other less technological forms of "price beating," as well as the PPV metric, stand in stark contrast to the non-zero-sum collaborative problems-solving approaches used by some companies (Womack *et al.*, 1990; Nishiguchi, 1994; Bounds, 1996; Bounds *et al.*, 1996; Nishiguchi and Beaudet, 1998; Cooper and Slagmulder, 1999; Fujimoto, 1999; Dyer and Nobeoka, 2000; Liker and Choi, 2004; Dyer and Hatch, 2006) – which is the general approach that Rindsfoos and all the other book authors recommend. They would be gratified to see non-zero-sum purchasing practices and the total cost metrics used by some large corporations, and the improvement in knowledge and skills for these purchasing professionals.

### **Purchasing ethics**

Often it is the case in purchasing that large buyers procure goods and services from smaller sellers. In general, buyers who possess a power position over sellers will tend to use their power to their advantage to achieve price savings, especially when corporate financial performance suffers due to poor internal decisions or deteriorating macroeconomic conditions. They will typically resort to zero-sum power-based bargaining to reduce unit prices quickly. Such an action is widely recognized as likely to damage buyer-seller relationships, and indicates a need to establish corporate policy or a code of conduct to discourage "price beating." Professional associations often create a code of conduct for members to abide by in the hope of improving job performance and perceptions of the profession. Codes of conduct are expected to have a broad, favorable impact, though in some cases actions may be inconsistent with codes of conduct. Despite possible shortcomings with respect to enforcement, codes of conduct are typically perceived as necessary and beneficial, and are congruent with corporate social responsibility commitments (Millington, 2008).

The National Association of Purchasing Agents (NAPA), a professional association for full-time purchasing agents, was formed in 1915 (Farrell, 1954; Institute for Supply Management (ISM), 2008). Soon after its creation it became increasingly concerned with improving the stature of purchasing departments and purchasing agents. To help achieve this it established the "Principles and Standards of Purchasing Practice" in 1923 (Farrell, 1954, p. xii) (Figure 1).

# Principles and Standards of Purchasing Practice

ADVOCATED BY

National Association of  
Purchasing Agents



LOYALTY TO HIS COMPANY  
JUSTICE TO THOSE WITH WHOM HE DEALS  
FAITH IN HIS PROFESSION

*From these principles are derived the N.A.P.A. standards of purchasing practice.*

- [1] To consider, first, the interests of his company in all transactions and to carry out and believe in its established policies.
- [2] To be receptive to competent counsel from his colleagues and to be guided by such counsel without impairing the dignity and responsibility of his office.
- [3] To buy without prejudice, seeking to obtain the maximum ultimate value for each dollar of expenditure.
- [4] To strive consistently for knowledge of the materials and processes of manufacture, and to establish practical methods for the conduct of his office.
- [5] To subscribe to and work for honesty and truth in buying and selling, and to denounce all forms and manifestations of commercial bribery.
- [6] To accord a prompt and courteous reception, so far as conditions will permit, to all who call on a legitimate business mission.
- [7] To respect his obligations and to require that obligations to him and to his concern be respected, consistent with good business practice.
- [8] To avoid sharp practice.
- [9] To counsel and assist fellow purchasing agents in the performance of their duties, whenever occasion permits.
- [10] To co-operate with all organizations and individuals engaged in activities designed to enhance the development and standing of purchasing.

WE SUBSCRIBE TO THESE STANDARDS

Figure 1.

However, because of the continuing prevalence of “price beating,” purchasing’s poor standing in the business community and within companies, and other problems that can occur in industrial purchasing, the NAPA created a code of ethics for buying and selling in 1928, which for decades stood along side the “Principles and Standards of Purchasing Practice.” The code of ethics document was officially titled: “Standards for buying and selling,” and is as follows (Farrell, 1954, pp. 98-9).

*NAPA Standards for Buying and Selling (1928)*. We recognize that the concern which buys must also sell, that buying and selling are companionate functions, that sound commercial transactions must be mutually profitable, and that cooperation between buyer and seller will reduce the cost of purchasing, sales and distribution with consequent benefits to industry as a whole. In furtherance of these principles, we subscribe to the following standards in our buying and selling:

- (1) To buy and sell on the basis of value, recognizing that value represents the combination of quality, service and price which assures greatest ultimate economy to the user.
- (2) To respect our obligations and neither expressly nor impliedly to promise a performance which we cannot reasonably expect to fulfill.
- (3) To avoid misrepresentation and sharp practice in our purchases and sales, recognizing that permanent business relations can be maintained only on a structure of honesty and fair dealing.
- (4) To be courteous and considerate to those with whom we deal, to be prompt and businesslike in our appointments, and to carry on negotiations with all reasonable expedition so as to avoid trespassing on the rights of others to the time of buyers and salesmen.
- (5) To avoid statements tending to injure or discredit a legitimate competitor, and to divulge no information acquired in confidence with the intent of giving or receiving an unfair advantage in a competitive business transaction.
- (6) To strive for simplification and standardization within the bounds of utility and industrial economy, and to further the development of products and methods, which will improve industrial efficiency.
- (7) To recognize that character is the greatest asset in commerce, and to give it major consideration in the selection of customers and source of supply.
- (8) To adjust claims and settle disputes on the basis of facts and fairness, to submit the facts to arbitrations if a mutual agreement cannot be reached, to abide by the decision of the arbiters and to resort to legal measures in commercial disputes only when the preceding courses prove ineffective.
- (9) To provide or accept no gift or entertainment in the guise of sales expense, where the intent or effect is to unduly prejudice the recipient in favor of the donor as against legitimate competitors.
- (10) To give or receive no bribes, in the form of money or otherwise, in any commercial transaction, and to expose commercial bribery wherever encountered for the purpose of maintaining the highest standard of ethics in industry.

This code of ethics contains clear reference to non-zero-sum practices in the preamble and in eight out of the ten items listed. Thus, “price beating” and other zero-sum actions



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that may be used by buyers are in violation of its code of ethics. Collaborative and fair purchasing practices are the intent of the NAPA members who created this code of conduct in order to advance their profession.

In today's era where reverse auctions are widely used, it is easy to see how they are inconsistent professional purchasing association's standards for ethics. The ISM (2005), which descended from the NAPA, has the following standard for ethical supply management.

*Principles and Standards of Ethical Supply Management Conduct (2005).*

- Loyalty to your organization.
- Justice to those with whom you deal.
- Faith in your profession.

From these principles are derived the ISM standards of supply management conduct (global):

- (1) Avoid the intent and appearance of unethical or compromising practice in relationships, actions and communications.
- (2) Demonstrate loyalty to the employer by diligently following the lawful instructions of the employer, using reasonable care and granted authority.
- (3) Avoid any personal business or professional activity that would create a conflict between personal interests and the interests of the employer.
- (4) Avoid soliciting or accepting money, loans, credits or preferential discounts and the acceptance of gifts, entertainment, favors or services from present or potential suppliers that might influence, or appear to influence, supply management decisions.
- (5) Handle confidential or proprietary information with due care and proper consideration of ethical and legal ramifications and governmental regulations.
- (6) Promote positive supplier relationships through courtesy and impartiality.
- (7) Avoid improper reciprocal agreements.
- (8) Know and obey the letter and spirit of laws applicable to supply management.
- (9) Encourage support for socially diverse practices.
- (10) Conduct supply management activities in accordance with national and international laws, customs and practices, your organization's policies and these ethical principles and standards of conduct.
- (11) Develop and maintain professional competence.
- (12) Enhance the stature of the supply management profession.

Note that reverse auctions are inconsistent with Principles (1), (6), (11), and (12).

In addition to the code of ethics for members of the NAPA, their employers may have also had codes of ethics to guide individual and corporate behaviors beyond that called for by professional associations. Corporate codes of conduct, which are common in large corporations today, typically use words such as these to characterize ethical business practices: fairness, trust, communication, respect, responsibility, integrity, stakeholders, good faith, relationships, communities, dignity, and so on. The words used in corporate codes of ethics also indicate that "price beating" and other zero-sum, power-based

actions are also inconsistent with codes of ethics. Previous studies have shown the specific ways in which reverse auctions are coercive and therefore inconsistent with corporate codes of ethics (Emiliani and Stec, 2002b; Giampietro and Emiliani, 2007) and how voluntary codes of conduct for buyers, sellers, and market makers engaged in reverse auctions are largely ineffective (Emiliani, 2005).

The larger problem is the dominant view possessed by senior managers over the last 100 years is that business can and should be practiced in a zero-sum fashion. Unfortunately, they fail to see that zero-sum purchasing practices create sellers who begin to work against buyers, or at least who will not work as hard for their customers, and is detrimental to buyers' and sellers' interests and the markets they serve. "Price beating" and other "sharp practices" remain as big an issue today (Guth, 2009) as it was in the early 1900s, due, for example, to the widespread use of reverse auctions in nearly all segments of industry, at one time or another, since the mid-1990s (Hannon, 2006; CAPS, 2007).

Ultimately, it is impossible to be ethical when buyers use zero-sum, power-based purchasing practices and when management condones or promotes their use – past or present, person-to-person, or machine-to-machine. Doing so clearly impinges upon corporate and professional codes of conduct, as well as commitments to corporate social responsibility.

### Summary

This paper examined one key determinant of buyer-seller relationships from a historical perspective. Namely, how buyers comprehend the relative importance unit prices in purchase decisions, the actions they take to secure desired unit prices from sellers, and purchasing ethics, from the early 1900s to the late 1900s and early 2000s.

It is noteworthy that the authors of these early purchasing texts were uniformly in agreement that unit price is but one of many factors to consider when procuring goods and services, and that buyers should not engage in "price beating" and other "sharp practices." It is also notable how "price beating" and other "sharp practices" thrived both before and after these books were written. It seems that sound advice given by people with great practical experience and credibility are typically dismissed; their work having failed, in large part, to inform present practice. The executives who manage purchasing organizations, as well as their superiors, continue to condone or promote practices that are well-known to cause many different types of problems, principally, to achieve short-term financial objectives.

While progress is being made in some companies, it is difficult to sustain improvements as executives come and go and as businesses are bought and sold (John, 2008). The zero-sum mindset remains deeply ingrained in senior managers after decades of work experience. Most executives can see no other way to win than by using zero-sum tactics, and this filters down to employees at all levels, including purchasing agents. Thus, over time, purchasing practices and supplier relationships as driven by unit price have, overall, remained about the same. The effect has been to impede progress in purchasing and supply chain management, as well as in business.

Many executives operate under the theory that zero-sum power-based bargaining has no costs and no negative consequences. This is incorrect; there are indeed costs and consequences. Despite this, it appears that zero-sum power-based bargaining is simply more attractive to each successive generation of senior manager than the golden

rule, probably because it is easier to do. It is clear that Rindsfoos and the other authors have tested this theory and know from first-hand experience that it is fatally flawed.

The lessons to be learned from the historical record in contrast to current practices are manifold. Purchasing has long been a discipline that has been held in low regard by senior managers and the business community. So it is not surprising that its history has been largely ignored by academics and practitioners. People who work in the field of purchasing, in any capacity, view their experiences as unique and ignore the historical record. They do not think about the history of purchasing and instead rely on others to think for them. If a market maker says reverse auctions work, and any problems that are encountered are manageable, then reverse auctions are rapidly put into use by buyers. Only much later do buyers find out that this new form of zero-sum power-based bargaining also has high costs and many negative consequences. Unfortunately, this will likely be forgotten as managers and buyers come and go.

Despite the overwhelming evidence that non-zero-sum collaborative problem solving is more effective, it appears most senior managers will not accept it because it requires them to learn new things and they think that it will take a long time to see results. In addition, they are not likely to stop using the PPV metric and replace it with other, more meaningful purchasing metrics.

While there may be no short-term solution to these problems, there are things that can be done to affect change for future generations of managers. Professional associations such as the ISM can reach out to managers and buyers and educate them on the history of purchasing. Academics can include purchasing history in their courses and increase their research activity in this field.

Future research could investigate why non-zero-sum purchasing policies and practices which are well-known to yield improved business results are not taught more aggressively by academics, and not put into wider use by management practitioners. Another avenue for study is the relationship between corporate social responsibility, codes of conduct, and the use of zero-sum purchasing practices and the PPV metric.

Senior managers in large corporations can, themselves, take a greater interest in the history of purchasing, a core business activity whose labors result in the increased cash flows and stock price that they care so much about. History matters because doing what is known to work and avoiding what does not work will only lead to improved corporate financial and non-financial performance and improved end-use customer satisfaction. Knowing purchasing management history is good for business.

### **Application questions**

- What mistakes could senior managers avoid by knowing about purchasing history?
- How would you introduce purchasing history to executives in change of purchasing or other departments?
- How would convince them that the 100-year old policies and practices specified by Rindsfoos and the other authors with respect to supplier relations remain relevant today?
- In what other ways would a company president or Chief Executive Officer benefit from knowing about purchasing history?

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**Note**

1. Prof. Howard T. Lewis may have obtained practical government purchasing experience during World War II. According to *The Harvard Crimson*: "Several members of the Business School have left to serve the interests of National Defense . . . Charles I. Gragg '21, associate professor of Business Administration, has a full-time job as advisor to Donald Nelson, Coordinator of Purchasing in the Treasury Department, with Howard T. Lewis as an assistant."

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