



ACCESS GROUP  
**ROUNDTABLE**



# **Manufacturing Roundtable White Paper: Innovating the Supply Chain**

## **A Report on the Leaders Knowledge-Exchange Roundtable**

**Wednesday, February 15, 2006**

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Roundtable facilitated by Rick Wolfe

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Two Roundtables were held previously – on “**The Excellence Gap in Productivity & Innovation**” in October 2005 in London, Ontario and “**Managing Manufacturing Growth**” in Montreal in November 2005. The third Access Roundtable took place in Toronto on February 15, 2006 on the topic of “**Innovating the Supply Chain**”. An eight-person Panel and over 100 manufacturing organizations discussed how to *innovate logistics and global supply chain management*. This White Paper reports on Innovating the Supply Chain and examines the issues and solutions put forward.

# Manufacturing Roundtable White Paper: Innovating the Supply Chain

## Key Findings

1. Low cost foreign competition is not just about labor but innovating all the components of the supply chain
2. Canadian innovation competencies are real and a competitive strength, so we must be careful not to lose sight of what we do well
3. Temporary stabilization of the competitive environment may provide some immediate breathing space, but a sense of urgency is still needed
4. Supply chain innovation comes in many varieties – new materials and processes, continuous improvements, design, branding, customer relationships, etc.
5. Be sure that cost comparisons with competitors take into account the total cost of operation and not just labor rates
6. Supply chain innovation needs to be augmented with partnering and developing trust – upstream (procurement) and downstream (customers)
7. Management has much work to do, for example in clarifying strategy, fostering teamwork and an innovation culture, rapid response, etc.

## 1. The squeeze on the Supply Chain

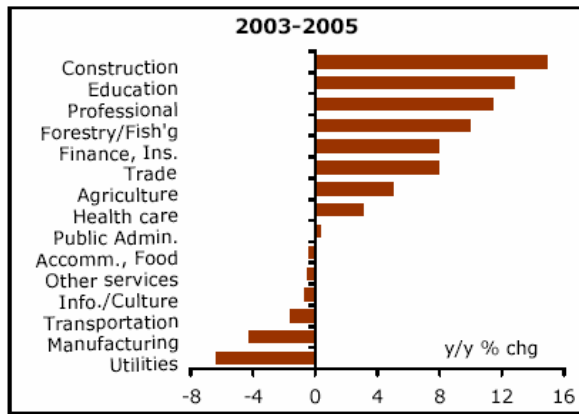
Manufacturing is a major force in Canada despite two decades of low cost overseas competition. According to Canadian Manufacturers and Exporters, manufacturing is 21% of direct economic activity and 55% when including goods and services purchased in Canada. 70% of goods manufactured in Canada are exported, up from 25% in 1980. Manufactured products are 90% of Canada's merchandise exports. Productivity growth of 2% is comparable with other leading Canadian sectors – but modest by global marketplace standards, especially against the Far East where wage rates can be one twentieth those in Canada. Given Canada's competitive handicap on labor costs, Canada must depend on innovation to compete in the global economy.

The climate for Canadian manufacturing has deteriorated recently. Already fiercely competitive, the market has experienced a renewed cost cutting assault from overseas, intensified by a rising dollar.

Frequent news reports of large scale layoffs paint a picture of a Canadian manufacturing industry struggling for survival. "Michelin plant latest Ontario casualty" runs a typical headline (Globe & Mail, Report on Business, February 2, 2006). The article tells an all-too familiar story. "Until now, analysts have been optimistic that manufacturers would be able to muddle through by trimming costs, cutting prices, and boosting productivity. But with the dollar trading at 14-year highs against the U.S. currency, there is a sense that a second round of adjustment has begun and that this round will be much rougher than the first." Canadian Manufacturers & Exporters, the article says, is predicting another 100,000 manufacturing jobs will be lost this year, mainly in Ontario.

"Manufacturing loses most jobs in 15 years," ran a Report on Business story a week later (February 10) on a reported 42,000 Canadian jobs lost in January. Some doubt has been cast on the accuracy of these statistics, but the manufacturing job loss is real.

## Growth in Full-Time Jobs



As the table on the left shows, manufacturing is near the bottom of Canadian job growth rankings, with an average annual 4% decline since 2002 (CIBC Employment Quality Report, January 30, 2006).

It is fair to point out that lost manufacturing jobs are being more than replaced by much higher paid managers, engineers and other skilled professionals. Overall Canadian employment is growing, while job quality has declined more slowly than the US.

However, this is only of limited comfort since CIBC's Canadian quality index is currently 4% below its long-term average. The Canadian labor market, despite its recent surge, cannot close the quality gap.

Introducing "Innovating the Supply Chain" at the third Roundtable, Taimour Zaman, President of Access Group and Roundtable producer, gave an example of Canadian manufacturing competitive reality. A leading Canadian steel company prices its steel at the world price but finds its Chinese competitors are quoting less than 75% of that. Apparently China is undercutting Canadian companies on the materials that typically comprise 70% of a product's cost, not just on the labor 30%. We need radical not just incremental change.

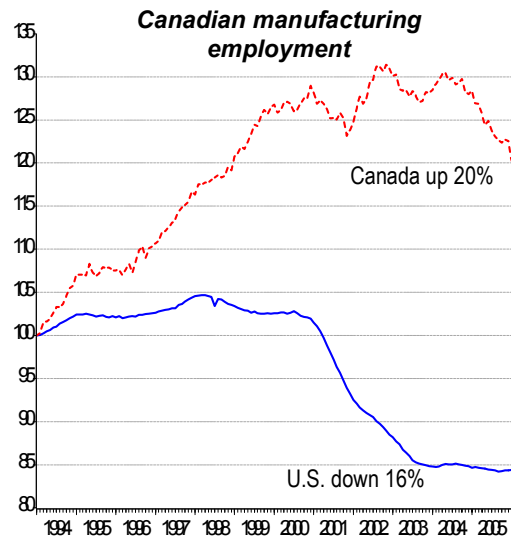
Costs and the high dollar are not the only issues. Rick Wolfe, of Poststone and the Roundtable facilitator, says that Canada is getting a reputation for poor leverage of innovation and design responsiveness.

China's freedom from union problems is also a critical competitive factor for some Canadian companies. Government support or lack of it was also mentioned in the

context of tax rates estimated to put Canada at a 35-40% cost disadvantage against some Far East competitors.

The positive manufacturing stories reported today are mostly about foreign countries. A story in InformationWeek on February 13, 2006 describes how “IT plays a major role in India's economy. Technology and business-process outsourcing is expected to bring in \$22 billion for the fiscal year ending next month ..... Technology developed and sold inside India is roughly a \$4 billion market that's expected to grow even faster than its current 20% to 25% rate, reaching \$20 billion by 2010. Driving domestic growth (are) ..... near-zero tariffs for imported IT hardware, increasing demand from the middle and upper classes, and falling production costs.”

Canadian manufacturing restructuring still has a long way to go. According to National Bank Financial, their manufacturing employment index, on the right, indicates that while the US has been rationalizing manufacturing employment Canada has been growing it, but expects an adjustment in Canada.



Ontario's automobile and parts sector appears the most exposed especially with the Canadian dollar potentially reaching parity in the next four years. However, all sectors are vulnerable, meaning that all manufacturers should be implementing supply chain innovation now.

The rest of this document takes a high level look first at innovation itself and then on how to put it into practice in the supply chain.

## 2. Glimmers of Hope

Taimour Zaman's wish is that the press will soon be reporting our success stories rather than problem stories. Gary Closson agrees. Dean of the School of Applied Computing and Engineering Sciences at Sheridan College and both Roundtable Panelist and Sponsor, he warns that "manufacturing bad-news stories discourage students from advanced manufacturing education and thus deplete our stock of skilled technicians and engineers. Newspaper articles tend to miss the increases in productivity taking place, and there is a danger that this will scare off innovative people from manufacturing jobs and training.

**The articles in the newspapers tend to miss the increases in productivity taking place**

Chris Piper, Associate Professor and Faculty Director of the Ivey Operations Program at Richard Ivey School of Business and Panelist and Sponsor also would like to see more news emphasis on Canada's innovation strengths.

The implication is not to suppress negative stories but that our manufacturing organizations need more successes to report. Indeed, there are already some positive stories to tell, and tentative signs that competitive conditions may be stabilizing.

Indian cost advantages may actually have peaked. "The tech sector is consuming college graduates, but many of them don't have adequate business skills in an economy where customers are paying for programmers' time" says InformationWeek. "Wages for employees with a few years of experience, while still maybe a quarter of those in the developed world, are heating up, reducing the cost advantages that make Indian offshore development so attractive in the first place...The balancing act everyone's trying to pull off is finding talent without overheating wages, which are rising at 10% to 15% a year in the IT sector...Western-style poaching of top talent is becoming a problem as startups and U.S. consulting companies raid the larders of the big vendors."

Other trends should help Canada as well. Canadian business investment in machinery and equipment, an indicator of future productivity, has picked up recently. Energy price

increases have raised transportation costs, which should bring a "proximity to the U.S. market" benefit to Canada, although so far Mexico looks set to be the greater beneficiary.

Steve Carrington, a Roundtable Panelist and Sponsor, and Application Management Services Leader for Siemens Business Services, sees another "glimmer of hope". Despite the cost driven structural shift to Malaysia and China since 2004 that has squeezed margins without closing the labor cost gap, the total cost gap may be less than first appears. For example, labor costs of \$89/hour in Toronto and \$65 in Montreal compare with only \$23 in India. However, this comparison needs to take into account other costs in India such as connectivity, staff turnover in excess of 5%, the premium to run a 3<sup>rd</sup> shift, and effect of time zones. These all add up to a real differential of perhaps only 15%, meaning it is feasible to send work to Montreal and bridge the rest of the value/cost equation with additional Canadian quality.

As Taimour Zaman asked, how can we capitalize on our evident strengths in supply chain management? How can we make better use of good people, efficiencies, sound IT infrastructure?

### 3. Built-in Innovation

The late Dr. Peter Drucker, author and management pioneer, once defined innovation as "change that creates a new dimension of performance."

**The first Roundtable overwhelmingly identified an innovation culture as essential**

The participants at the first Roundtable on Innovation and Productivity overwhelmingly identified an innovation culture as essential, although they were not altogether clear on what it is. Interestingly, the participants at the "Innovating the Value Chain" Roundtable barely mentioned innovation culture directly at all.

Why is this? It is unlikely that they believe the issue has been resolved. Whatever the reason, innovation will occur only with the cultural dimension to innovation – such as

shared knowledge and learning, flexible response, design agility, and leadership by example, etc. – a topic this writer feels strongly about as a practitioner of culture change and performance management.

How can we mobilize the organization to an innovation culture? In the author's view, by achieving progressively higher levels of innovation, an "advanced" organization is typically integrating organizational silos, so that individual departments can work with each other for productivity improvements and greater flexibility of response. More operating decisions are being pushed down to the front line. Higher profit contributing customer groups are being identified and given special treatment. Selected operating metrics are being measured, but the ability to use the data to fine tune business decisions may lag the ability to generate the data. To take the organization to "breakthrough" level, performance extends strategy alignment to goal alignment. "The desired payoff is competitive advantage that is self-sustaining as the environment changes. Enhanced leadership capabilities; development of front line supervisory skills to improve employee engagement and retention; cooperative and creative business practices; organization-wide self-actualization – these all lead to a shared knowledge and learning organization.

It has been pointed out that product quality has improved to such an extent that it is now a commodity -- something that every company must deliver to stay in business but no longer provides a competitive advantage.

Innovation needs to be pervasive throughout the organization. This may be easier for smaller companies than large. Research by Roundtable Panelist and Sponsor William Surphlis, Managing Partner of Grant Thornton's productivity improvement practice, indicates that many large businesses are reducing jobs but small and mid sized firms are hiring. He attributes this to niche strategies and quicker reactions compared to large organization innovation inertia. As discussed in the next section, some large companies like Xerox, UPS and Siemens *are* successfully innovating supply chain innovation.

Many smaller manufacturers have not yet embraced innovation. Panelist Bill Cole, CFO of Swish Maintenance, cited a \$9,000 lathe machine that he sourced from China recently at 65% of the Canadian alternative's cost but better than the machine being replaced. He admits concern about a breakdown that might raise issues of repairs spares and support to keep the machine running, but has not encountered any problems so far.

An example was also given of a Chinese company redesigning a light bulb for a patient care facility in only one week, something that the Canadian supplier was unprepared to do.

Innovation brings its own rewards. Several recent research studies have found that leveraging global networks – internally and with suppliers and customers — is a hallmark of successful innovators and significantly more profitable. However, most studies find that only a relatively small number of organizations are actually leveraging their global networks in a sophisticated way and recording the profitably lift

The direction for Canadian manufacturers is pretty clear. Innovation is a prerequisite for staying in business. The next section offers some high level direction in this regard.

## **4. Supply Chain Improvement**

It is not enough to say that the answer is relentless cost reduction, quality improvement, vision, and leadership. All are crucial – and all were suggested in the Roundtable – but these concepts are obviously by themselves too high level to be useful.

How can we be more specific about what needs to be done? Drawing on the Roundtable discussion, the following points are presented as high-level guidance on supply chain improvement.

## 1. Use innovation to support your brand

Some large companies like Siemens *are* building the brand around innovation. Steve Carrington drew attention to the Siemens logo which contains the words “Global network of innovation”. This helps account for 75% of Siemens’ products on the market today having been built in the last five years.

### **The goal is to avoid becoming a commodity.**

Innovation in Canada that competes on a global scale is eminently feasible. The Xerox Research Centre of Canada typifies a Canadian operation that does just that. Panelist Dr. Paul Smith manages new materials design and synthesis at the 170-person World Laboratory. Xerox is organized right from the top of the organization to differentiate the company with unique products and product features. The goal is to avoid becoming a commodity. He described development of a cost effective and ecological toner that is replacing the old product across the entire Xerox line. He sold the concept to the Board and is now sending the market a strong message about what Xerox is better at. His point is that innovation does establish leadership in the market, build a knowledge base, and get you past the cost issue.

UPS also looks to its operations as source of competitive advantage. Panelist Brad Mitchell, Managing Director of Supply Chain Solutions, says that UPS senior executives view UPS supply chain operations as having reached Level 4, i.e. quantitatively managed. He contrasted this approach with Boards that are dominated by financial considerations and consequently are unable to bring about innovation strategies.

## 2. Think global – or not

The critical point from UPS’ perspective is to make a well-considered and fundamental decision on whether to go global or not. No Canadian manufacturer is insulated from global competitors. Without ever leaving Canada, you can be in a head-to-head battle with foreign companies as your customers leave no stone unturned to stay competitive – buying from foreign suppliers, outsourcing overseas, or moving operations offshore.

Should you consider setting up your own multi-national manufacturing operation for economies of scale and low cost labor? The Panel believes this is probably a necessity for a commodity product or service that competes on cost. Operations overseas might also be needed to place yourself close to an overseas customer.

However, much will depend on individual circumstances and relative business cases. If you do elect to remain a purely Canadian operation, you will need to hold on to your niche with an agile management style, a unique differentiation, and very close customer relationships.

### **3. Do frequent health-checks on your supply chain strategy**

Your supply chain strategy ought to fall out of your business strategy. It would seem obvious that a manufacturer should have a coherent competitive strategy based on a critical examination of your own supply chain relative to those of competitors. You need to understand what is going to make you successful and how to remain successful in the face of changing markets. How can you expect to succeed unless you are extremely clear on this? How will you deal with the inevitable surprises?

**How can you expect to succeed unless you are extremely clear on exactly what will make you successful?**

This might sound fundamental, but judging by some of the participants' comments, this is perhaps still a work in process in many organizations.

Deconstructing the value chain was a topic notably missing from the Roundtable discussion, but being considered or implemented in an increasing number of companies. Value chain deconstruction considers each value chain component's costs and value – what you bring to the table relative to the cost. The evaluation should include such factors as your fit with customer needs and experience, speed to market, core competencies, suitability of distribution channels, competitors' differentiators, inventory

carrying costs, continuous improvement track record, innovation capabilities, expected competitor strategies, etc. It can result in the business model being broken apart and reassembled in quite a different configuration. For example, Swish is rigorous in reviewing its competitive strengths and stretch goals regularly.

One of Swish's supply chain strategy concerns is keeping innovation intellectual property and other knowledge from suppliers who may be potential competitors. As a matter of policy, Swish does not export any research and development. Bill Cole's advice is, by all means get someone to manufacture for you to keep costs down, but be sure to be the best at what you do to preserve your market positioning.

**Keep innovation intellectual property and other knowledge from suppliers who may be potential competitors**

All manufacturers need this discipline, according to Doug Mack, Advantage Manufacturing Technologies and a Roundtable sponsor. The goal of frequently reevaluating which products are competitive throughout the supply chain is to identify how to become efficient at every stage of the value chain, and to foster continuous improvement.

#### **4. Supply chain innovation must include the customer**

For Grant Thornton, the supply chain goes "from the customer back to the customer", meaning that it starts with customer requirements and runs past delivery before feeding back into updated customer requirements. Others may define the value chain more narrowly, but only at the risk of not thinking enough about customer needs, William Surphils stated.

Xerox takes a similar view in materials research, that the supply chain starts with client concepts and design. Paul Smith then drives innovation from test tube through to scaled engineering, de-risking, and transfer to manufacturing operations.

One of the most critical customer aspects of a supply chain is being able to leverage call center interactions into value. This is a major reason that outsourced operations are starting to come back, according to Siemens Business Services' Steve Carrington. For example a Montreal company has recently brought its operations back in house in order to deliver better quality to their customers.

**Examine your supply chain through your customer's eyes**

It is essential to examine your supply chain through your customer's eyes and understand what makes your organization different and whether quality for customers is still being put first. Swish continually looks at profitability by customer type, which tends to vary dramatically despite Swish using the same tools in each of their various markets. While Bill Cole regularly reviews which customers may not be profitable, the real long term strategic answer is to change the supply chain to suit the customers – rather than to change the customers.

For Swish, the relationship opportunities come from altering packaging, e.g. warning labels, and assisting their customers to become more competitive. Swish's challenges are to measure the key cost drivers in the supply chain accurately enough to make decisions. This helps determine which customers to target.

## **5. Form partnerships, share technology, create trust**

Partnering generated significant discussion, and rightly so. Partnership forward in the supply chain promises a much more enduring relationship with customers than merely being a supplier. By the same token, a collaborative relationship backwards in the supply chain creates a competitive offering with deeper value contribution and hopefully more enduring results.

Siemens' supply chain strategy is based on developing a global network – with a knowledge base but without stove pipes. Siemens has set up the network by sector around world, especially as an early-stage bridge until the technology can be put fully in

place. Steve Carrington warned that a partnership driven by cost without value reinforcement will get bogged down very quickly.

Siemens identifies preferred suppliers and brings them into the inner circle. Supplier adoption needs a lot of work, he says, and all too often receives too little attention. Reaching out in the market, for example collaborating with India and China, plays to Canada's particular place in the world, different from the US and Europe. Steve Carrington says our good reputation and proximity to the US means overseas companies can perfect their North American innovation in Canada prior to launching in the US.

UPS nurtures innovation by fostering supplier trust - sharing profits if costs are reduced, helping when operations get in trouble. Brad Mitchell calls this "looking at ourselves in the mirror", in other words taking the extra step to share information outside, picking partners who will benefit a gain-share arrangement, and recognizing how other organizations are doing it successfully.

The ethics of partner relationships deserves constant attention. Kevin Flynn, Superior Machine Tool, put forward as an example a sub-contract to a mold company that appears to be building up their own expertise in house to cut the sub-contractor out of the next contract with the end customer. Anticipating that, the sub-contractor is talking directly to the end customer to prevent it.

The Roundtable heard of an ethical dilemma involving pressuring internal groups to improve lean manufacturing practices because a design company in India can provide similar service at a 30% savings, but holding exploratory discussions with the Indian company at the same time. Chris Piper spoke for most people in advising an open approach, working with internal staff to deploy them where they can best bring economic advantage for the long term. Gary Closson warned about being too hasty with partner cost comparisons that may not consider the whole supply chain and hidden overseas design costs. Steve Carrington suggested a dual approach, both

**Consider the  
whole  
supply chain  
and hidden  
overseas  
design  
costs.**

innovating internally and partnering, with two deals to provide data that can be evaluated on which produces the better experience.

A contract manufacturer, Bob Starr, described a casting business that is about to move work to India. He recommended that we should partner or perish, but only keeping in-house on what we are really good at. We ought to let the rest go.

How best to work with customers who only want to hear about cost reduction and only see the relationship as a supplier one, an unfortunately blinkered attitude that does not augur well for long term market growth? Grant Thornton advise an educational approach will slowly remove the blinkers, based on their experience of conducting a review of how long it took to get automobile parts to different plants, but being unable to get the auto companies interested in it. The result was unplanned inventory building.

## 6. Make sure the leadership is out in front

As already noted, innovation culture change was not much discussed at the “Innovation in Supply Chain” session. To what extent is supply chain innovation in the mindset of management today?

The participants took a rather jaded view of management attitudes. It was noted that some presidents have never been in their plants and seem not to care unduly. Apparently, Canadian management generally is seen by the participants as being little prepared to accept risks, using safety concerns and cost barriers as an excuse. It was

### **Just move up the value chain and innovate!**

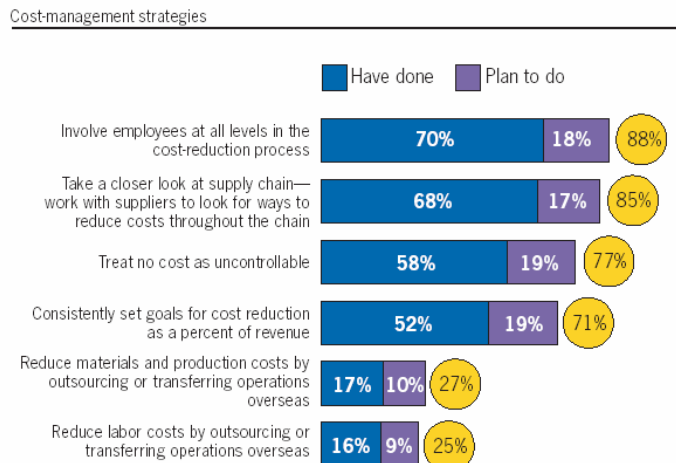
left to one of the panelist to call on Canadian manufacturers to stop “all the defensive stuff” – just move up the value chain and innovate!

For Grant Thornton, the key is less management and more the front line because 90% of the product costs go by them. William Surphils believes in empowerment of first line supervisors to get them engaged, but he recognizes innovation may be somewhat above them as mechanics rather than

electronics engineers. Because change can be threatening, they need to obtain some benefit from supply chain improvement.

The overall conclusion was that we should not be afraid of telling people the truth. People need to be engaged – to collaborate in creating more jobs and contributing to the greater good.

Certainly, business leaders talk more about linking supply chain cost reductions to employee involvement. Grant Thornton’s Survey of Business Leaders (February 2006) in the chart at the right, shows that business leaders say they are getting their employees involved at all levels of the cost-reduction process (70% have done), and pinpointing opportunities to reduce costs throughout the supply chain (68%). To what extent do the employees feel such statements go beyond good intentions and are actually creating a more collaborative environment? To what extent is it producing higher productivity and customer satisfaction? While a few organizations are making progress in this regard, the evidence seems to be that the majority have yet to see sustained performance lift. To say or even do the “right” things is no guarantee of results.



**7. Capitalize on the capabilities you already have**

Gary Closson pointed out that we have excellent design skills in Canada. Given that design needs to be integrated closely with manufacturing, keeping design in Canada makes eminent sense.

Canada has a history of innovation “firsts”, for example, the first nano-technology product. Canada’s considerable innovation talents need to be exploited more. Barry Gander, Executive Vice President of CATA, expects to see more Canadian organizations capitalizing on our home-grown competencies.

**Canada has  
considerable  
innovation  
talents**

Sheridan Colleges emphasizes the formative effects of learning supply chain innovation in school. Gary Closson has seen at first hand how regimented the education system can be in the Far East. He believes it is still quite difficult for graduates in China and Korea, for example, to do things differently from how they were originally taught. Canada has the advantage of education that is more open to innovation, something that is often missed by the articles in papers and magazines. Jill Birch, Vice President Business Development at Sheridan, added that Canada benefits when our strong educational system helps gifted professionals around the world get their credentials and harness their international reputations.

Government support for innovation should be utilized whenever feasible. Paul Smith noted that awareness is often lacking, as evidenced by 48% of manufacturers not using SRD grants. Government support for electronics printed on plastic, removing the need for expensive plant in Asia, and government funding of nano-product are two examples of how government makes a difference.

Marsan Foods, a food processor, advocates opening up the borders to competition in both exports and imports through a collaborative process. Having already made its supply chain very competitive, it is still constrained from export growth by a closed border mentality.

Simple things can often make a big difference in the supply chain. Bill Cole has installed GPS in Swish delivery vehicles. There has been a rapid improvement in productivity that has enabled Swish to shrink the fleet while still providing “fabulous service improvement”. Swish is now considering how to apply GPS to its unionized sales force for telephone and email communication.

**Provide a constant flow of supply chain improvements.**

To summarize, supply chain innovation is urgent. A three to four year view of innovation is strongly recommended. Paul Smith observed how future profits tend to erode at the Xerox Laboratory without a constant flow of supply chain improvements. The choice is new innovations in the pipeline today, or being consumed by constant firefighting tomorrow.

## 5. Conclusions

A Roundtable is only as good as its participants. We wish to thank the Panel, the Sponsors, and all the other people who attended, for their insightful contributions. We will give the last words to the Sponsors who summarized their conclusions as follows:

**Bell** – as a supply chain manager, supplement your knowledge of the overall business strategy by putting a team together (Mark Eccleshall)

**Siemens Business Services** – the Roundtable has reinforced that Canadians can compete on a global scale if we are motivated and think both globally and locally; remember that the devil is in the details, put supporting systems behind the scenes, and do the hard work to facilitate supply chain innovation (Walter Loews)

**Grant Thornton** – the customer is the crucial link in the supply chain; watch your agreements carefully to pick a good partner (William Surphlis)

**MTCG** – a holistic approach works best for effective supply chain innovation; there is an increasing rush to get human capital so we must plant seeds for harvesting as leaders five years out (Morris Tambor)

**Verge and Associates** – be honest with yourself about strengths and weaknesses, and admit to any supply chain problems; define your core competency as well as different



## Manufacturing White Paper

future scenarios, e.g. will we need a design team in Canada if our customer is moving their operations to China? (Mike Verge)

**Ivey Executive Development** – avoid silos when management is looking at the supply chain numbers, realize the impact of all areas; be collaborative and determine what skills are needed (Andrew Wright)

**Hydrogen Creative** – the supply chain is an opportunity to increase sales by understanding customer needs and creating trusted relationships; recognize that looking just at margin is transactional not relationship driven (Zale Tabakman)

**Sheridan** – reach out to customers and partners; look at your supply chain strategically before tactically; identify the value of moving the customer up the supply chain (Gary Closson)

**Advanced Management Technologies** – some manufacturers are not scared enough yet; do not assume you can improve productivity by yourself, rather recognize that self help is not working (Doug Mack)

As Taimour Zaman of the Access Group said, we need to focus on work that requires a higher level of education and decrease the amount of labor in the shop floor. We need to change the cultures of the enterprise to adopt the lean process. We need to work on aligning business units to speak the same language in order to achieve common goals.

A discussion of only three hours has limitations in degree of detail. Nonetheless, as outlined in this White Paper, in that time the participants talked about real steps producing real results.

Robert Angel

February 15, 2006

## Appendix: Introducing the Roundtable

### Roundtable Panel

Steve Carrington, Application Management Services Leader, Siemens Business Services

Bill Cole, CFO, Swish Maintenance

William Surphlis, Managing Partner, Grant Thornton Productivity Improvement

Dr. Paul Smith, Manager New Materials Design & Synthesis, Xerox Research Centre of Canada

Chris Piper, Associate Professor, Richard Ivey School of Business

Brad Mitchell, Managing Director, UPS Supply Chain Solutions

Gary Closson – Dean, Sheridan Institute of technology and Advanced Learning

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