
An Assessment of Manufacturing Customer Pain Points: Challenges for Researchers

Robert B. Handfield, PhD

Professor of Supply Chain Management
North Carolina State University

Wolfgang Steininger, MIM

Senior Consultant, Percipio Consulting Group
Supply Chain Redesign, LLC

There is increasing evidence that companies that excel in managing their supply chains repeatedly outperform their rivals (Accenture, 2002). It is also increasingly clear that companies must collaborate with suppliers and customers to respond to market needs. Such collaboration, while often beneficial, may result in challenges that we refer to as pain points—that is, specific and well-defined aspects of SCM that are hindering smooth flow and ability to innovate in a firm’s supply chain as perceived by senior supply chain executives. An understanding of current supply chain pain points is essential to coming to grips with the role of collaboration and the trust it often implies in the chain. Collaboration is most likely to arise in response to certain pain points, and its development may well generate additional such points. Our review of the 10 pain points identified indicates that trust and collaboration are becoming both more valuable and more costly as supply networks increase in complexity and global manufacturing becomes more competitive. Our findings also illustrate the confusion that occurs as decision makers toggle between collaborative and transactional relationships.

Introduction

Organizations now recognize that business functions that manage the supply chain (purchasing, logistics, and operations) are critical contributors to competitive advantage and profitability. Until recently, organizations’ attempts to gain competitive advantage focused primarily on marketing, product differentiation, and the exploration of new distribution channels (e.g., Internet, e-commerce, e-business, and e-market places). Recent studies, however, suggest that senior executives have added supply chain management (SCM) to this list, considering it as critical or very important to their company and industry. There is also increasing evidence that companies that excel in managing their supply chains repeatedly outperform their rivals (Accenture, 2002).

Why have executives’ perceptions of the relative importance of SCM changed so radically? Handfield and Nichols (2002) identified three major developments in global markets and technologies that have contributed to this shift:

1. Ever-increasing customer demands in the areas of product and service cost, quality, delivery, technology, and cycle time brought about by global competition;
2. The emergence—and greater acceptance—of higher-order cooperative interorganizational relationships; and
3. The information revolution.

In other words, it has become clear that most companies must collaborate with suppliers and customers in order to respond to market needs, with such collaboration enabled by new information technologies. Is

collaboration always beneficial? We address this question from the perspective of what we refer to as pain points—that is, specific and well-defined aspects of SCM that are hindering smooth flow and ability to innovate in a firm’s supply chain as perceived by senior supply chain executives. An understanding of current supply chain pain points is essential to coming to grips with the role of collaboration and the trust it often implies in the chain. Collaboration is most likely to arise in response to certain pain points, and its development may well generate additional such points. Therefore, in this article we set the stage for this special issue of the *Supply Chain Forum* and share our insights into the key areas for research identified by practitioners who experience the daily pains associated with managing supply chain relationships. Our pain point map is useful for defining the role of trust and collaboration in the SCM toolbox, allowing us to move away from the simultaneous errors of taking trust and collaboration completely on faith in all supply chain contexts and holding back from investment in relational capital out of fear and outdated thinking in contexts where it would provide clear benefit.

Research Methodology

We carried out focused interviews with senior supply chain executives from ten Fortune 100 manufacturing companies to identify pain points inhibiting their organizations’ ability to innovate. Interview notes were coded, allowing us to classify pain points into 10 different categories, as illustrated in Figure 1. Each of these pain points has implications for research into supply chain trust and collaboration, as we describe in the following section of the paper.

We began by creating the interview protocol and establishing contact with key subject matter experts (most commonly, vice presidents operating at the global level). The interview protocol was designed to allow us to identify three or four

key pain points being experienced by the expert. The expert was also asked to estimate the severity of the pain, as well as the probability / frequency of its occurrence. Finally, the interviewee was asked to identify the primary process or function associated with the source of the problem. The interview protocol is shown in Appendix 1.

We conducted interviews with a group of subject matter experts through a study commissioned by a large software manufacturer, in preparation for an executive forum focused on the core problems of manufacturing companies and how technology could support them in these instances. We mailed invitations to experts at 15 multinational manufacturing companies to join the study, with 10 companies agreeing to participate. Participants were told that their responses would be kept confidential, so individual responses are not reported here. The companies represented include a chemicals manufacturer, three consumer packaged goods (CPG) manufacturers, three electronics firms, one industrial glass maker, and one industrial printing and communications company.

We carried out a series of semi-structured 30-minute phone interviews with experts during the period from November 2004 to January 2005, coding and analyzing interview data to develop a “pain

point map.” Ten distinct categories emerged, most of which were classified by respondents as severe as well as having a high probability of occurrence:

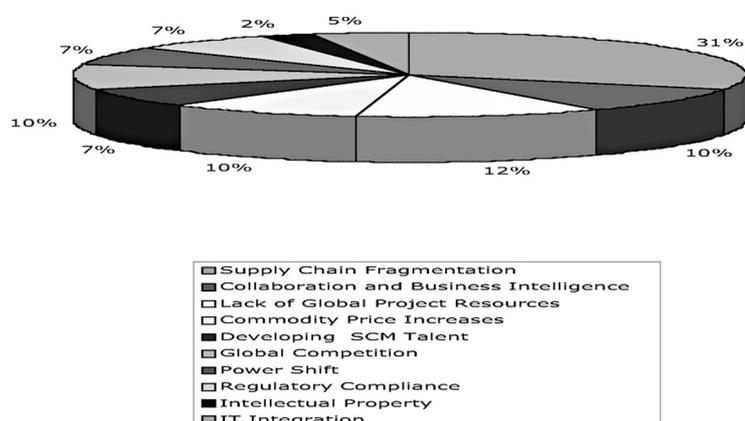
1. Supply chain fragmentation
2. Lack of global project resources
3. Lack of internal collaboration and business intelligence
4. Commodity price increases
5. Global competition
6. Developing SCM talent
7. Power shift from manufacturers towards buyers
8. Regulatory compliance
9. Information technology (IT) integration
10. Intellectual property protection

For each of these categories, we provide examples of statements made by the senior executives that we interviewed to give a better sense of how these respondents are conceptualizing the pain point. The statements also serve to illustrate how these executives are toggling back and forth from a relational to a transactional view of the problem.

Supply Chain Fragmentation (31%)

The global business environment is creating longer and more complex supply chains, driven by increased outsourcing to low cost country suppliers. The integration and management of multiple partners in the chains are broad and deep and are likely to include several Tier 1 and Tier 2 low-cost country suppliers (from China, Vietnam, or

Figure 1
Pain point categories identified during focused interviews.



Indonesia), several intermediaries in inbound logistics, and multiple downstream distribution channels. Complexity in these channels is driven by the inability to resolve the disconnects created by the lack of planning and alignment of manufacturing operations, capacity, inventory, and demand information. Transportation and long supply lines are complicated further by homeland security measures. When multiple business processes are poorly aligned, the result is a fragmented patchwork of technologies, staff members, and decisions that are not effectively working together, and problems arise. When personnel do not have a common platform and set of processes in a global environment, complicated by language and time zone differences, confusion ensues. The result is often a major disruption of supply chain flows of product and services. Our interviewee from the chemicals plant put it this way:

Synchronized supply chain is a major pain point, and maintaining the product all the way to the shelf to achieve good service and stock. One half of the problem has to do with improving visibility through collaboration with retailers. The other half has to do with how people take on special activities, promotion, and brand building, and managing events in a way that they don't disrupt the normal process. In the first half, one can automate those things and link up, but when unexpected events occur, how do we gain visibility into that through event management across a complex network of retailers? This is where the real challenge occurs. We are constantly in a reactive mode as we are thrown into chaos and the product transitions. I think these problems are not handled well, and it [lack of visibility and being in a reactive mode] becomes the catalyst for a nonsynchronized supply chain.

Transportation availability and logistics issues are a problem, because there are fewer modes of transport available to us today,

particularly in the United States and in Europe. With the consolidation of railways in the United States and huge imports from Asia, there is no space on the ships. Lack of visibility and control are increased due to homeland security. When we import materials, there are additional measures, protocols, and additional costs. Buying from a low-cost vendor may not be possible for me because I can't accurately estimate the total cost of sourcing with confidence. The incremental cost of disruption is also difficult to estimate.

Lack of Global Project Resources (12%)

Global expansion of operations and distribution requires resources to manage business processes, relationships, and information flow. However, many respondents complained of insufficient funding to carry out such expansion, describing situations in which the combination of increased initiatives and reduced resources resulted in project delays and gaps in deliverables. When asked to do more with less, the fragmentation of long supply chains is exacerbated as problems begin to overwhelm the supply chain systems. For instance, one respondent from a packaged goods manufacturing firm told us:

We have an overseas business with multiple sites in multiple countries—and their product has gone from a high-tech leverage product to a commodity item—so competition is much more difficult. So the supply chain (getting product from the supplier into manufacturing, getting it manufactured, and sending it out to the customer base all over the world) is not optimal. We need to run a major project with only a single individual (all we can budget) to re-look at that supply chain, including shipping, distribution, all the way to the end customer. We have already started to consolidate the supply chain and move the manufacturing from overseas sites to Eastern European sites (Poland, etc.).

Our challenge is that we need to redesign a supply chain and only have one person to do it. We have huge downsizing—and huge consolidation and rationalization.

An overall issue that I have is a lack of organizational structure on the international front to deal with our global expansion plans in the next couple of years. The issue that we are facing is aligning pan-European buying on the procurement side while leveraging whatever we can on transportation and other global commodities. We need to use agents who can enable us to find sources around the world for low-cost country sourcing, but we can't afford such people, who are often difficult to find.

Lack of Internal Collaboration and Business Intelligence (10%)

Poor communication between business units and disjointed legacy systems prevent coordination and alignment of sourcing and logistics strategies. In many companies, internal spend data is not accurate, and people have to estimate their total spend. Internal business performance plans are not aligned with external customer demand requirements. There is also a fundamental lack of supply market intelligence, which provides insights into the current changes in global supply markets, associated risks, and contingency planning strategies (Handfield, 2006). As one of our interviewees noted:

We are a highly decentralized company. From a sourcing point of view, that decentralization is painful, because the information required (spend and vendor data) is captured in a variety of different computer systems, Excel files, and Access databases—homegrown systems. Furthermore, this data cannot be accessed electronically, implying a huge manual collection and formatting task. To make matters worse, there is disagreement about the meaning of various terms. Until this year, there was no consistent commodity coding structure. This problem is very

common for multi-industry manufacturers. It takes so much time and effort to pull all this information together that it is not done often enough.

Commodity Price Increases (10%)

Severe and unexpected increases in raw material prices (particularly steel, alloys, resins, concrete, natural gas and energy) are negatively affecting financial performance. Customers will not accept price increases to accommodate raw material price increases, resulting in squeezed profit margins. Visibility into the nature of commodity price increases is difficult, as such price increases are often the result of several factors' influence on different tiers in the value chain and are difficult to predict. For example, who would have predicted that a storm like Hurricane Katrina would hit all of the Gulf Coast refineries in the United States and drive up the price of gas? Such unpredictable events are causing major problems for manufacturers. A representative from the chemical company explained:

Speculative money is driving up the cost of base metals and chemicals in the current economic cycle. This is not a function of misaligned supply and demand. Earlier in the business cycle, producers could not afford to stay in the business. When demand was lower and raw material capacity was reduced, buyers expected capacity to come back when demand increased again. However, it is not coming back, because producers cannot afford to buy the capacity. They are taking advantage of the situation to make a profit in this cycle [use the leverage from the scarce capacity to take short-term profits without thinking about its impact on the supply network long term]. The mergers and acquisitions we have seen have reduced overall capacity in metals and chemicals, and it isn't coming back. After years of depressed prices, the large

commodity suppliers in areas such as plastics, precious metals, minerals, resins, steel, pipe, and other commodities are able to take advantage of these market conditions and raising prices, in some cases by over 200%.

Global Competition (10%)

Competition from low-cost countries is driving cost pressure. Labor costs are a fraction of Western rates, causing Western manufacturers to face a substantial cost disadvantage in many markets. The growth in manufacturing in China has been a particular challenge. However, the nation's breathtaking rate of change means that a wide range of sourcing questions must be constantly readdressed by policymakers and by managers whose companies are buying more components or finished goods from China. The questions range from "How clear can supply chain planning visibility be?" to "What environmental compliance can be expected of Chinese factories?" Answers to such questions tend to be based on weak assumptions, received wisdom, and even myths. Much of the received wisdom comes from a time when the bulk of China's product offerings were unsophisticated, many of its industrial managers lacked crucial skills, its factories were antiquated, and its supply lines were unpredictable. Today, those characteristics are confined to smaller and smaller industrial pockets in the nation's hinterland. They certainly do not describe supply conditions in the flourishing provinces and cities of China's east coast. Overall, the nation's industrial practices, processes, and capabilities are changing faster than many Western managers understand. The changes dictate the types of decisions, the velocity of those decisions, and the agreements made when establishing a sourcing operation in China (Handfield & McCormack, 2005). A electronics firm's representative stated:

General competitiveness is causing us to experience increased pressure. Key drivers

are in taking out cost through continuous consolidation of our supply base combined with continuous improvement. The bar keeps getting higher and higher—we need to be more and more creative in our approaches to global sourcing. The situation is forcing us to take risks with partners in China that we wouldn't have taken before. We do not have the experience and knowledge to do business in this region.

Developing SCM Talent (7%)

Rapidly changing business environments (structures, processes, technologies, business models) require new skills and knowledge in SCM teams. Research has shown that the top skills required by new applicants for management positions in the supply chain world include team building and relationship management. The latter is especially important in a global environment, where different cultures, buyer-supplier relationship modes, and requirements for successful collaboration are critical to becoming globally competitive (Giunipero & Handfield, 2004). However, many of our respondents noted that there is a shortage of new personnel and also that existing personnel often leave for higher-paying positions and attractive career enhancements. Multiple new challenges in succession planning and career development have surfaced in the area of supply chain human resource requirements. One of our interviewees, a mid-level manager at a CPG company, said:

We have 83 manufacturing locations, and 57 of those 83 have purchasing needs, yet it is tough to find purchasing personnel.

We don't have a culture for developing high-quality purchasing people, so the idea of strategic purchasing is completely foreign to our staff. There is not even a single commodity that we leverage to get price discounts across our operating units. That is an outcropping of our culture—but it continues. Our new chief procurement officer is the first person that I know of in

senior management who has ever had any purchasing experience, which shows that we have a real lack of leadership for creating a pipeline of supply chain talent. As this economy takes off, the biggest challenge is developing and retaining talent. What everyone has forgotten is that before 9/11 there were a lot of people moving to better jobs, and we were losing some good people. You have to watch this closely—as the economy takes off, people will be getting more headhunter calls, and companies will be looking at the people that are doing things well for us. We can't forget that we can lose good people, so we need retention strategies, and we need to hire the right people. We don't have a high attrition but expect that we will lose people with a lot of knowledge, and when you run lean, you have to manage them carefully. This will heat up again, in the next year. Whatever you want to call it—the talent search and retention—can become a real problem if you are not careful.

Power Shift (7%)

Increasing volume consolidation in retail markets is driving a shift toward creation of a buyers' market in many manufacturing categories. Large global retailers such as Wal-Mart, Metro, Carrefour, Tesco, and Target have the ability to dictate difficult terms for manufacturers to meet while making a profit. Buyers dictate price and conditions for delivery, creating competitive tensions that require manufacturers to reevaluate the current business processes in their respective supply chains. According to one manufacturer's representative:

The pinch point is the aggressive nature of what I would consider global competition. Among the CPG companies, the power has shifted from manufacturer to the trade. In general, average selling prices have been coming down for CPG. Retailers like Wal-Mart and Carrefour do not allow manufacturers to increase prices or even keep them stable, and there is pressure for continuous improvement. And there is

consolidation among the CPG retailers—they get bigger every year. So there is competition for share of shelf. What this means for people in procurement and logistics operations is that, although we have done a great job of taking cost out (a 39% to 54% increase in margins last year), it is not good enough. We get tremendous pressure from the trade. What this does for the corporation is that we are continually asked for more savings.

Regulatory Compliance (7%)

Escalation of logistics security, government regulators, and compliance with mandates is a trend that is an inherent parameter in the post-9/11 supply chain environment. For example, the Sarbanes Oxley Act and the recent spate of regulatory requirements for companies in Europe demand that companies effectively document all of their business processes, transactions, and decisions down to the last penny. The potential for legal torts requires careful administration of all packaging and consumer services. Additional regulatory requirements established by agencies such as the U.S. Food and Drug Administration and the U.S. Department of Homeland Security, as well as their counterparts in European countries, create a constantly changing set of hoops that companies must dutifully jump through. As one of our respondents noted:

Regulatory compliance is a big issue, including [compliance with] Sarbanes Oxley, [attention to] environmental health and safety issues, [and reduction of] exposure to liability. We are also being asked by the government to increase the diversity of suppliers, which is problematic for us as we have difficulty in some cases identifying qualified companies. Regulatory and legal controls are problems for us because they are often out of our control and are unknown elements that we must deal with on a daily basis. The cost of meeting these requirements is going up, not down.

IT Integration (5%)

Technological innovations often differentiate competitors and create lead versus follower market positioning. Integration within organizations and between Tier 1, Tier 2, and Tier 3 suppliers is often inefficient, however, as one respondent explained:

What also keeps us up at night is loss of market share due to information and technology gaps in the supply chain. In our industry, technology leadership is the only ingredient for survival; if you are not the leader, you can't extract the full value of your product, as you must constantly be innovating. That is also true when it comes to information technology. Am I the best at communicating with my customers? If someone else has a technology advantage, they have innovated better than me. If I come up with an RFID [radio frequency identification] solution and I go to my customers and say I can track their freight—then I will leave the others behind. I can still be the best at my traditional business—but I will lead because I have a technology innovation.

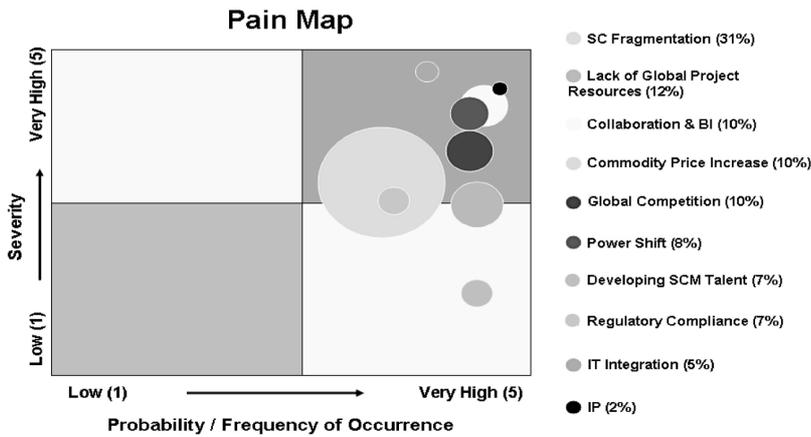
Intellectual Property (2%)

Manufacturers from countries in which costs are low are flooding markets with lower priced knockoffs, which threatens intellectual property (IP) ownership. A senior manager from an electronics firm told us:

We are seeing a lot of our products coming out as "Made in China" knockoffs for less than half the cost. . . . IP issues are surfacing. The quality is not as good, but it looks just like ours and is being sold into a distributor network. We know it is coming from China. That is a significant threat for our business.

Most of the risks identified by executives we interviewed are located in the upper right quadrant of the graph in Figure 2, indicating very high probability and severity of occurrence. In other words,

Figure 2 : A pain point mapping of interview responses.



The circle size represents the relative number of responses to the pain point category. The vertical (y) axis represents the perceived severity of the pain point, and the horizontal (x) axis shows the perceived probability of occurrence. Note that most circles are in the upper right quadrant, indicating very high frequency and severity.

these risks require immediate executive and corporate attention.

Relating Pain Points to Supply Chain Trust and Collaboration

Each of the pain points identified in the previous section has implications for the development of trust and collaboration in the supply chain. These consequences may take either of two forms: Pain can motivate collaboration and enable trust, or collaboration and risking trust can lead to pain. In this section, we link what our group of senior global logistics executives told us about their supply chain pain points with the constructs of trust and collaboration.

Supply Chain Fragmentation

Consider a group of children playing “crack the whip.” Before these children begin to move, little force and concentration are required to keep their hands attached. As chain length and speed increase, however, holding on becomes a primary activity. Similarly, as supply chains become longer in more chaotic environments, staying attached becomes increasingly difficult. Although representatives of companies in supply chains have

not been accustomed to working hard to maintain such attachments, the pain they are currently experiencing in this domain indicates that holding on is a skill that managers need to acquire and may well represent a configuration of capabilities that firms will need to invest in through a focused recruiting effort. Development of such collaboration and trust implies a combination of enabling technologies and investment in relational capital.

Relational capital is often a function of improved socialization, both formal and informal (Cousins, Handfield, Lawson, & Peterson, in press). Relational capital between buyer and seller facilitates the ability of potentially useful and important information to travel quickly and accurately through the network. Relational capital (like social capital) is believed to be malleable (Oh, Chung, & Labianca, 2004) and can be focused to improve the social relationship interactions as directed by the actors in both firms. Recent research shows that relational capital not only facilitates the general relationship interaction process, but is also governed by joint operational metrics in the relationship (Cousins et al., in press).

Lack of Global Project Resources

When companies strive for more efficient and effective supply chain performance, it is often assumed that working together will occur naturally and that little cost will be involved; hence, limited resources (if any) are made available for such efforts. Collaboration and trust are not free, however, and there are clear trade-offs involved with their deployment. Often, companies extend their supply chains in search of cost reductions that prove to be relatively minor, without adjusting their calculations to include the costs that will arise from increased coordination. Better decision making concerning supply chain extension will require increased understanding of the costs and benefits of collaboration and trust.

Furthermore, in evaluating the value of an investment in supply chain integration, it becomes necessary to use new tools to conceptualize the network. SCM research traditionally looks at dyads, but a network perspective—including new approaches to designing and describing the network—will aid companies in determining the resources required to keep their chains functioning well. Also, the specific sets of skills and competencies required to create trust and manage relationships is relevant, because managers often fail to understand the delicate balance that must be managed through close relationships with critical suppliers and customers (Giunipero & Handfield, 2004).

Lack of Internal Collaboration and Business Intelligence

In this pain point category, the executives we interviewed referred to weaknesses in the systems through which information flows between supply chain members. Collaboration depends on enabling technologies, and new ways to use technology to support collaboration continually emerge. What are the technologies that

enable collaboration, what are the problems that arise with their use, how extensively are they used, how reliable are they, and what are the implications when a technology does not work as it should? To what degree are new technologies pushed into the supply chain environment, rather than being created to respond to supply chain integration needs?

These questions illustrate a costly and paradoxical problem facing businesses today. The multiple sources of unstructured information (contained in e-mails, call center notes, news groups, presentations, Web pages, etc.) has created an environment in which the answer to almost any question can be found. Yet common reporting and analysis tools available to knowledge workers focus only on structured information (that may be housed in a data warehouse.) This places the onus on end users in supply management to creatively search multiple internal and external repositories of information for supply market and business intelligence, then combine and deduce the results to arrive at needed answers (Handfield, 2006).

Typical forms of information that are required include internal business intelligence elements such as total forecasted product demand and total cost of goods sold, as well as current performance data for internal business units and suppliers, internal finance budgets, quality reports, and other key pieces of data. This information is generally located in a variety of different databases that are dispersed widely across many companies.

Even more difficult to attain is the set of data required to develop supply market information. This includes information on trends in diverse supply markets (found on Web sites and in analyst's reports), industry trends (perhaps available in various trade magazines and Web sites), goods and commodities pricing, financial status of specific suppliers, new technology trends, and mergers and acquisitions. It

also includes information on emergence of cutting-edge suppliers in diverse geographical locations, competitor strategies and acquisition, and technology shifts, as well as other forms of general and specific knowledge regarding industry events that have a direct impact on sourcing decisions. All of these data are located in diverse and difficult to identify sources that must be continually scanned, read, filtered, and summarized into packets of information. These information packets are synthesized and processed into templates that must be communicated effectively, efficiently, and in a timely manner to key decision makers involved in critical SCM processes. Only then can users apply this information to make more effective decisions.

Commodity Price Increases

In identifying commodity price increases as a top pain point, the executives interviewed demonstrate the dichotomy between transaction-based and collaboration-based thinking. On one hand, executives expect suppliers of these materials to refrain from taking advantage of current high levels of competitive power. On the other hand, the same executives make it clear that they are describing commodity products that can come from any supplier, with the supplier chosen based on competitive bidding. What are the roles of collaboration and trust in purchases of commodities? Is it better to remain with a transactions perspective, moving toward relationship-free platforms such as Internet auctions, or can collaboration and trust pay off even in such purchases?

Every organization needs a dedicated resource that is focused on gathering, sifting through, collating, and organizing data for the benefit of end users making decisions in supply management. Few organizations can invest in dedicated personnel to conduct supply market intelligence, despite the need for this type of information. Moreover, as we

argued earlier, given that an average organization spends 40% to 60% of its cost of goods sold on external materials and services, it would make sense for this same organization to devote at least as much time to supply market intelligence as to consumer market intelligence, because supply and demand must be balanced in the supply chain equation.

In general, companies in today's economy find that their primary source of competitive advantage lies in the unique proprietary knowledge they possess. To put it simply, there is great value in sharing—across a whole company—proprietary insights into customers, competitors, products, production techniques, emerging technologies, and the like. In practice, companies find it far more difficult to take advantage of all this knowledge than an individual would, of course. An individual's knowledge is self-contained, always available. But companies are discovering that it is increasingly difficult to exploit the valuable knowledge in the heads of a few hundred employees, particularly if they are scattered in different locations. In large, diverse companies with complex global supply chains, the task expands to cover thousands of highly educated professionals and managers spread across a variety of specialties, locations, and countries.

Global Competition

The executives interviewed indicated that the cost advantages of low-cost countries were creating pressure on production in developed countries. This pain point demonstrates the tendency of cost to dominate other sources of competitive advantage, such as short lead times or product customization. Consider two supply chains, one in which goods are sourced from a low-cost producer selling in a developed market, and a second in which goods are sourced from a local producer in the developed market. Collaboration and trust are expected to be much more limited in the first chain than in the second

due to geographical, cultural, and process constraints. The second chain is positioned to exploit any customer needs for responsiveness. Therefore, responding to such challenges requires a dual approach: simultaneously exploring ways of creating some collaboration with distant suppliers while using collaboration to strengthen the competitive position of the domestic producers.

This is particularly true when working in China. Western managers are urged to understand the sharp rivalries between Chinese provinces, towns, and local districts and to trace the logistics linkages that must be used to reliably source from their selected Chinese suppliers (Handfield & McCormack, 2005). The better they understand the political rivalries, the better these managers can accommodate scenarios such as duplicate investments in ports and airports, and difficulties in obtaining products on time, and the more easily they can cope with the concomitant red tape and trade barriers. Similarly, if managers can pinpoint the bottlenecks in their supply chains, they can begin to plan around them through close collaboration and relationship management.

Developing SCM Talent

Deploying enabling technologies and building social capital requires a new skill base, so this pain point is not a surprising one. Whether the supply chain is transaction- or collaboration-based has far-reaching consequences for the talent required to run it well. It is interesting to note that this was the only major pain point perceived as being less severe, although this problem must be resolved in order to address most of the others. What are the skill bases required to build a collaborative supply chain? Do supply chain networks remain in a transactional mind-set because employees lack the skills to build collaboration?

A more strategic role will be a requirement for supply management professionals in the

future. Research indicates strong trends underlying this movement (Giunipero & Handfield, 2004). These include the need for purchasing managers to build strategic relationships and focus on total cost and strategic cost reduction, yet still be able to collaborate and integrate purchasing processes with those of its suppliers. The managers that we interviewed stated clearly their belief that strong relationships drive costs lower through improved process efficiencies. Strong intercompany linkages fuel innovations that improve both quality and cost.

It also appears that the supply management function will soon be divided into strategic and tactical areas. Tactical buyers will be more concerned with day-to-day activities, whereas strategic supply managers will focus on building relationships and lowering total costs. The skill sets required of the two groups of supply management personnel are expected to differ considerably, with those involved with strategic initiatives needing a high level of communication and financial skills in addition to technical SCM competences. We can expect to see companies struggling to find a balance between over- and undertraining their SCM personnel in these strategic skill sets, with more companies failing to invest than overinvesting in the training required for achieving operational goals.

Power Shift

It is one thing to develop trust and collaboration in a relationship where the distribution of power seems stable over time. It is another to maintain trust and collaboration when shifts in power occur. Under such conditions, is collaboration possible, or is there always a trade-off between gaining power over suppliers (customers) and reaping the benefits of relational capital? How can supply chain members counteract the negative effects of power imbalances? This is an important question for researchers to

consider in investigating buyer-seller relationships.

Regulatory Compliance

Exposure to liability encourages collaboration but may reduce trust. As the demands of regulatory compliance increase, supply chain members may become more willing to invest in collaboration to avoid being vulnerable for the actions or omissions of upstream or downstream members. Nevertheless, increased liability may be expected to lead to a blame game in which supply chain members try to protect themselves rather than build the relationship. How can companies work with regulatory agents in a collaborative manner to achieve benefits? For example, more multinational companies are working closely with U.S. regulators through the Customs-Trade Partnership Against Terrorism (C-TPAT) and Partners in Protection (PIP) programs. These are joint government business initiatives to build cooperative relationships, with a goal of strengthening the overall supply chain and border security. Benefits provided to logistics partners accrue from reduced inspections and faster shipment clearances at borders.

IT Integration

New information technologies permit collaboration and the exchange of information at a level that would have been difficult to imagine a decade ago. Such technologies, however, may limit the type of information exchanged in a way that also limits the development of the relationship. The executives interviewed in our survey were very focused on staying at the forefront of information exchanges using technologies such as RFID, but there was little mention of the development of social or relational capital. Consider a scenario in which a supplier has shifted from telephoning to electronic data interchange to notify customers of production problems. Telephone contact offers the chance for a rich exchange of information plus an opportunity to look for creative

solutions to the production problem, whereas computer-based exchanges lack such richness and search behavior. Rather than automating the most important exchanges of information, should supply chain professionals seeking a competitive advantage in turbulent environments go so far as to maintain more personal forms of contact in their networks, even though such contacts require more resources and are by nature more variable? Also, these questions of IT integration remind us that, in researching supply chain collaboration, we must go beyond simple instruments that collect general assessments of the quality of communication to measure (and quantify) data concerning who communicates what to whom, with what frequency.

Intellectual Property

The quality of intellectual property protection in a given market has far-reaching implications for collaboration, trust, and the development of relational capital. If intellectual property protection is weak, the value of the product is reduced, putting strain on the relationship. Furthermore, as organizations share more information collaboration becomes a riskier proposition. Therefore, it is useful to consider the relevant intellectual property and the level of its protection in setting goals for relationship development in the network.

Conclusions

What should manufacturers be doing to improve the level of relational (social) capital in their supply networks through trust and collaboration? We decided to start off this special issue with a managerial look at supply chain pain points as perceived by a group of senior global logistics executives from a number of different Fortune 100 manufacturing companies. We expected these pain points to give us insights into where such companies may be planning to increase collaboration and to risk trust—or where they may be reacting to the downside of such collaboration and trust.

Our review of the 10 pain points identified indicates that trust and collaboration are becoming both more valuable and more costly as supply networks increase in complexity and global manufacturing becomes more competitive. Our findings also make it obvious that executives often debate the possible trade-offs arising from relationships where trust and collaboration is required. Confusion occurs when decision makers toggle between collaborative and transactional relationships.

Research questions arising from these interactions with managers include the following:

1. What are the benefits and costs of supply network collaboration? When do benefits outweigh costs? Can a transactions-cost approach be used to quantify benefits of collaboration, or do such benefits remain so intangible that their benefit is difficult to capture and model?
2. How can research on relational capital be applied to the supply network context?
3. What kind of information is being transferred? How and to whom is it being transferred? What are the implications of the choice of technology used for such transfers?
4. How do context variables such as intensity of competition, power shifts, and intellectual property protection affect development of trust and collaboration?
5. What new skills are required of supply chain personnel to allow quality decision making about whether and how to invest in relational capital in the network?

References

Accenture. (2002). *A Global Study of Supply Chain Leadership and its Impact on Business Performance*. Retrieved October 22, 2005, from http://accenture.com/xdoc/en/services/scm/scm_thought_fp.pdf

Cousins, P., Handfield, R. B., Lawson, B., & Peterson, K. (in press). *Creating supply chain relational capital: The impact of formal and informal socialization processes*. *Journal of Operations Management, special issue on Behavioral Research in OM*.

Giunipero, L., & Handfield, R. B. (2004). *Purchasing Education and Training, Part II*. Tempe, AZ: Center for Advanced Purchasing Studies.

Handfield, R. B. (2006). *Supply Market Intelligence*. New York: Taylor and Francis.

Handfield, R. B., & McCormack, K. (2005). *What you need to know about sourcing in China*. *Supply Chain Management Review*, 9(5), 56-62.

Handfield, R. B., & Nichols Jr., E. L. (2002). *Supply Chain Redesign: Transforming Supply Chains into Integrated Value Systems*. Upper Saddle River, NJ: Prentice Hall.

Oh, H., Chung, M.-H., & Labianca, G. (2004). *Group social capital and group effectiveness: The role of informal socializing ties*. *Academy of Management Journal*, 47(6), 860-896.

Appendix

Interview Protocol

We are completing a research project as part of the Supply Chain Resource Consortium at North Carolina State University, in conjunction with Microsoft, to identify the key pain points being experienced by manufacturers. A "pain point" represents a critical problem that is preventing your organization from being successful in terms of financial and growth objectives. These pain points may stem from global competition, industry trends, organizational issues, supply chain partners, cost pressure, regulatory issues, or others. After we collect this data, we will summarize it in the form of a brief report, and will share the aggregate results with you. Any information you provide will be considered confidential and will not be released to the public. Results will also be presented and discussed at the Microsoft East Manufacturing Regional Meeting in January 2005.

1. We would like you to briefly describe three or four primary pain points you are experiencing today. What is the primary business process or business function associated with this pain (e.g. finance, supply management, manufacturing, marketing, etc.)
2. Could you describe the relative severity of these pains on your business operations, in terms of their aggregate loss or severity on a range from relatively low dollars to very high dollars? An extreme example might be a catastrophic activity which would shut down your business for a month or more.
3. What is the relative probability of these pains occurring? That is, are they likely to occur frequently, or are they extremely rare in terms of occurrence? For example, theft may be an event that occurs two or three times a year, while a terrorist event might happen once in a decade.

Thank you for your time. You will be receiving an invitation to the MS East Regional Meeting, which we hope you will attend. These issues will be discussed in more detail at this meeting.