

The Emerald Research Register for this journal is available at
www.emeraldinsight.com/researchregister



The current issue and full text archive of this journal is available at
www.emeraldinsight.com/1066-2243.htm

Integrated strategy of industrial product suppliers

Integrated
strategy

Working with B2B intermediaries

471

Mark A. Johnson and Dana M. Johnson

School of Technology, Michigan Technological University, Houghton, Michigan, USA

Abstract

Purpose – The primary purpose was to learn about different variables of an integrated strategy associated with choosing to supply through business-to-business (B2B) intermediaries and apply the variables to a series of cases.

Design/methodology/approach – A literature review served as a basis to develop an integrated model. A combination of primary and secondary research was conducted to apply the concepts of the model to different internet trading exchanges.

Findings – Each trade exchange offers a different set of customers and suppliers vying for business opportunities. There are no common platforms for software and hardware. If a small company is interested in trading through an internet exchange, they want to select based on the variables identified that best meet their needs and integrate with their business strategy.

Research limitations/implications – The focus was on industrial products and may not be applicable to consumer products.

Practical implications – Suppliers must carefully operate in the future by evaluating each customer and determining which trade exchanges will provide them with the greatest benefit at the lowest cost. The infrastructure investment is an unavoidable cost that cannot be forgone unless the supplier wants to discontinue providing to most of its customers. The supplier needs to look at all aspects identified in the integrated business model and the foundation and facilitation for success lie in the information management of the entire entity.

Originality/value – This paper takes the existing body of knowledge and applies it to the development of an integrated e-business model for industrial suppliers used to compare different internet trading exchanges.

Keywords Automotive industry, Electronic commerce, Intermediaries

Paper type Case study

1. Introduction

The rapid growth in information technology (IT) has opened up new channels for exchange of industrial products. Industrial products are defined as direct materials, raw materials, and purchased parts for end use products for original equipment manufacturers (OEM). In the past, the sales and purchase transactions of industrial products was heavily influenced by personal relationships of buyers and sellers that were culminated over the years. As more products are being offered through internet-based exchanges and reverse auctions, the personal influence will play a less significant role and the face of industrial product purchases/sales will be changed forever. Third-party providers of technology enablers serve as a middleman between the buyers and sellers of goods.

Instead of dealing with a familiar person on a face-to-face basis, the virtual transaction involves an electronic exchange of information removing the non-verbal cues and communication that aided or affected the purchasing decision. Although this



Internet Research
Vol. 15 No. 4, 2005
pp. 471-492

© Emerald Group Publishing Limited
1066-2243

DOI 10.1108/10662240510615209

electronic mode of operation is now another distribution avenue, it may soon become the prevalent reality of the future where practically all transactions include minimal human interaction.

The discussion will focus on the several concepts and dimensions of an integrated strategy that a supplier should emphasize to successfully operate in a business-to-business (B2B) environment. The B2B channels will focus primarily on independent, industry-specific or affiliated trading exchanges (OEM owned and operated). The sales side has unique challenges that may not be experienced by the buying operations. However, there are some attributes that are common amongst selling and buying entities that will be addressed.

An analysis of several third-party providers along with a company specific site will be evaluated to judge how well they will meet the needs of suppliers. The issues associated with the buyers present another set of variables that will not be discussed. Because of the rapid innovations and the focus on value creation in e-commerce and internet-based operations, there are numerous issues that were to be researched and discovered as a result of this study. This study forms the conceptual and theoretical foundation through the development of models to be empirically tested through the development of a survey questionnaire to users of third-party B2B in the automotive supply industry.

2. Related literature and research model

Organizational theory construction provides the foundation for identifying variables and attempting to develop a set of rules for examination of the relationships (Blalock, 1969). Theories are established to explain and predict events (Bacharach, 1989). Theory development requires obtaining a comprehensive view of the different dimensions associated with variables. From theory, hypothesis can be constructed to empirically test the validity of the theories.

A thorough literature review of the existing e-commerce and e-business specific publications, along with associated information technology and business management journals, was completed to identify key variables associated with the pursuit of conducting business online from a supply perspective, either through a trade exchange or individual company site. The search identified several concepts and dimensions that support an integrated model for physical and/or virtual operations.

These concepts and dimensions can assist companies in identifying the most appropriate and logical path to travel when engaging in trading through electronic means. An integrated approach will focus on the best of both worlds, both physical and virtual, for industrial products suppliers.

2.1 Concepts and dimensions

Customers are mandating their suppliers to cut costs and operate through electronic exchanges. Ford had its own Ford Supplier Network (FSN), a company operated trade exchange. Ford, General Motors, DaimlerChrysler AG, and Nissan formed a joint venture called Covisint that officially began providing services in the US on January 1, 2001, and in Europe, Asia-Pacific and Latin America in July, 2001 (Konicki, 2001). Ford was the first automaker to move a major part of its collaborative business-to-business supply chain onto Covisint LLC. This is one example of a third-party exchange.

Covisint and others will be analyzed in more detail as a part of the case study portion of the discussion.

As the distribution channels change, there are several concepts and dimensions a supplier should emphasize to successfully operate in a mixed distribution scenario.

2.1.1 Distribution channels. There are several types of internet trading exchanges: independent, affiliated, and company-owned. An independent trading exchange is defined as owned by an organization that does not trade goods or services on the exchange and collects fees from participant companies, primarily the buyers, but in some cases the suppliers pay a fee. An example of an independent exchange is Ariba. Ariba purchased FreeMarkets in early 2004 (Binns, 2004). An independent trading exchange serves multiple industries and does not have specific ties to any companies where trading is conducted between buyers and suppliers.

An affiliated exchange is defined as being owned by some of the organizations that are purchasing and/or selling products. Therefore, an affiliated exchange does not have independent owners or operators. An example of this type of exchange is Covisint, which is supported by a consortium of automotive OEMs. One of the issues with an affiliated trading exchange is the possibility of channel conflict (Tsay and Agrawal, 2004). In the case of Covisint, since buyers own and operate the exchange, channel conflict could be likened to cartels and need to be closely watched by competition regulators to avoid issues like price fixing. The affiliated exchanges could also include industry specific products such as chemicals or steel, but they generally do not support or exchange in a single industry like the automotive industry and are likely to support multiple industries.

Internet trading exchanges, whether independent or affiliated, provide critical sales channels. These channels are replacing the traditional sales channels because they serve as a means for companies to reach prospective consumers in the global, virtual marketplace by extending the sellers' reach to new buyers and possible markets (Phelan and Smith, 2000). Disrupting the existing market relationships and displacing participants with new technology could greatly impact the success of the exchange and willingness of organizations to participate (Weinberg, 2001). Early sales activities on the internet focused primarily on retail types of products. Company-owned websites may still exist. However, much information is exchanged through extranets and intermediaries are replacing the direct selling of individual company owned websites (Chow, 2004). Electronic trading exchanges offer a range of distribution opportunities, from new product development and collaboration, to spot buys and auctions of excess or obsolete inventory. Because of the vast array of distribution options available, the primary focus will be on the supply relationship with existing and future product development and collaboration and not the spot buys or reverse auction aspects.

The new or modified distribution channels have placed a priority and focus on the organizational direction suppliers are taking. Each business needs to evaluate its existing business model and determine how it will adapt or modify the overall business strategy to operate in both a bricks-and-mortar and virtual environment, with primary focus on the new economy.

2.1.2 E-Business integrated strategic model. The evolution of the new economy and the rapid changes occurring to commence and continue operation through electronic channels requires an integrated strategy. The traditional business model and organizational structure may no longer be suitable for the new economy. The range of

planning for e-business is broad, and encompasses internal business processes, external interfaces with customers, suppliers and partners, and internet-based technologies and standards for networked, electronic systems (Johnson, 2001).

A structured approach to integration of traditional and new economy business models will enable a company to achieve its objectives of providing products and services to existing and new consumers (Lapierre, 2001). E-business is a critical business imperative to many suppliers that cannot be ignored. The importance of the basics of virtual operations and the organization's survival need to be grasped by managers at all levels within the supplier's organization (Trepper, 2000). Dai and Kauffman (2002) believe e-business is an enabling technology that allows businesses to increase the accuracy and efficiency of business transactions processing. It does not, however, help organizations that suffer from an inefficient process, defective products, or unacceptable customer service (Johnson, 2001). Poorly run bricks-and-mortar operations become poorly run virtual entities.

In virtual transactions through exchanges, the market is not the same; not the customers, channels, products, services, organizational structure or support operations. The rapidly exploding global market places different demands that must be aggressively addressed as conditions for continuing accelerated or even moderate growth are factored into the business model (Feigenbaum and Feigenbaum, 1999). Studies have found that the organizational rather than the technical issues were major gating factors for successful implementation of an internet business strategy that often is the result of an unclear, corporate strategic vision and uncertainty as to where the responsibility lies for internet aspects of the operation (Hackney *et al.*, 2002; Lieb and Bentz, 2004; Soliman and Janz, 2004; Zaklad *et al.*, 2004).

The e-commerce environment is dynamic and requires flexibility. The focus of planning and analysis should center on the ability of an organization to be able to support fundamental changes to existing strategic foundation and infrastructure (Herman, 2000). Strategies, structures, and systems must be aligned with each other (Lawler, 1996). Often companies have a strategy that does not align with their appropriate structures and systems which causes a company to perform poorly in the implementation phases (Epstein, 2000). An integrated strategy should clearly outline the necessary investment required to properly develop the infrastructure and foundation for the virtual operation, including evaluating existing resources, new requirements, and the overlapping internal and external entities. The investment should not only include technology, hardware, and software, but it is imperative that it includes training, organizational change management, and overall evaluation of existing and future business operations.

Prior to the advent of industrial trading exchanges, the supplier relationship was very hierarchical and vertically focused (Figure 1). In the automotive industry, many of the first tier suppliers, direct suppliers to the original equipment manufacturers known as tier 1 suppliers, are participating in the exchanges, both affiliated and independent. Most of the tier 1 suppliers have an integrated strategy and maintain up-to-date technology, systems, and structures to allow them to adequately participate. Covisint expects the tier 1 supplier to drive adoption to the smaller suppliers, known as tier 2 and below, to participate in the affiliated exchange (Vasilash, 2000; Konicki, 2001). This model (Figure 2) illustrates the current trend for some industries, where the trading exchange serves as a middleman and facilitator for all business transactions

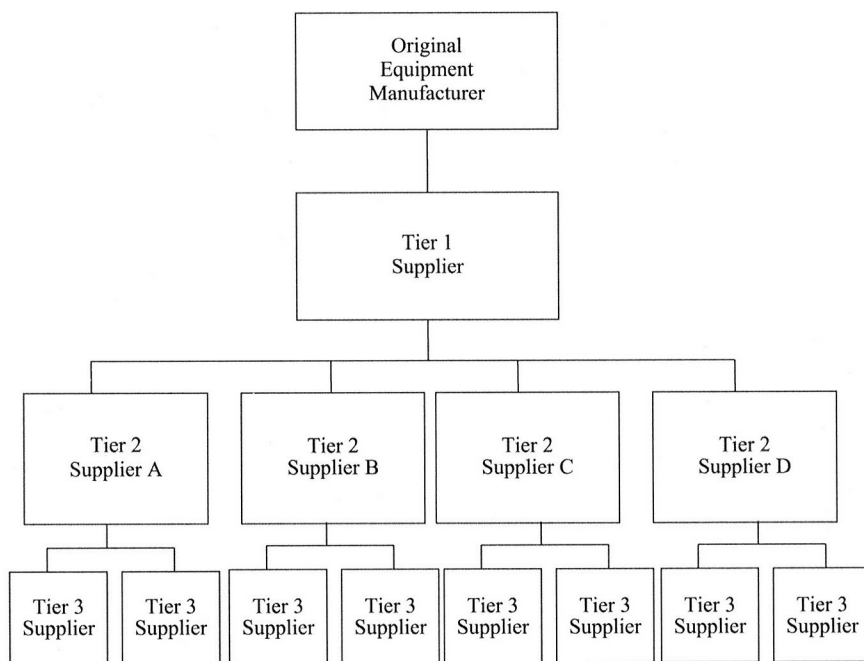


Figure 1.
Traditional tiered extended enterprise relationship

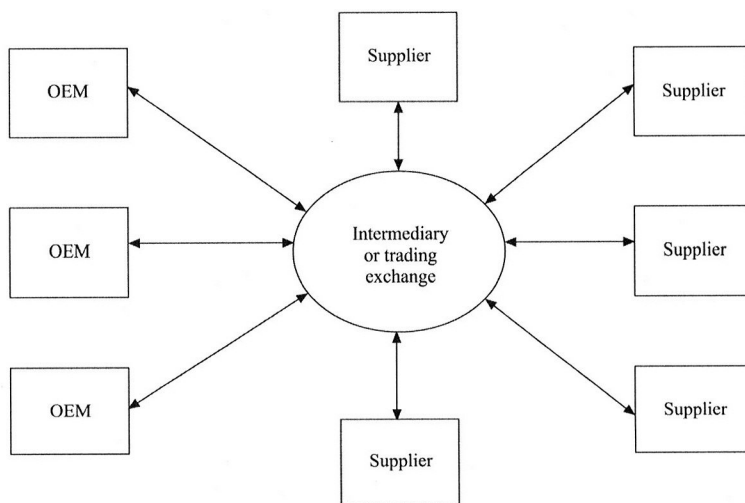


Figure 2.
Hub and spoke relationship for trading exchanges

processing associated with initiating and developing new products through supply chain management and development initiatives. This represents what is called a hub and spoke model of exchange (Kaplan and Sawhney, 2000). E-hubs represent an evolutionary advance beyond conventional exchanges and with industrial products

focus on the progressive integration of transactions from concept through product launch and supplier development activities (Barrenechea, 2001).

Delphi Automotive Systems supports e-business and hosts a supplier portal on Covisint and believes that to properly position and successfully implement initiatives such as lean manufacturing, design collaboration, and collaborative supply chain requires the involvement of their suppliers (Shah, 2001c). Failure to consider participation in either exchanges or company based websites, as a major integrated strategic initiative, would be a fatal error for any supplier who wants to continue to operate in certain industries, and especially the automotive industry. Strategy deployment will require the support of the organization as well as the necessary investment in the infrastructure to include hardware, software, training, and information technology professionals.

The notion that a company can transform itself into an e-business by simply buying a piece of software and adding it to its existing infrastructure is wrong and dangerous. Companies need to carefully assess the impact of new e-applications and internet on the IT environment and the overall business. A true e-business facilitates accurate delivery promises, enables overnight order fulfillment, and allows real-time, self-service information, all of which require very tightly integrated business systems (Shepherd, 1999).

2.1.3 Infrastructure investment. Virtual and e-business distribution channels are not free. They are becoming less expensive as companies begin to realize that smaller suppliers do not have the financial capability to invest in elaborate systems (Gould, 2003). Established and larger companies will have a competitive advantage and may be more successful in supporting an integrated environment of bricks-and-mortar and e-commerce because of their financial capability. Initial investments to support the necessary technology and to become a real player in e-business can be significant and a barrier to entry for some organizations. It is also not a one-shot investment to provide the foundation for e-business; it requires continuing costs, both fixed and variable, to properly support an e-business operation, and in some cases, just to keep up with your competitors. The ongoing investment is a necessity and not an option (Johnson, 2001).

Because of the great demand for information technology professionals, a company will need to invest heavily in this resource to be successful. Fully understanding the technology, making the necessary investment in the technology with people to support the e-business sector, tailoring the technology for the organization's needs, and evaluating the technological advances are prerequisites (Spector, 2000). If suppliers believe e-business is integral to its existence, then the focus will need to be on long-term requirements and not just short-term results.

A strong business case will enable a company to evaluate all the scenarios associated with choosing to operate in the virtual distribution channel. Merely relying on a trading exchange to "do all the work" will leave companies in a precarious position without the necessary support on the supply side of their business. The initial six months of an e-business implementation project require impressive infrastructure, and even at this point companies still may have a long road ahead of them before they reap the benefits of their investment (Spector, 2000). Making the investment now allows the company to develop a strong foundation of integrated capabilities between different applications and allowing for an open platform concept.

The infrastructure will be determined by the strategy selected by the supplier. Operating through a trading exchange may require purchase and implementation of software to interface with the exchange. Although the exchange provides access to certain capabilities, the OEM still may require a unique design software package like CATIA or another alternative. For the supplier to multiple OEMs, this would mean that they would be required to operate through trading exchange(s) and it may not include all their customers. In fact, it is entirely possible that a supplier would need to operate through multiple exchanges and/or individual companies to reach all their customers. Ultimately this increased cost of doing business to support the information systems requirements of all customers may be quite costly, and from a lower tier perspective, so prohibitive that they are unable to continue in business.

2.1.4. Product realization. Competitive dynamics are rapidly changing in e-business, requiring companies to design, develop, and deliver products faster to the consumer through virtual distribution channels. A major priority of e-business is the fast and reliable delivery of not only products, but also content and information to be used in the design, development, and manufacturing process for an optimized business experience (Kryswnos, 2000).

E-business has allowed for the creation of large relational databases making a wealth of information readily available to organizations and their consumers (Johnson, 2001). Because information is readily available, buyers' expectations for quicker product introductions are now a requirement for business operating in a virtual environment. These competitive pressures will have an impact on those businesses that are taking a "wait and see" stance and are late adaptors (Milligan, 2000). It is critical in a highly dynamic environment, such as operating in a trade exchange or on the internet, where new product definition requires a shortened period of time, that a company introduces what is referred to as "real-time definition" (Bhattacharya *et al.*, 1998; Sanchez and Mahoney, 1996). This means that a firm adapts its product definition process to the market and competitive environment. Bhattacharya *et al.* (1998) state "uncertainty in the product definition is resolved through frequent, repeated interactions with customers and using a flexible development process."

B2B emphasizes the reduction of time-to-market as a major goal with primary focus on shortened product development time. Rosenau (2000) believes that developing new products faster will result in more timely technology, designs based on more current market research, greater credibility with organization leadership and capital markets, overall lower development and investment costs, preempt competition, more new products introduced per year, more sales and profits, and greater retention of engineering and technology-related personnel. This is the ultimate for many lower tier suppliers that are already struggling to merely survive under today's operating conditions and gloomy economic outlook and may not have the necessary financial resources or organizational stability to pursue B2B.

Success in new product development in the new economy requires flexibility. Although concurrent engineering has been in vogue for sometime and is practiced inconsistently, the sequential product development processes are inefficient, will likely lead to early obsolescence, and are not likely to work in the fast-paced world of e-business (Christman, 2000). Because of the availability of computer-aided design technology, the future will be the elimination of physical prototype models allowing for quicker response to customer requirements and shortened life cycles. The real obstacle

for suppliers is supporting multiple design software capabilities of numerous customers and trading exchanges. Internal manufacturers and suppliers have been working slowly towards functioning in workgroups and enterprise collaboration. Collaborative technologies, such as those offered by trading exchanges, allow designers and engineers to work together closely by sharing information online (Christman, 2000).

Product realization is highly dependent on maintaining and upgrading the skills of designers as well as the information technology personnel associated with enabling the entity to operate through trading exchanges. Failure to maintain and upgrade skills will result in a loss of the distinctive competency gained by entering the e-business arena.

The performance objectives in new product development such as product flexibility, product development time, design innovation, and product technological innovation reveal the significance of integrating product development and quality management systems (Gunasekaran, 1998). Concurrency will lead to minimization of product realization cycle and promote quality management throughout the entire value chain as a key strategic initiative. Integration of quality management during design phase of the product will take care of all the quality related problems during the design phase as well as at all other stages of operation (Gunasekaran, 1998).

2.1.5 Quality management and product. Customer's wants and needs, translated into the technical requirements using tools such as quality function deployment, cannot be viewed as the responsibility of the organization's marketing or quality functions (Zineldin, 1999). Virtual quality suggests that the culture and tools of conformance assurance and continuous improvement that have evolved are to be integrated into the work processes they now support (Taormino, 1999). In other words, quality function deployment involves more than marketing or quality functions; it is likely to involve design engineering, manufacturing, purchasing, finance, and other possible organizations that this particular process affects. This supports Taormino (1999) who believes that a holistic system of contingent processes should focus on a need to make the traditional quality disciplines or quality planning and management, procurement control, design control, process control, metrology, non-conformance control, quality audits, training, and statistical methods an integral part of the value delivery system in a virtual environment instead of an appendage and a separate cost center. Quality management should not be recognized as a discipline but an integrated part of strategic initiatives to meet customer requirements by creating loyalty and a continuing, on-going relationship no matter what the distribution channel, virtual or traditional.

2.1.6 Procurement and industrial consumer price. With dynamic trading, the internet makes actual supply and demand more apparent and prices will generally fall to their lowest competitive point as the demand varies (Modahl, 2000). Real-time information allows for more competitive prices than the bricks-and-mortar businesses may be able to provide. A concern for business is managing costs and profitability in this environment. Although a company may offer the lowest competitive price, offering a price that is insufficient to cover costs poses risk to profitability, long-run business viability, and future product development efforts. A traditional bricks-and-mortar supplier dually operating in an internet environment will require a management information system with accurate cost data to meet physical and virtual business

opportunities. Currently, real-time cost and financial data may not be a reality for some suppliers operating in a bricks-and-mortar environment, which is a potential barrier to successfully operating through a trading exchange or through a company-based web site. Price sensitivity may be a real concern. Wilder (1997) states that price information alone is very imperfect luring online consumers with the lowest price, and it tells nothing about reliability, product availability, supplier behavior or delivery performance.

2.1.7 Customer relationship management and competitive pressures. Consistent delivery performance and attentive customer service are critical in both a bricks-and-mortar and e-business environment. Because the later trend focuses more on electronic exchange than human interaction, customer interface becomes increasingly more important. Customer interface includes strengthening relationships with existing consumers as well as strategies for acquiring new consumers (Herman, 2000). Placing a middleman like a trading exchange between the supplier and the buyer poses special issues that may impact customer relationship management.

Although the relationship is changed in e-business exchanges, many believe that failure to utilize the internet may result in competitive disadvantage (Nelson, 2000). E-business has helped many companies reach a goal they have sought for more than a decade, a true partnership between information technology and business executives to deploy technology for competitive advantage (Wilder and McGee, 2000). It is inevitable that companies will compete online through trading exchanges and continue to distribute through traditional channels; the competition not only is their traditional competitors but they are competing against themselves, bricks-and-mortar versus online trading. Epstein (2000) states:

If you don't steal business from your own company, your competitors will.

This may sound radical but it is reality. Savvy traditional bricks-and-mortar businesses understand this and are moving fast to embrace the internet, or at least they should or they will find themselves out of business (Barrenechea, 2001).

Customer relationship management systems combine the application of software and management practices to serve the customer from order through delivery and after-sales service (Kleindl, 2001). Because the faces of customer relationships are dramatically changed by e-business and trading exchange transactions, companies that place emphasis on this aspect of their electronic distribution will gain a competitive advantage. Some companies are leveraging technology to deliver service online with many e-commerce companies negligent at online contact and response (Kleindl, 2001). Successful CRM integrates sales, marketing, and service strategy that depends on coordinated activities by all departments within a company rather than being driven or managed by one single, functional department (Rayport and Jaworski, 2001).

The nature of e-business has placed the customer in control with the ability to peer into the depths of the supply chain and have quicker access to information from a multitude of suppliers (Reynolds, 2001). Customer care begins with product and service support for existing products (Poirier and Bauer, 2000). However, advanced supply chain management is critical, with focus on the customer and also on the supply base. Not only does a supplier need to react quickly to its customers, it must also get its

supplier to respond to meet the customer's requirements. This changes the face of customer relationship management and places more focus on the development and engineering aspects of the business. In the past it was primarily driven by marketing, sales, and customer service operations. This creates more pressure to focus on interdisciplinary process and places emphasis on modifying the structures of the organization and the culture changes required to operate in these new distribution channels.

2.1.8 Cultural change impact. Schein (1997) defines culture as a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. This definition serves as a basis for a company's ability or inability to adapt to the rapidly changing environment, especially traditional organizations with inflexible structures. Not only should the adaptation of new members be considered, but also the ever increasingly changing adaptations required for existing members of an organization in the throws of any major change initiative such as expanding into e-business.

According to Beer and Nohria (2000), most traditional organizations have accepted, at least in theory, that they must either change or die and internet companies recognize that they need to manage the changes associated with rapid entrepreneurial growth into a new business sector. It is important for the CEO to set the tone for the kind of corporate culture that adopts e-initiatives. Trust is a part of that culture, not only with internal employees but also with the entire supply chain and extended enterprise (Grossman, 2004; Kwon and Suh, 2004).

2.1.9 Supply chain management and development. Under an internet based trading scenario, traditional supplier bidding processes will be greatly modified. The e-business model will focus on locating suppliers with innovative technologies who can provide cost reductions, quality improvements, and consistently strong delivery performance. Lack of participating in a trading exchange or not having a company-based website will exclude some suppliers from future product programs or expanded global opportunities. Effective integration of suppliers, distributors, and customers into the product value/supply chain will be key factors for manufacturers in achieving improvement necessary to operate in an e-business environment and to remain competitive (Handfield *et al.*, 1999).

Each supplier to the OEM market, to operate most effectively, will need to promote the benefits of operating through trading exchanges. Initial infrastructure investment is likely to be a concern for most tier 2 and below suppliers. Ultimately this cost will be passed up through the supply chain to the OEM. Because of the pressure that may be placed on lower tiered suppliers by tier 1 suppliers, it is possible that a company will be abandoned by some of its suppliers if it is not willing to take the risk nor invest in costly, unproven benefits of forging into electronic trading (Shah, 2001c). This could require operating through traditional trading channels, especially if no supply source is willing to operate under the company's electronic trading terms.

A major consideration involves selection of the trading exchange, affiliated or independent, and if all business can be conducted exclusively with one exchange. It is possible that a supplier could provide products to OEMs who are operating through numerous exchanges. There may also be a concern regarding the exclusive operation

in one exchange that may limit the opportunities and exposure to multiple OEMs. If the exchange were to fail or greatly reduce its operations, all the company's "eggs are in one basket", leaving it in a precarious position.

A supplier will need to evaluate which exchanges its customers/buyers operate. Another factor will be the cost and exposure of participating in numerous channels. Exposure will be greater by participating in more than one exchange. But will the benefits be greater than the costs by doing so? Operating in several exchanges could become a burden because of the different information technology applications employed by each of the exchanges and there is not a common platform.

2.1.10 Information management. Migration to an e-business strategy requires significant data management challenges such as web-based customer or trading exchange interfaces that generate huge volumes of incoming and outgoing data on customers and their interactions. Operating in multiple exchanges may require increased attention to operating platforms and the different information technology applications facilitating transactions and exchanges. Because each trading exchange is competing for participation, there has been no movement or desire to communize computing platforms. A supplier needs to have an open systems approach, especially when participating in several exchanges.

2.2 Research model

The research study and literature review have focused on aspects a supplier must evaluate and consider when making decisions regarding distribution channels. These channels include traditional relationship based channels, company-owned and operated websites, and participation in trading exchanges, affiliated and/or independent to form an integrated business model. Information management facilitates the other processes. Figure 3 illustrates the processes and aspects associated with providing products and services through multiple channels, which requires an integrated organization.

2.3 Discussion of research model

The integrated business model was formulated based on the concepts and dimensions of a traditional approach. However, each of the components was further defined in the context of operating in an integrated organization that distributes thorough traditional and virtual distribution channels. The primary focus of the research model discussion emphasizes the concepts and dimensions necessary for moving into the virtual distribution channels specifically as they relate to trade exchanges. At this point speculation is a key to developing theory in a qualitative study. Speculation involves anticipating what will happen in the future, based on what has been learned in the past about constructs and linkages among them and on comparisons between knowledge and what presently is known about the same phenomena (Merriam, 1992). Figure 3 reiterates the discoveries and aided in the development of the proposed integrated business model.

3. Methodology

Case study methodology can be applied to both qualitative and quantitative studies. The primary focus of this study was to address issues surrounding suppliers' choice into new and different distribution channels associated with trading exchanges,

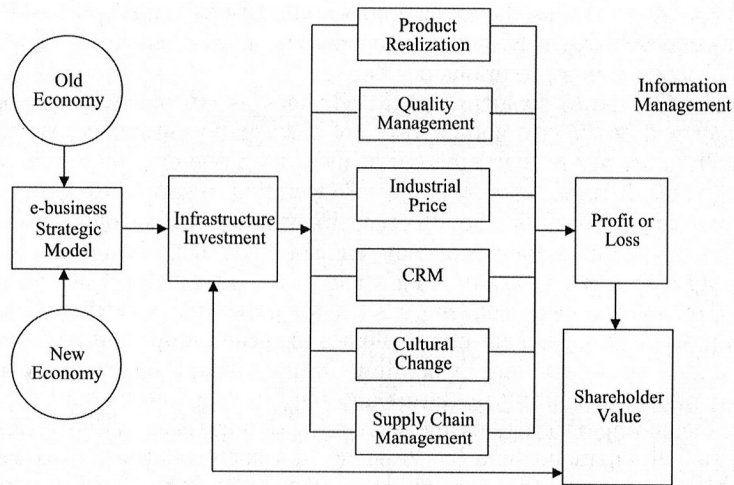


Figure 3.
Integrated e-business
model industrial suppliers

affiliated or independent. The factors and issues studied were of a qualitative nature as opposed to quantitative, where hard facts and data would be available. Qualitative research focuses primarily on the inquiry and information gathering to help understand and explain the meaning of particular phenomena (Merriam, 1992). A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context (Yin, 1994).

There are a limited number of empirical studies that address the issues associated with electronic trade exchanges on the internet (Lieb and Bentz, 2004; Min and Mentzer, 2004; Sakaguchi *et al.*, 2004; Soliman and Janz, 2004). There has also been some case analysis (Clark and Lee, 2000; Dai and Kauffman, 2002; Versendaal and Brinkkemper, 2003; Themistocleous *et al.*, 2004). Before a quantitative study can be initiated, it is necessary to develop the foundation of grounded theory and to formulate a proposed business model after thorough investigation of the phenomenon through literature reviews. Although there are numerous theories that have been posited by several researchers (Walters and Lancaster, 1999; Bovel and Martha, 2000; Cross, 2000; de Figueiredo, 2000; McWilliam, 2000; Reichheld and Scheffer, 2000; Taylor, 2000; Wise and Morrison, 2000; Lee and Whang, 2001), several studies have focused on the how-to, barriers, myths, and assumptions (Brache and Webb, 2000; Oliver, 2000; Venkatraman, 2000; Williams and Cothrel, 2000; Czuchry *et al.*, 2001; Rangan and Adner, 2001) without applying or testing these theories. As the numbers of companies expand their distribution channels, quantitative data can be gathered regarding the various concepts and dimensions identified in this study.

In this study, the phenomena being investigated involve suppliers' integrated business model, the related concepts and dimensions, and whether the trade exchange distribution channel will serve them well. Because this area of research is rapidly developing, the literature review focused on studies and related concepts as well as specific information on the topic.

The integrated business model developed from the literature review serves as the basis for evaluating the trade exchanges. Three trading exchanges were evaluated. Two independent and one affiliated trade exchanges were evaluated. One of the

independent trade exchanges was initially an affiliated exchange until the subsequent sale to an independent company.

4. Background and history of key B2B intermediaries

Prior to comparing each of the B2B intermediaries to the variables and criteria a supplier considers for an integrated strategy, it is necessary to provide some background and history about each of the companies.

483

4.1 Covisint LLC

Covisint is an affiliated trading exchange. As defined earlier, an affiliated exchange is characterized as being owned by some of the organizations that are buying and/or selling products. Because Covisint is an affiliated exchange, many of the stakeholder/owners are original equipment manufacturers requiring their suppliers and their suppliers' suppliers to conduct all product related activities through the exchange. Upon the establishment of the Covisint venture in December 2000, DaimlerChrysler AG, Ford Motor Company, General Motors, Nissan, and Renault were named as the initial five OEM partners with an equity stake in the venture. As of January 2005, the number of business partners has been expanded and includes DaimlerChrysler, Delphi Automotive Systems, Ford Motor Company, General Motors, Johnson Controls Inc., Lear Automotive, PSA Peugeot Citroen, and Visteon (Covisint, 2005). Covisint serves over 20,000 companies and provides services in 96 countries (Covisint, 2005).

This represents an unusual strategic partnership among obvious competitors that have developed somewhat common standards for quality and product development activities through the Automotive Industry Action Group (AIAG). On the surface it may appear that there is potential opportunity for collusion, especially when dealing with same suppliers and similar products on competing vehicles. The focus is to turn the suppliers into strategic partners with the OEMs in hopes of streamlining processes with overall emphasis on cost reduction and integrated systems approach. This requires a rethinking for buyer-supplier relationships by turning suppliers into strategic partners (McDowell and Simon, 2001). Because most automotive suppliers conduct business with the major OEMs, they are being mandated to use this exchange. The OEMs are pressing their suppliers to get the lower tier and small suppliers on board.

In over four years of existence, Covisint has facilitated a large number of supply transactions that are impressive. Initially Covisint served as a transaction processing entity and an auction-services provider. In January 2004, Covisint LLC spun off its auction business and was purchased by FreeMarkets Inc. (Anonymous, 2004). Although they have been successful, the Federal Trade Commission has been watching very closely because of the ownership by competitors and the potential for price fixing opportunities (Karpinski, 2001; Foer, 2001). The infrastructure of any trading exchange requires the use of collaborative commerce applications to include integrative forecasting tools and design software that are currently in the development phase or have not been fully implemented (Milligan, 2000). This poses problems for both suppliers and OEMs since the entire process of operating on an exchange is based on the information technology infrastructure.

4.2 Automotive Network Exchange (ANx)

ANx was one of the first initiatives in trading exchanges. In 1994, the Detroit-based Automotive Industry Action Group (AIAG) took a major step forward to standardize interface between customers and suppliers in the automotive industry (ANx, 2000). In 1999, ANx was the world's largest extranet, trading exchange initiative with fewer than 30 active participants, with a goal of 10,000 plus (Wilder, 1999). Although ANx had lofty expectations, the progress of online trading channels was off to a rather slow start. It was not surprising for AIAG to be a leader in developing standards for the automotive industry and this was one of a long list of initiatives that it chose to support. The AIAG wanted to develop a global, secure infrastructure, which the internet alone could not provide (Anonymous, 1999). In December 1999, ANx was purchased by San-Diego based Science Applications International Corporation (SAIC) (Stedman, 1999). One of the reasons ANx did not succeed at the expected rate was because of the different views held by each of the automakers and the formation of Covisint in December 2000.

The new owners of ANx did not change the name of the exchange. In January 2005, ANx is connecting more than 900 companies and still primarily supports the automotive industry (ANx, 2005). ANx has found that its supply-chain model not only works with products but also is a strong fit for the health-care industry and Blue Cross/Blue Shield is a participant (ANx, 2001). Although ANx is an independent trading exchange, it still experiences some of the same woes of the affiliated exchange, Covisint. There is apprehension by small suppliers to join because of cost uncertainty. There is no difference in structure between an affiliated and an independent trade exchange as illustrated earlier in Figure 2.

2.3 Ariba (formerly FreeMarket)

Trade exchanges were in their infancy in 1995 when Glen Meakem decided to start his own company, known as FreeMarkets Inc. in Pittsburgh, focusing on B2B transactions primarily in the coal mining and auto manufacturing industries (Crockett and Meakem, 1999). As a visionary while at GE, Meakem proposed his bold new business approach to CEO Jack Welch and provided him an investment cost of \$10 million (Tully, 2000). The idea was simple, radical, and thought to be rather expensive but would allow GE to operate more efficiently and cost effectively in the global marketplace with ultimately large savings (Tully, 2000). FreeMarkets set standards for trade exchanges and served as a model for Covisint and other trading exchanges. In fact, GM was one of FreeMarkets' earliest participants along with semiconductor, metal stampings, aluminum, packaging material, circuit board and a large number of other suppliers (Tully, 2000).

Although these exchanges seem to facilitate transactions faster, there is a cost of adding an intermediary like FreeMarkets or any trade exchange. Because the number of trade exchanges is growing, there needs to be a compelling advantage to participate in one trading exchange over another or decide to utilize several. Your decision may depend on if you are on the buy or the supply side, and the fees a company is paying to participate along with investment costs. Because FreeMarkets does not focus on one industry, it may find difficulty in attracting certain industries that have their own exchanges because they are not offering customized services or research capabilities (Schaff, 2000).

Like other exchanges, FreeMarket has selected its own software, in addition to its proprietary BidWare, requiring users to learn multiple packages and have many different interfaces (Moozakis, 2001). Since some suppliers cannot afford to invest or participate in multiple trade exchanges, and since FreeMarkets is not industry specific, continuing to support proprietary software selection and implementation may have an impact on its earnings power (Shah, 2001a, b; Hill, 2001).

In January 2004, Ariba, an enterprise spend management software provider, purchased reverse auction service and software provider FreeMarkets (Hannon, 2004). This acquisition beefed up Ariba's earlier service offerings, which prior to the acquisition, primarily focused on indirect materials, whereas FreeMarkets emphasis is on direct materials (Hannon, 2004). Unlike Covisint and ANx who primarily serve the automotive industry, Ariba serves companies in a multitude of industries which include Ariba's numerous clients span such diverse industries as consumer products, energy, financial services, high technology, manufacturing, pharmaceutical, public sector and higher education, and telecommunications, and transportation.

2.4 ChemConnect

Founded in 1995 as a bulletin board site, ChemConnect has since grown as a leader in helping companies optimize their purchasing and sales processes for chemicals feedstocks, chemicals, plastics, and related products through the use of e-commerce (ChemConnect, 2005). There are more than 9,000 member companies in 150 countries (ChemConnect, 2005). ChemConnect is different from the previously discussed trading exchanges in that it is a commodity markets platform allowing a one-stop connecting buyers and sellers worldwide. It serves as both a transactions processor and an auction site providing value-added services to its user base. There are different levels of services through this third-party provider that allows companies to choose what best meets their needs. Key members of ChemConnect include Abbot Laboratories, Atofina, BASF AG, Borden Chemical, BP Conoco Philips, Crompton Corporation, The Dow Chemical Company, DSM NV, DuPont, Enterprise, ExxonMobil, Ferro Corp, Flint Inc., GE Plastics, HB Fuller, Honeywell, ICI, Koch, Louis Dreyfus, Lubrizon Corporation, Lyondell, Occidental Chemicals Corporation, Rohm and Haas, Shell Chemicals, Sun Chemical, and Valero Energy Corporation (ChemConnect, 2005).

5. Case study comparison of integrated strategy to B2B intermediaries

Based on a review of secondary data, as opposed to primary data, a comparison was conducted of different B2B intermediaries focusing on the model elements and how it supports the industrial product suppliers (Table I).

6. Discussion

6.1 Analysis of comparison

Each trade exchange offers a different set of customers and suppliers vying for business opportunities. Because there is not a common platform for software and hardware, suppliers may not be able to integrate their existing systems with every exchange. Most suppliers' systems, structures, and processes are established to operate in a traditional tiered approach (Figure 1). Moving to the hub-and-spoke model (Figure 2) and adding an intermediary, adds to the existing complexity involved in operating in certain industries such as the automotive industry. Because many of the

Table I.
Comparison of integrated
strategy components

Concept description	Covisint	ANx	Ariba	ChemConnect
Distribution channel Infrastructure investment	Affiliated exchange, automotive industry focus Small supplier can have limited capability at low cost. May be cost prohibitive to have full capability. It is web-based accessed through a browser. Covisint or customer applications may not be compatible with supplier's existing systems. There are no cost estimates provided regarding the investment required for the supplier's internal operations	Affiliated exchange, automotive industry focus Third-party provider software is required for any supplier interested in using this exchange. May require the addition of infrastructure on supplier's end. There are no cost estimates provided regarding the investment required for the supplier's internal operations	Independent exchange, multiple industry focus Ariba's content solutions give suppliers the ability to cost-effectively create and manage their product data, either within their existing e-commerce infrastructure or on the Ariba Supplier Network (open systems approach). There are no cost estimates provided regarding the investment required for the supplier's internal operations	Affiliated exchange, industries requiring chemicals ChemConnect offers multiple options so you can connect to your suppliers, customers, third-party service providers, and supply chain partners (ChemConnect, 2005) (open systems approach). There are no cost estimates provided regarding the investment required for the supplier's internal operations
Product realization capability Quality management	Industry and customer specific No auction capability; meet customer requirement	Industry and customer specific Meet customer requirements	Open systems Online auction capability; meet customer requirement for transactions Transaction fees and subscription fees	Open systems Online auction capability; meet customer requirement for transactions Transaction fees based on purchases, subscription fees based on the sales dollar of companies impacted by virtual transactions; customer service by e-mail
Procurement and industrial consumer price CRM	Transaction fees and subscription fees Sales and marketing telephone number allows for contacting the company 24/7 If voice response is important, this is available	Subscriber fees determined by bandwidth Sales and marketing telephone number allows for contacting the company 24/7 If voice response is important, this is available	Sales and marketing telephone number allows for contacting the company 24/7 If voice response is important, this is available	Transaction fees based on purchases, subscription fees based on the sales dollar of companies impacted by virtual transactions; customer service by e-mail
Cultural change/ social structure	Industry and company specific standards Requires basic to complex capabilities; depending on company size and needs	Industry standards Requires basic to complex capabilities; depending on company size and needs	Industry standards Requires basic to complex capabilities; depending on company size and needs	May be difficult to reach a person via telephone at exchange or customer Industry standards
SCM and development Information management	Industry and company specific standards Requires basic to complex capabilities; depending on company size and needs	Industry standards Requires basic to complex capabilities; depending on company size and needs	Industry standards Requires basic to complex capabilities; depending on company size and needs	Industry standards Requires basic to complex capabilities; depending on company size and needs

suppliers have implemented their technology based on its customers' ever changing and various requirements, adding yet another information technology standard, will stretch the thin financial basis and increase the potential to put some suppliers out of business. Surviving suppliers may selectively choose the business relationships pursued because they can no longer afford to supply all of the customers operating on numerous trading exchanges. The result could have an impact on the lower tier suppliers that are already struggling to operate efficient processes under the traditional tiered model. Shortages of certain suppliers at the lower model are eminent because of the movement by OEMs to participate in trade exchanges.

6.1.1 Infrastructure investment. In reviewing the table and the multiple trading exchanges, there are both industry specific closed systems as well as some open system platforms. However, the supplier may need to go with the intermediary where their customer is a member or participant. In most cases basic capabilities are available through web-based browsers. To gain greater capability, requires an investment. In reviewing the different intermediaries, the supplier internal investment cost estimates are not provided. Only the membership, subscription, and/or transaction fees are provided. As discussed earlier, companies need to make an initial investment along with a long-term plan for maintaining this capability.

6.1.2 Product realization capability. There is industry specific, and in the case of Covisint, there are customer specific portals and requirements. Operating in multiple environments may require investing in numerous EDI capabilities for compatibility in exchanging product design information. This would be quite costly for a small supplier.

6.1.3 Quality management. Quality management is still determined by the customer. The exception is the auction capability. The customer buys from the supplier at the negotiated price the overstock or product as determined by the posted specifications. Since most companies in the automotive industry have achieved ISO 9001, QS 9001, and/or ISOTS 16949, this is likely a part of the contract to purchase from the supplier.

6.1.4 Procurement and industrial consumer price. An additional cost of purchasing industrial products includes the transaction and subscription fees. Although it may not be a specific line item, in a quote, it is definitely a part of the selling, general, and administrative expenses of a supplier operating through the intermediary. In reality, it should be considered as a part of the purchase price for the product.

6.1.5 CRM. Most intermediaries have a 24/7 access number and e-mail contact capability. However, this does remove the face-to-face negotiations and transactions of the past under the old model.

6.1.6 Cultural change/social structure. Dealing with a person even in a telephone voice exchange can be a smoother transition than purely virtual exchanges of information. However, most of the transactions are automated and streamline the processes, thereby reducing the number of people/human interaction involved. This is a change from the old model.

6.1.7 Supply chain management and development. By reviewing the websites it was difficult to discern the level of supply chain management and development. However, suppliers still need to adhere to quality, industry, and company specific standards. This was readily apparent where the Covisint website has customer specific portals.

6.1.8 Information management. Depending on the capability the supplier desires, will determine the level of information management required to operate in this environment.

6.2 Lessons for practitioners

Because suppliers are mandated to participate in some form of exchange, delaying the decision could cause long-term and potential loss of existing business and future opportunities. Most suppliers provide products and services to several OEMs; and if they are unable to operate financially in more than one trade exchange they will need to identify the exchange that offers the largest sales and profit opportunities for existing and future business.

Suppliers must carefully operate in the future by evaluating each customer and determining which trade exchanges will provide them with the greatest benefit at the lowest cost. The infrastructure investment is an unavoidable cost that cannot be foregone unless the supplier wants to discontinue providing to most of its customers. In the past few years, many tier one suppliers have purchased lower tier suppliers to ensure supply of products. A supplier could consider selling to at least recoup some of the business investment.

The focus needs to be on the long-term direction of the business entity with primary focus on the integrated business model of bricks-and-mortar and e-business distribution channels. The supplier needs to look at all aspects identified in the integrated business model and the foundation and facilitation for success lies in the information management of the entire entity.

6.3 Implications for future research

Although the research model covered many areas, virtual manufacturing could be another key area to be addressed regarding operating through internet-based channels, either through trading exchanges or company-based websites.

There are concerns that suppliers have regarding participation in these trade exchanges such as privacy and security, ever-changing software and hardware requirements, long-term business viability, and unknown costs.

The next step is to develop a survey questionnaire to solicit information from industrial product suppliers regarding how the different components of an integrated strategy have been addressed in their specific operations. An important link will be to determine whether a statistical significant model exists to predict the performance of key measures like customer satisfaction, increased sales, reduced information systems costs, reduced transaction processing time, and increased turnaround for customer requests, to name a few. The automotive industry will be the target for this next study to learn more about their strategies. This will be an important contribution to the body of knowledge for practitioners and the academic world.

7. Conclusion

The world of supplying in any industry is rapidly changing. No longer can suppliers of industrial products use traditional face-to-face relationships to sell its products. Technology facilitates the exchange of goods and services in a global marketplace. By failing to recognize and expand on these opportunities, suppliers will not be able to serve. There will be a transition period where suppliers will still be able to operate in

the traditional tiered model. Over time they will be required to communicate and transact most of the business through a trade exchange. This will require an initial investment for infrastructure and continuing long-term strategy to integrate existing business processes with necessary future technology. It may require suppliers to make significant business decisions regarding the customers they want to continue to do business with and whether they can support operating through more than one trade exchange. These are challenges that are faced by most business, and to succeed, they must have a well thought out integrated business model.

References

- Anonymous (1999), "Roll out the superhighway", *Supply Management*, Vol. 4 No. 13, pp. 26-7.
- Anonymous (2004), "Automotive brief – FreeMarkets Inc.: auction-services business to be acquired from Covisint", *Wall Street*, (accessed January 2, 2004).
- ANx (2000), "ANx e-business services and benefits", available at: www.anx.com/service_benefits/ (accessed November 15, 2000).
- ANx (2001), "Meet the ANx community", available at: www.anx.com/community/network-subscribers.html#B (accessed September 27, 2001).
- ANx (2005), "ANxeBusiness – ANX Network", available at: www.anx.com (accessed January 19, 2005).
- Bacharach, S.B. (1989), "Organizational theories: some criteria for evaluation", *Academy of Management Review*, Vol. 14 No. 4, pp. 496-515.
- Barrenechea, M.J. (2001), *E-business or Out of Business*, McGraw-Hill Publishers, New York, NY.
- Beer, M. and Nohria, N. (2000), "Cracking the code of change", *Harvard Business Review*, Vol. 78 No. 3, pp. 133-41.
- Bhattacharya, S., Krishnan, V. and Mahajan, V. (1998), "Managing new product definition in highly dynamic environments", *Management Science*, Vol. 44 No. 11, pp. 50-64.
- Binns, S. (2004), "Ariba buys FreeMarkets and plans system merger", *Supply Management*, Vol. 9 No. 3, p. 12.
- Blalock, H.M. (1969), *Theory Construction: From Verbal to Mathematical Formulations*, Prentice-Hall, Englewood Cliffs, NJ.
- Bovel, D. and Martha, J. (2000), "From supply chain to value net", *Journal of Business Strategy*, Vol. 21 No. 4, pp. 24-8.
- Brache, A. and Webb, J. (2000), "The eight deadly assumptions of e-business", *Journal of Business Strategy*, Vol. 21 No. 3, pp. 13-17.
- ChemConnect (2005), "Welcome to ChemConnect", available at: www.chemconnect.com/ (accessed January 19, 2005).
- Chow, W.S. (2004), "An exploratory study of the success factors for extranet adoption in e-supply chain", *Journal of Global Information Management*, Vol. 12 No. 1, pp. 60-7.
- Christman, A. (2000), "CAD/CAM, e-business and the internet", *Modern Machine Shop*, Vol. 72 No. 11, pp. 184-6.
- Clark, T.H. and Lee, H.G. (2000), "Performance, interdependence and coordination in business-to-business electronic commerce and supply chain management", *Information Technology and Management*, Vol. 1 Nos 1/2, pp. 85-105.
- Covisint (2005), "Covisint.connect.communicate.collaborate", available at: www.covisint.com/ (accessed January 19, 2005).

- Crockett, R.O. and Meakem, G. (1999), "Freemarkets Inc.", *Business Week*, No. 3648, pp. 32-3.
- Cross, G.J. (2000), "How e-business is transforming supply chain management", *Journal of Business Strategy*, Vol. 21 No. 2, pp. 36-40.
- Czuchry, A.J., Yasin, M.M. and Bayes, P. (2001), "Are you in control of your e-commerce strategy?", *Information Strategy*, Vol. 17 No. 3, pp. 6-11.
- Dai, Q. and Kauffman, R.J. (2002), "Business models for internet-based B2B electronic markets", *International Journal of Electronic Commerce*, Vol. 6 No. 4, pp. 41-72.
- de Figueiredo, J.M. (2000), "Finding sustainable profitability in electronic commerce", *MIT Sloan Management Review*, Vol. 41 No. 4, pp. 41-52.
- Epstein, M.J. (2000), "Organizing your business for the internet evolution", *Strategic Finance Magazine*, Vol. 82 No. 1, pp. 56-60.
- Feigenbaum, A.A. and Feigenbaum, D.S. (1999), "New quality for the 21st century", *Quality Progress*, Vol. 32 No. 12, pp. 27-31.
- Foer, A.A. (2001), "E-commerce meets antitrust: a primer", *Journal of Public Policy & Marketing*, Vol. 20 No. 1, pp. 51-63.
- Gould, L.S. (2003), "Suppliers talk about e-business: it's becoming business as usual", *Automotive Design & Production*, Vol. 115 No. 6, pp. 38-40.
- Grossman, M. (2004), "The role of trust and collaboration in the internet-enabled supply chain", *The Journal of American Academy of Business*, Vol. 5 Nos 1/2, pp. 391-6.
- Gunasekaran, A. (1998), "An integrated product development-quality management system for manufacturing", *The TQM Magazine*, Vol. 10 No. 2, pp. 115-23.
- Hackney, R., Griffiths, G. and Ranchhod, A. (2002), "Towards an e-commerce business strategy", *International Journal of Services Technology and Management*, Vol. 3 No. 1, pp. 39-53.
- Handfield, R.B., Ragatz, G.L., Petersen, K.J. and Monczka, R.M. (1999), "Involving suppliers in new product development", *California Management Review*, Vol. 42 No. 1, pp. 59-82.
- Hannon, D. (2004), "SupplyOn takes on North American market", *Purchasing*, Vol. 133 No. 13, pp. 14-15.
- Herman, J. (2000), "A rare moment in time", *Business Communications Review*, Vol. 30 No. 2, pp. 22-3.
- Hill, S.J. (2001), "The perfect e-business platform", *Manufacturing Systems*, Vol. 19 No. 5, pp. 18-19.
- Johnson, D.M. (2001), "Delivering high quality/low-cost products to the consumer and profits to the shareholders: can it be done in the e-commerce environment?", Portland International Conference on Management of Engineering and Technology, Portland, OR, PICMET and Portland State University.
- Kaplan, S. and Sawhney, M. (2000), "E-hubs: the new B2B marketplaces", *Harvard Business Review*, Vol. 78 No. 3, pp. 97-103.
- Karpinski, R. (2001), "Net market slaps Big 3 with lawsuit", *B to B*, Vol. 86 No. 2, pp. 1-2.
- Kleindl, B.A. (2001), *Strategic Electronic Marketing: Managing E-business*, Southwestern Publishing/Thompson, Cincinnati, OH.
- Konicki, S. (2001), "Great sites: Covisint", *Information Week*, August, pp. 18-20.
- Kryswonos, R. (2000), "What happens after the 'buy' button is hit?", *Communications News*, Vol. 37 No. 7, pp. 60-2.
- Kwon, I.G. and Suh, T. (2004), "Factors affecting the level of trust and commitment in supply chain relationships", *Journal of Supply Chain Management*, Vol. 40 No. 2, pp. 4-14.
- Lapierre, V. (2001), *Winning Strategies for B2B E-commerce*, Isabelle Quentin, Toronto, Ontario.

- Lawler, E.I. (1996), *From the Ground up: Six Principles for Building the New Logic Corporation*, Jossey-Bass Inc. Publishers, San Francisco, CA.
- Lee, H.L. and Whang, S. (2001), "Winning the last mile of e-commerce", *MIT Sloan Management Review*, Vol. 42 No. 4, pp. 54-62.
- Lieb, R.C. and Bentz, B.A. (2004), "The use of third-party logistics service by large American manufacturers: the 2003 survey", *Transportation Journal*, Vol. 43 No. 4, pp. 24-33.
- McDowell, R.L. and Simon, W.L. (2001), *Driving Digital*, HarperCollins Publishers, New York, NY.
- McWilliam, G. (2000), "Building stronger brands through online communities", *MIT Sloan Management Review*, Vol. 41 No. 3, pp. 43-54.
- Merriam, S.B. (1992), *Qualitative Research and Case Study Applications in Education*, Jossey-Bass Publishers, San Francisco, CA.
- Milligan, B. (2000), "Research center has 10 warnings for Covisint", *Purchasing*, Vol. 129 No. 7, pp. 28-31.
- Min, S. and Mentzer, J.T. (2004), "Developing and measuring supply chain management concepts", *Journal of Business Logistics*, Vol. 25 No. 1, pp. 63-99.
- Modahl, M. (2000), *Now or Never*, Harper Business Press, New York, NY.
- Moozakis, C. (2001), "Reverse auctions application slashes cost big time", *Internetweek*, No. 848, p. 11.
- Nelson, G. (2000), "Exposed on the net: a comparison of internet business exposures with standard business policies", *CPCU Journal*, Vol. 53 No. 2, pp. 106-21.
- Oliver, R.W. (2000), "The seven laws of e-commerce strategy", *Journal of Business Strategy*, Vol. 21 No. 5, pp. 8-11.
- Phelan, J.A. and Smith, S. (2000), "Supplier-centric solutions", *Academy of Management Review*, Vol. 10 No. 10, pp. 43-9.
- Poirier, C.C. and Bauer, M.J. (2000), *E-supply Chain*, Berrett-Koehler Publishers Inc., San Francisco, CA.
- Rangan, S. and Adner, R. (2001), "Profits and the internet: seven misconceptions", *MIT Sloan Management Review*, Vol. 42 No. 4, pp. 44-53.
- Rayport, J.F. and Jaworski, B.J. (2001), *E-Commerce*, McGraw-Hill/Irwin, Boston, MA.
- Reichheld, F.F. and Scheffer, P. (2000), "E-loyalty: your secret weapon on the web", *Harvard Business Review*, Vol. 78 No. 4, pp. 105-13.
- Reynolds, J. (2001), *Logistics and Fulfillment for E-business*, CMP Books, New York, NY.
- Rosenau, M.D.J. (2000), *Successful Product Development: Speeding from Opportunity to Profit*, John Wiley & Sons, Inc., New York, NY.
- Sakaguchi, T., Nicovich, S.G. and Dibrell, C.C. (2004), "Empirical evaluation of an integrated supply chain model for small and medium sized firms", *Information Resources Management Journal*, Vol. 17 No. 3, pp. 1-19.
- Sanchez, R. and Mahoney, J.T. (1996), "Modularity, flexibility, and knowledge management in product and organization design", *Strategic Management Journal*, Vol. 17, pp. 63-76.
- Schaff, W. (2000), "FreeMarkets: still a lot to prove", *Information Week*, No. 797, p. 118.
- Schein, E.H. (1997), *Organizational Culture and Leadership*, Jossey-Bass, Inc. Publishers, San Francisco, CA.
- Shah, J.B. (2001a), "Adexa deal key to Freemarket's goal – provides software for direct materials purchasing", *Ebn*, No. 1250, p. 78.
- Shah, J.B. (2001b), "MiTAC, TI turn to FreeMarkets – both implement marketplace provider's B2B global platform", *Ebn*, No. 1262, pp. 60-1.

- Shah, J.B. (2001c), "Staying efficient despite tough market dynamics – Delphi is honing its supply chain practices, seeking to leverage the web, and looking to choose its suppliers based on their long-term strategies", *Ebn*, No. 1277, pp. 33-4.
- Shepherd, J. (1999), *Achieving Supply Chain Excellence Through Technology*, Montgomery Research, San Francisco, CA.
- Soliman, K.S. and Janz, B.D. (2004), "An exploratory study to identify the critical factors affecting the decision to establish internet-based interorganizational information systems", *Information & Management*, Vol. 41 No. 6, pp. 697-706.
- Spector, R. (2000), *Amazon.com*, Harper Business Press, New York, NY.
- Stedman, C. (1999), "Auto coalition sells extranet", *Computerworld*, Vol. 33 No. 50, pp. 1-2.
- Taormino, T. (1999), "Virtual quality", *The TQM Magazine*, Vol. 11 No. 5, pp. 299-303.
- Taylor, S. (2000), "E-commerce best practices", *APICS-The Performance Advantage*, Vol. 10 No. 11, pp. 38-44.
- Themistocleous, M., Irani, Z. and Love, P.E.D. (2004), "Evaluating the integration of supply chain information systems: a case study", *European Journal of Operational Research*, Vol. 159 No. 2, pp. 393-405.
- Trepper, C. (2000), *E-commerce Strategies*, Microsoft Press, Redmond, WA.
- Tsay, A.A. and Agrawal, N. (2004), "Channel conflict and coordination in the e-commerce age", *Production and Operations Management*, Vol. 13 No. 1, pp. 93-110.
- Tully, S. (2000), "The B2B tool that really is changing the world", *Fortune*, Vol. 141 No. 6, pp. 132-7.
- Vasilash, G.S. (2000), "Cars, the internet and vehicles that morph", *Automotive Manufacturing & Production*, Vol. 112 No. 1, pp. 16-17.
- Venkatraman, N. (2000), "Five steps to a dot-com strategy: how to find your footing on the web", *MIT Sloan Management Review*, Vol. 41 No. 3, pp. 15-28.
- Versendaal, J. and Brinkkemper, S. (2003), "Benefits and success factors of buyer-owned electronic trading exchanges: procurement at Komatsu America Corporation", *Journal of Information Technology Cases and Applications*, Vol. 5 No. 4, pp. 39-52.
- Walters, D. and Lancaster, G. (1999), "Using the internet as a channel for commerce", *Management Decision*, Vol. 37 No. 10, pp. 800-16.
- Weinberg, N. (2001), "B2B grows up", *Forbes*, September.
- Wilder, C. (1997), "E-commerce myths and realities", *Information Week*, Vol. 712, pp. 52-63.
- Wilder, C. (1999), "Slow revolution in e-commerce", *Information Week*, No. 720, p. 18ER.
- Wilder, C. and McGee, M.K. (2000), "Building out e-business", *Information Week*, Vol. 790, pp. 50-70.
- Williams, R.L. and Cothrel, J. (2000), "Four smart ways to run online communities", *Sloan Management Review*, Vol. 41 No. 4, pp. 81-91.
- Wise, R. and Morrison, D. (2000), "Beyond the exchange: the future of B2B", *Harvard Business Review*, Vol. 78 No. 6, pp. 86-96.
- Yin, R.K. (1994), *Case Study Research: Design and Methods*, Sage, Newbury Park, CA.
- Zaklad, A. and McKnight, R. (2004), "The social side of supply chain", *Industrial Engineer*, Vol. 36 No. 2, pp. 40-4.
- Zineldin, M. (1999), "Exploring the common ground of total relationship management (TRM) and total quality management (TQM)", *Management Decision*, Vol. 37 No. 9, pp. 719-28.