



The Five Immutable Laws of Universal Supply Chain Connectivity

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Abstract

Although the importance of the supply chain is well recognized and eCommerce is rapidly developing, the tremendous possibilities for eCommerce within the supply chain have not been obtained. The reason is that the small and medium sized (SME) enterprises within the supply chain have not been electronically connected. First, three immutable laws are presented that explain the current status and why SMEs have not been connected using eCommerce. Then Law Four states that targeted technology will be required to initially electronically connect the SMEs into the supply chain. Finally, Law Five describes the basic nature of the technology required to maximize the value of those connections into the future. Also, a case study is presented to describe and reinforce the nature of these Laws.

Introduction

Business-to-business electronic commerce is such a hot topic in 2001 that all anyone has to say is B2B eCommerce and interest is piqued. The forecast for B2B eCommerce is staggering. Goldman Sachs predicts that by the year 2005 the value of B2B transactions done online will be \$7.6 trillion. They project that eventually 80 percent of business-to-business commerce worldwide will be conducted online. However, today only a fraction of that number in transactions are done via B2B.¹

No one would argue that the Internet is not a revolutionary business tool. But the nature of its business use and its total impact is a point frequently debated.

The attention given to B2B eCommerce coincides with the recognition given to the importance of the Supply Chain. Prior to the 1990s, little was said about the impact of efficient and effective supply chains; however, by the late 1990s, the competitive importance of supply chains was well recognized.² As businesses enter the 2000s, the importance of supply chain integration is well recognized. Professor Lee of Stanford University observed that “The battle for market supremacy will not be between enterprises but between supply chains.”

Companies such as Proctor & Gamble demonstrate the impact of an effective supply chain. In 1997 P&G estimated that it saved retail customers \$65 million over 18 months as a result of improved supply chain management.³ By 2001 such terms as *integration*,

connectivity, synchronization and collaboration are frequently heard in relationship to supply chain management. But as the technology for connecting, sharing, and storing massive amounts of data matures, it appears that the actual supply chain connectivity is still lacking.⁴

Before continuing the discussion of supply chains, a review of its definition is insightful. A leading book defines supply chains this way:

A set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses and stores so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requests.⁵

Given this definition, it is easy to see that the supply chain is a complex network of facilities and organizations with different, conflicting objectives. As a result of this complexity, it is not difficult to understand why only a few large companies are even approaching efficient and effective supply chain management.⁶ Many stories can be read about the success of companies such as Wal-Mart, Cisco, Eddie Bauer and Dell. Many other descriptions have provided information on Amazon.com and the efforts of the likes of Drugstore.com but these later companies remain unprofitable.

Why has supply chain management not been totally embraced even though its potential impact is understood? Why is it that the Internet has not been totally utilized in an effort to maximize the potential of supply chain management?⁷ Why is the adoption rate of B2BCommerce at such an infancy stage given the power of the Internet?

The following discussion argues that an answer to these questions lies in the role of the small and medium sized enterprises (SMEs) that frequently make up the bulk of a supply chain. In many instances, 80 percent of the supply chain members are small and medium-sized enterprises.⁸ Five immutable laws are presented regarding SMEs and the supply chain to support this argument. After reviewing these laws, it will become evident that the future success of B2B eCommerce and the supply chain may *initially appear* to lie with large firms that receive the bulk of the attention. But the reality is that a major impact and savings may well be found with the SMEs within the supply chain.

Law #1: Enduring Supply Chain Rules Based on Electronic Commerce between Large Companies are Already in Place.

Business-to-business commerce is obviously nothing new. Supply chain management existed when Henry Ford bought grease from Rockefeller to pack the bearings on the Model-T Ford. From the beginning, the success of B2B Commerce has been dependent on many business rules. Quantity, pricing, discounts, method of delivery, cost of delivery, dates, return policy, payment terms, exceptions, variances, penalties and other considerations must be understood and adhered to by all parties involved in a given transaction.

The business documents that exchange this information carry contractual liabilities – they are not casual conversations. These business rules have been in place for as long as modern commerce has existed and will always remain necessary. However, managers have known for decades that a great deal of time-consuming paper work involved in exchanging business rules results in low accuracy. This poor efficiency is due to data-handling errors, high use of staff time and resources, and increased uncertainty in the form of both mailing and processing delays.⁹ The current quest for supply chain efficiency, however, has created a new demand to improve the quality and speed of data exchange by expanding the scope of business rule automation.

A Successful First Step: EDI

EDI was the first serious attempt to support inter-organizational electronic exchange of business rules. In 1990, United States automobile manufacturers estimated that EDI resulted in a \$200 per-car cost savings.¹⁰ And Navistar, a truck manufacturer, reduced average inventory levels by 33% with EDI.¹¹ During the late 1980s and early 1990s, companies that could afford the expense of implementing EDI quickly jumped on the opportunity and saved millions.

A 1989 article assisted in identifying potential firms as EDI candidates.¹² This article is important a decade later because it indicates the limitations of EDI. Two of the suggestions follow:

- Identify the few firms that generate the largest volume of paperwork
- Identify firms from which you place large orders

These points demonstrate the limited use of EDI. It is meant for only the large firms in the supply chain. The disadvantage is that EDI requires:

- A standard for (EDI standards)
- A translation capability (EDI software)
- A mail service (EDI network)

Such a system may cost millions. For instance, Campbell Soup Co. is said to have spent \$30 million in 1996 to develop its order-processing system around EDI.¹³ Because of these requirements and the associated costs, most EDI success stories come from the most powerful unit in the supply chain. Both examples provided earlier—the automobile manufacturers and Navistar—as well as other popular examples such as General Electric, Motorola and Ford have the internal resources to implement EDI and the power to dictate that other large firms within the supply chain use the system.

These supply chain “masters” are in a position to practically force their upstream suppliers to use EDI as a condition of business. And in some cases the penalties associated for failing to eliminate data errors for non-compliance resulted in an adversarial relationship.

Transaction errors, however, were gradually omitted so EDI promulgated within certain supply chains. The buyers and suppliers became more tightly integrated in their commercial transaction rules and operations.

EDI and Large Enterprises

Many large companies started their e-commerce projects — EDI — by focusing on the largest 10 to 20 percent of their partners that accounted for about 60 to 70% of their supply chain volume. Companies like Sterling Commerce, IBM, GEIS and Harbinger provided the solutions to meet this need. But the ratio of EDI to total B2B commerce was small. In 1998, businesses used EDI transactions to exchange approximately \$500 Billion in products.¹⁴ Compare this to the estimated \$7.6 Trillion total B2B eCommerce predicted within the next several years.

Because of EDI, it may be said that supply chain rules based on electronic commerce between large companies are in place. This implementation has come slowly and requires major expenditures; however, it has increased accuracy and decreased time. The current status of EDI and the future may best be summed up by a recent quote from Gene Richter who retired in 2000 as the Vice President and Chief Procurement Officer for IBM.

When I entered the procurement profession in 1961, I was told that the best way to get orders typed and processed quickly was to buy boxes of candy for the women in the typing pool. Since that time, we have benefited immensely from EDI, but the most significant tool I have ever seen in my 39 years in purchasing is the Internet. We are going to do in two years with the Internet what it took us 20 years to do with EDI.¹⁵

This is an interesting perspective from an individual who spent his career in large organizations.

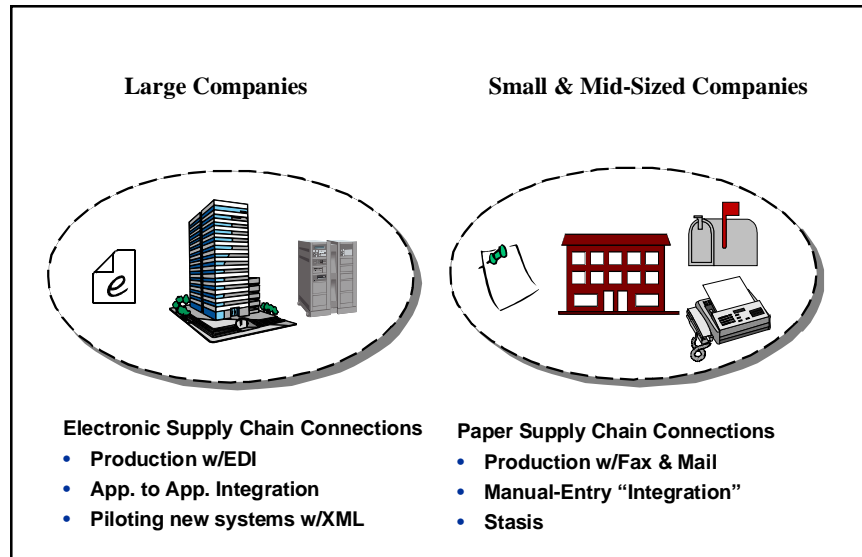
To overcome some EDI limitations, many large companies have begun using new Internet-based technology developed by companies such as WebMethods and NEON. These solutions hold the promise of moving beyond some EDI limitations such as batch processing, lack of sophisticated business rules, lack of flexible document design, and the high transport cost associated with proprietary networks. As with EDI, large companies are starting these efforts with their largest partners.

Much like traditional EDI, large companies using these Web-based solutions have attempted to force suppliers to adhere to systems' terms and conditions. Non-conforming suppliers are assessed fines and charge backs. The large companies don't want the revenue from the penalties, rather, they want automation throughout their supply chain. However, many suppliers still opt to pay the fines rather than change the way they do business.

Four themes permeate this discussion: (1) large organizations, (2) power within the supply chain, (3) inflexibility and (4) cost. It may be concluded that these themes create a gap between large organizations and SMEs when attempts are made to integrate the total supply chain. A small or medium size enterprise may find it more functional to pay a penalty than to implement either a costly EDI system or a Web-based hybrid.

By the late 1990s, a two-tier technology system for supply chain connectivity emerged as demonstrated in Figure 1. Large company to large company connectivity and integration has used EDI; however, the SMEs were frequently forced to use paper.

Figure 1



Law #2: Large Companies Are Fundamentally Different than Small Companies.

Imagine a 50 year-old executive dressed in an expensive suit, with a neatly trimmed, conservative hairstyle and wearing a class ring from his MBA alma mater. This executive is discussing business with a 28 year-old small business entrepreneur dressed in neat jeans and sweater, with rather long hair and he dropped out of college to pursue his business passion. These two individuals may be discussing a joint business endeavor; however, they probably have fundamentally different experiences, views of the business world and operating philosophies. And they probably have vastly different resources at their disposal.

The same is true of the difference between large and small organizations trying to integrate within a supply chain. They are different. The large organization has formal planning, budgeting and forecasting cycles. Emphasis is placed on controlling inventory costs, logistics, warehousing, material sourcing, manufacturing capacity and global supply chain efficiency.

Meanwhile, the small organization is trying to gain a beachhead in a new, fast growing niche. It probably does not have any grand master plan. Warehousing and inventory

controls are only minor issues while trying to develop a niche product and develop sales. Cash flow is a concern for daily survival.

Large enterprises have become connected with each other via expensive EDI systems. And they may add even more systems that will allow them to reap the benefits of eCommerce and efficient supply chains. But the small companies do not have the necessary resources.

Three Differences

Small and medium sized enterprises are different than large enterprises in three primary ways that hinder eCommerce adoption. First, large companies are generally more diverse and likely to be involved with mature markets. As a result, they probably have sophisticated coordination and control systems.¹⁶ Experience and expertise gained in creating these systems mean that new supply chain technology creates less organizational stress.

But SMEs seldom have such systems. At the entrepreneurial stage, emphasis is on product development and survival. Time and resources are not available for supply chain integration. In fact, such integration probably is not even on the radar screen of these small organizations.

The second difference between small and large organizations is that large organizations can spread new, costly systems over larger units of production. These costly systems have less affect on each unit's profit margin. New integration software obviously costs multi-billion dollar General Electric less per unit of sales than a small fledging company attempting to reach \$25 million in sales.

The third difference is internal technical development and maintenance capabilities. For the large organization, systems may already be in place. Also, new systems costs may be spread over larger units of production. Finally, more internal technical expertise is in place for systems maintenance. In other words, an internal IT department is available to manage any difficulties that may occur. As an example, Boeing deployed over 70 high level professionals to implement a Web-enhanced system.¹⁷

While the large organization is able to emphasize development and maintenance of technical systems, the small organization must emphasize sales teams. Any available funds must be placed in marketing rather than operating systems.

A study of the barriers to Internet integration supports this point. Of 17 barriers identified hindering e-business adoption, the greatest barrier was staff with adequate technical Web-specific skills.¹⁸

A Two-Class System

Why are these differences important? First, a two-class system is developing between large organizations and SMEs. One has the capability to connect within the supply chain but the other does not. Second, the supply chain will not be efficient nor effective until the supply chain is totally connected.

For instance, Motorola may be connected with Applied Materials or Wal-Mart may be connected with P&G; however, this does not mean they have integrated supply chains—they have only touched the surface of their supply chains. Even the most advanced large companies may have only 15-20% of their supply chain members electronically connected. Many may be closer to or even below 5%.

The supply chain for any given large company involves thousands of direct and indirect trading partners. Many orders go through 3-10 nodes before reaching the end consumer. Over 80% of the nodes may involve companies not electronically connected. These companies (or nodes) may not account for the majority of transaction volume; however, even in a best case scenario with a shallow supply chain, at least one non-electronic partner is involved in the process. The result is greater costs and more errors for both the small and large enterprise within the supply chain.

Law #3: Inertia and maintaining the Status Quo are Obstacles to Connecting all members of a Supply Chain.

Placing the initial focus on supply chain connections between large companies makes sense. No doubt Wal-Mart has many compelling reasons to be connected with P&G. However, the types of solutions designed to make the connections between these large companies — like EDI, and XML integration tools— have failed to connect large companies to small and mid-sized companies.

Why have the large enterprises not connected with the SMEs? The natural tendency of the large companies seems to be to look for a stripped down version of the existing solutions. This seems logical. The SMEs are smaller and have less impact. However, the stripped

down version lacks the levels of automated business rules application required for improving the data quality and responsiveness of the supply chain. Furthermore, large companies have not had the additional resources required for connecting with SMEs after implementing EDI for their large trading partners.

Three primary requirements must be met in order to integrate the SME into the supply chain:

- low, predictable cost
- minimal changes in behavior
- compelling benefits over alternatives.

Low, Predictable Cost

For most small and mid-sized businesses, the status quo is the fax machine. Moving them off the fax requires a better alternative. Expecting SMEs to make up-front investments in software, hardware, application upgrades and/or new staff to help automate a supply chain is unrealistic. Recall that Campbell Soup spent some \$30 million for EDI.

Expecting a SME to keep up with new upgrades and handle support on their own is not realistic because of limited funds and cash flow. A large enterprise with power in the supply chain may believe that it can *mandate* that SMEs implement the appropriate technology. But cases can be cited indicating that a large, powerful enterprise sending a memo mandating implementation is not effective.

SMEs simply don't have the budgets, staff or expertise to implement costly technology. SME's need an economical approach. One viable approach is technology delivered via a subscription-based model with low, predictable monthly fees. This way a second party worries about the upkeep of the infrastructure. The primary investment is transferred to another party but the SME obtains the primary benefits.

Minimal Changes in Behavior

Adoption of a solution that requires changes in employee behavior has been the focus of hundreds of research projects and books.¹⁹ Unfortunately, some rather sophisticated, costly program is often recommended for implementing new processes. As mentioned earlier, such costly and time consuming systems are not practical for SMEs. For instance, employee training is the most frequently cited solution for new system adoption.²⁰ The

SME, unfortunately, does not have the infrastructure for training programs. Technology solutions for supply chain integration must be designed so SME employees can make a painless switch – with little or no training - from the status quo.

Compelling Benefits over Alternatives

A key to any widespread adoption of new technology is providing compelling benefits that make it the preferred rather than just a required option. When delivered properly, the automated application of business rules benefits SMEs over the most current solution by

- eliminating the need to manually keep up with each large partner's changing terms and conditions,
- eliminating errors and labor caused by manual re-entry of data,
- reducing financial penalties assessed for non-compliance.

The large enterprise-to-large enterprise solutions (EDI, XML, etc...) have made great progress in connecting the Supply Chain. But they are not visualizing a practical approach for large company-to-small company connections. They fail to address the obstacles that can wipe out the problem of inertia and *status quo*. The solutions appropriate for large enterprises require too much initial investment and too much change in behavior for SMEs. And these solutions would place enormous support burdens on large enterprises once connections are made with the SMEs.

Law #4: Targeted Technology, a Proven Process and Dedicated Resources are Needed to Connect and Support Thousands of Supply Chain Members.

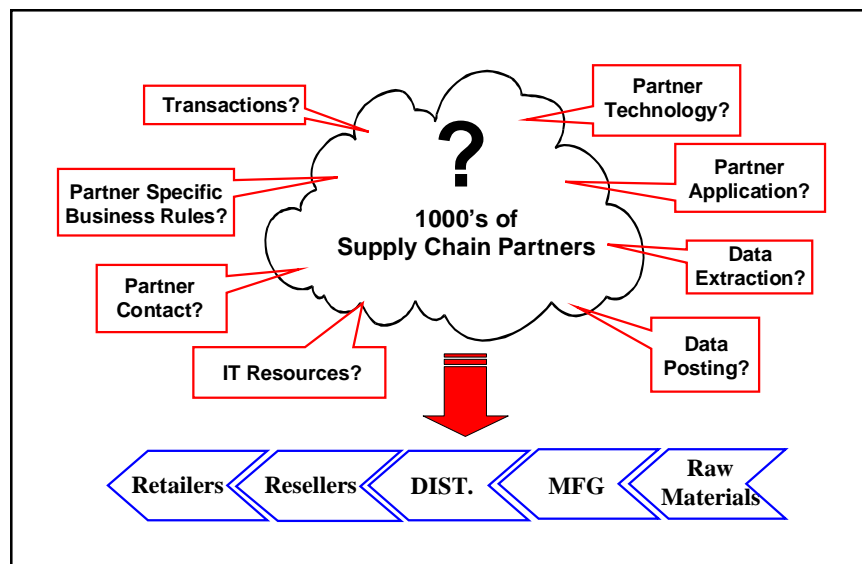
The fantasy for large company's supply chain integration goes something like this. First, develop a strong relationship with the primary supply chain partners using EDI or Internet/XML. Approximately 20 percent of suppliers accounting for as much as 60 to 70 percent of the volume can be electronically connected.

The second step is even easier. Send a memo to all other supply chain members telling them all purchase orders must be processed by downloading them off the Internet. The problem is solved. It is the responsibility of the SME within the supply chain to become connected.

If this fantasy was even near reality, the supply chain integration problem would be solved by now. Unfortunately, a more complex solution, a focus on the back-end, is required.

A comprehensive program is needed to help bring up hundreds, or possibly thousands, of companies on-line within a supply chain. And support is needed to provide these numerous supply chain members with the on-going assistance needed to maintain smooth operations once they are connected. A technology solution is needed that can solve numerous unique business rules such as quantity variances, delivery dates, direct posting and validation of data in and out of tens or even hundreds of individual supply chain member's applications. And even the integration of low-tech options such as fax and e-mail are required within the network for full coordination.

Figure 2

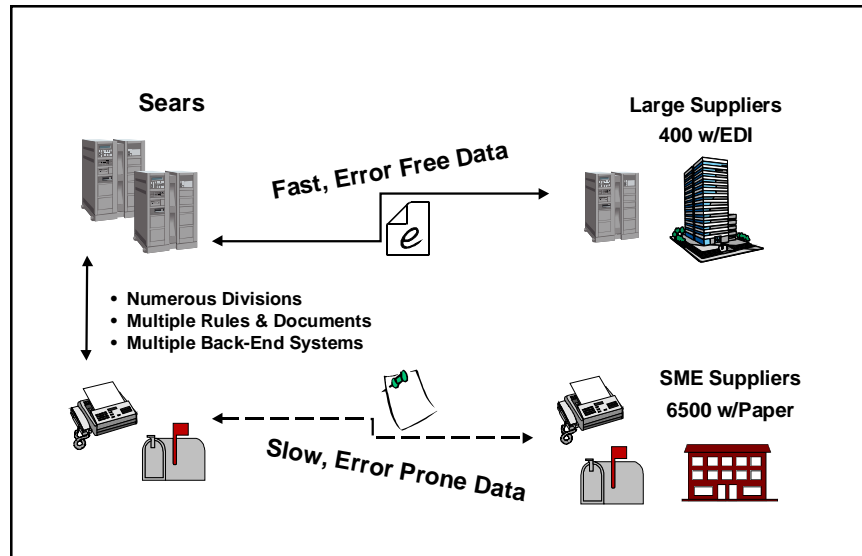


Sears: A Case Example of Connecting with the SMEs

As a \$41 Billion retailer, Sears has successfully gone beyond just connecting with large partners. It has connected every partner of its supply chain by using a targeted technology, a proven process and dedicated resources provided by a Supply Chain Integration Service.

Sears has over nearly 7000 suppliers. Several years ago, it was connected to only about 400 of its larger suppliers. It wanted to get the remaining small suppliers, 6600 of them, into an electronic relationship.

Figure 3



Like many large companies, Sears has multiple divisions that all have their own special business rules for managing their supply chains. For example, some divisions could support electronic fund transfers while others could not. Even within a single division, rules were different on a supplier by supplier basis. For instance, perishable goods or seasonal suppliers have different terms and conditions for delivery than suppliers with non-perishable items.

With a list of 6600 vendors came a list of over 350 different back office systems that needed to be integrated. And most of these were not the familiar systems like SAP or PeopleSoft. Some of the systems were regional while others were homegrown.

To solve these problems, Sears decided to outsource the solution and went to SPS Commerce, a provider of a Supply Chain Integration Service. This service provider needed to quickly develop custom forms and business rules that could integrate to Sears' existing back-end systems. And, it was necessary to ensure that the forms and rules could be

automatically routed to the right supplier with non-repudiation. Furthermore, the project had to be completed within a few months rather than years.

Sears found that successfully connecting SMEs into their e-supply chain also required a different process. The first step was to notify 6600 companies that an electronic connection with Sears was going to be a required condition of doing business.

But Sears knew that it had to make the suppliers feel good about the process. Simply writing a letter to the suppliers would not effect the change.

This is where the proven process, in this case SPS Commerce's enablement program, took over. SPS Commerce sent information to the suppliers and followed up with thousands of detailed phone calls to them. This task would have been daunting to Sears because it did not have the necessary infrastructure in place to perform this work. In fact, it would not have been advisable for Sears to have such an infrastructure. Supply chain integration with SMEs is not part of Sears' core competency so it is logical that it outsource this specialized process.

During the phone calls and supplier follow-up, SPS Commerce found that over 25% of the supplier database had to be corrected. And once contacted, much additional information on each vendor had to be gathered so that the best solution could be matched to each partner on an individualized basis. Questions included:

- Do they have an existing solution that needs better use or do they need to select a solution for the first time?
- Do they need direct application-to-application integration as soon as possible or is an intelligent web form delivered to the browser a good starting point?
- Who is the person(s) receiving and sending the documents?
- Do they need to send a fax or even a letter that can be converted into electronic format?
- What is the pricing?

In this case with Sears:

- About 28% of the suppliers only needed to connect an existing system to Sears application;
- About 8.5% of the suppliers needed direct A2A to deal with the volume;
- About 50% of the suppliers selected the document in the web browser;
- About 12% of the suppliers chose a fax to electronic conversion; and,
- About 1.5% of the suppliers opted for mail to electronic conversion.

Next, training for each supplier was scheduled and performed on-line or over the phone. Then, each member connection was tested and brought on board. The supplier was not responsible for any of the training so the change implementation was less of a burden.

But the story doesn't end here. Once the network of 6500 suppliers was up and running, the technology provider and supply chain integrator remains on-call to provide any operating assistance.

On-going assistance is required because suppliers are added and removed from the network over time. Suppliers frequently change the service they use as they migrate from the fax to the web. Some suppliers may upgrade existing applications or even switch to new ones so the new connections must be re-tested.

Sears has the need to change and/or modify the business rules as their business changes. And with thousands of partners on the network, the supply chain integrator assembled a team to handle the typical on-going support calls.

At this time Sears has made a substantial savings amounting to millions of dollars. The exact amount is difficult to determine because saved time, improved relationships and overall responsiveness of the supply chain is difficult to measure.

To quote a Sears executive:

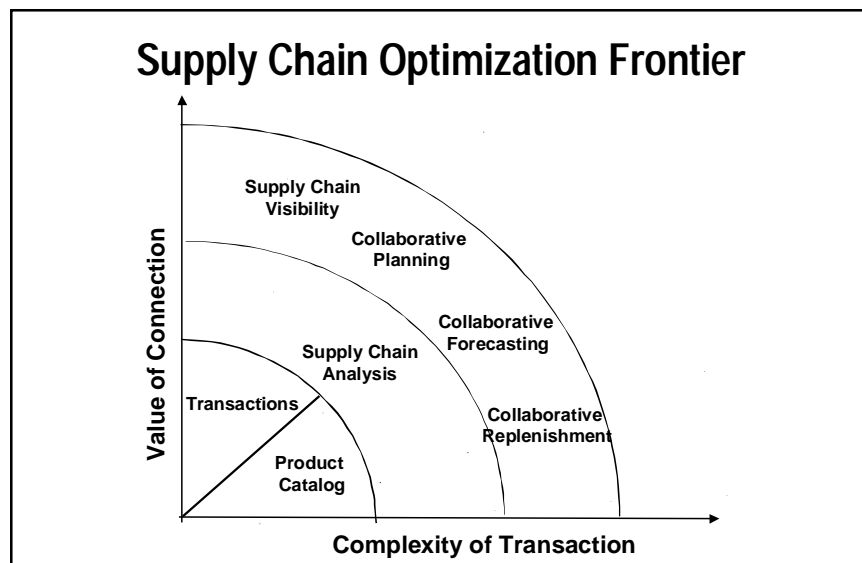
“The third party supply chain integrator has been invaluable in helping us reduce merchandise cycle times, increased data accuracy and generally manage supply chain costs. We were definitely not in a position to internally develop this technology or support the process.”²¹

Law #5: Integration to Technical Advances are Needed to Maximize the Value of Supply Chain Connections.

One promise of the Internet is greater supply chain efficiency. But tapping into this promise means selecting a technical solution that can capture complex aspects of supply chain connections for today and *tomorrow*. As shown in Figure 4, capturing the total value

of integration coincides with increased complexity of the transaction. To quote an author on several books on eCommerce, "Business as usual? The emergence of the Internet as a ubiquitous and inexpensive networking platform for electronic commerce has touched off a revolution."²²

Figure 4



Increased Technical Capabilities Required

Basic business rule transactions over the Internet like POs and invoices provide enormous value — especially if the existing transactions are managed via paper. But these transactions are relatively less complex and should not be considered an end but rather a beginning. Much more value can be achieved by using the Internet for total supply chain analysis and collaboration; unfortunately, this requires much more complex technology.

Moving to the point where the planning systems of every supply chain member can be directly shared in real-time should be the goal. To meet this reality, the technology will have

to advance in complexity to keep up with all the surrounding advances in related supply chain technology:

- Transactions are now changing to a point that EDI, as it stands today, will eventually become obsolete. New solutions based on XML allow transaction documents to be created more quickly, business rules to be more sophisticated, integrated into more systems faster, and operated in an environment approaching real time.²³
- Electronic catalogs are now able to dynamically update product and pricing information based on changing marketplace conditions, instantly synchronize updates with buyer's procurements systems, and contain multimedia elements that afford advanced visualization capabilities.
- Business Intelligence tools are advancing to query and merge data:
 - from near real-time data sources
 - from a multitude of heterogeneous data sources,
 - from larger databases than ever before,
 - and, provide on-demand exploration of the details and become dramatically easier to use.
- Operational and supply chain applications are moving towards the concept of Collaborative, Planning, Forecasting and Replenishment (CPFR) to gear up for coming real-time planning systems.²⁴

Technology providers that can solve the riddle of totally integrating the numerous applications of hundreds of supply chain members—not just the few big members—will be big winners. Being successful will require a network that can cost effectively support the transfer of sophisticated business documents into and out of the back-end systems of thousands of companies while keeping up with the changes in business processes and technology of each and every member of the supply chain.

What Will the Technology Look Like?

The capabilities of this technology:

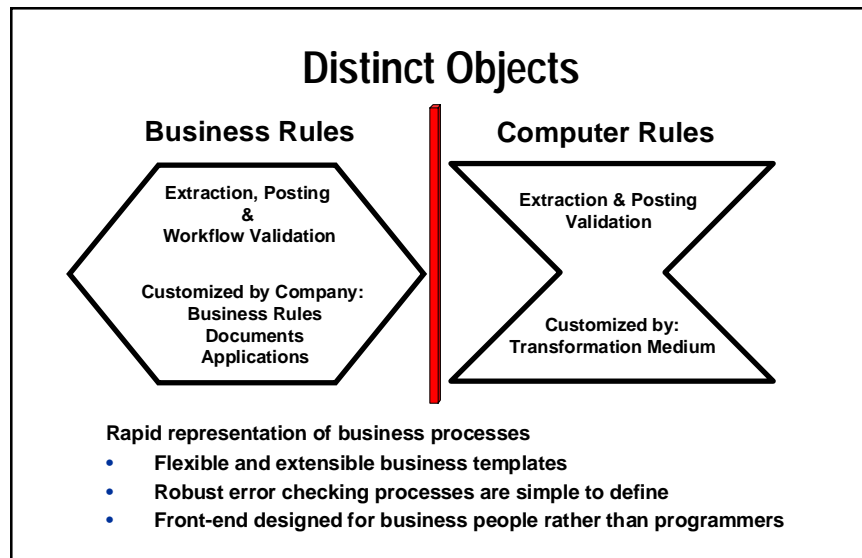
- Allows transaction documents containing sophisticated business rules to be built and modified in minutes and hours rather than weeks or months – even by non-programmers,
- Supports posting, extracting, and validating of data in and out of a multitude of systems where upgrades and/or the addition of new systems do not cause rework and downtime,
- Can be delivered so that the recipients don't need to make additional investments in hardware, software or human resources,
- Can be delivered as a service where members don't need to invest in developing, maintaining and supporting infrastructures of complex environments with numerous companies on a network trying to exchange a myriad of documents between a myriad of applications,

What will the solution look like?

First, the fundamentals of solid object-oriented software design must come into play. The *business rules* (i.e. those instructions that define the terms and conditions of a transaction and where the data needs to be extracted from and posted to), must be self-contained and separate from the *computer rules* (i.e. those instructions that define how to query data and how to transform it from one format to another).

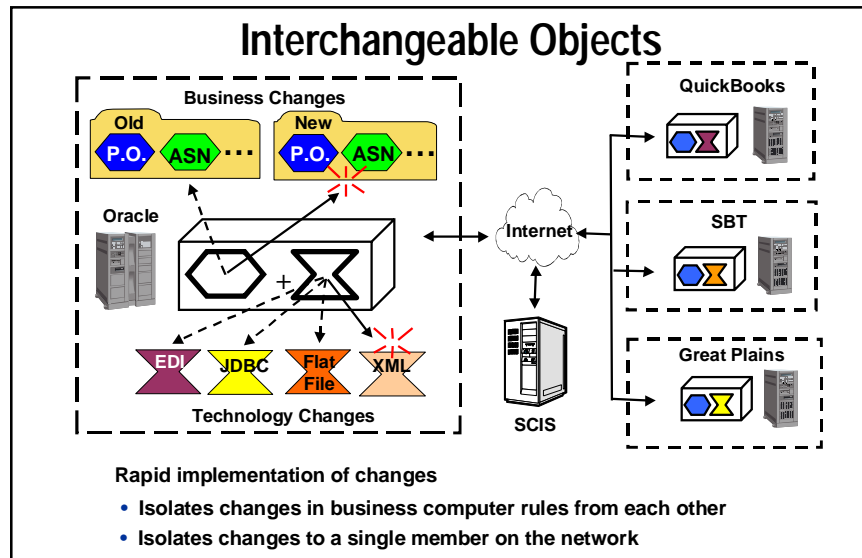
Only in this environment, can the complexities associated with technology be eliminated from the equation so that easy to use visual interfaces can be used by non-programmers to develop, integrate and modify transactions in days rather than months or years. This level of speed will be required for the supply chains of tomorrow in order to match the accelerating rate of business change. Figure 5 illustrates how the business rules and computers can be separated.

Figure 5



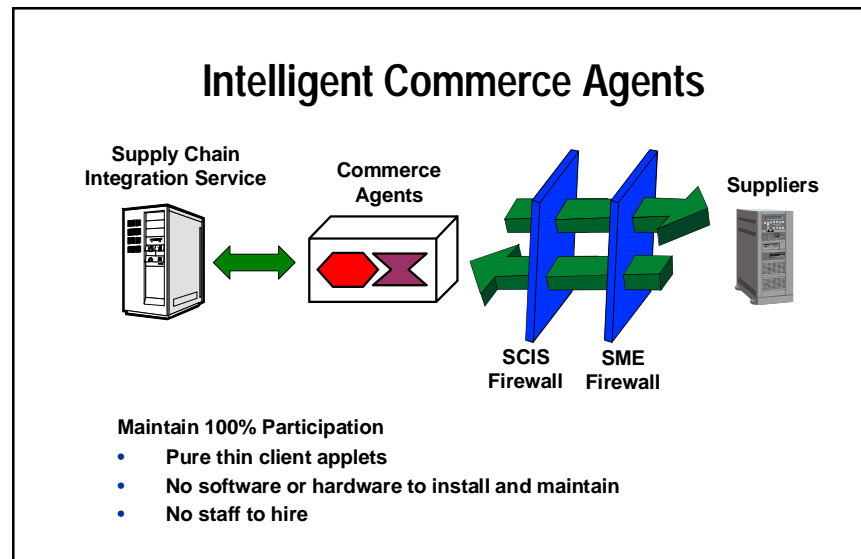
Second, the business rules and computer rules need to be interchangeable with each other. This allows a set of business rules built for an Oracle Planning system to be re-used with different mediums like XML or EDI. It also allows changes and application upgrades to be isolated to a single company so changes made in one place can automatically ripple through the entire network. When a large company's back-end systems are directly integrated with thousands of supply chain partners, changes become a daily occurrence. The "old world" integration methods of "hard-wiring" connections between two supply chain partners will not keep up the demands of the future. "New world" integration technology that can be quickly adapted to business and technology changes, both internally and externally, becomes a requirement. Figure 6 further describes how a new world integration technology would need to operate.

Figure 6



Third, keeping 100% of the partners connected requires a solution that doesn't require investment in: (1) software, (2) hardware, or (3) technical staffing when integrating directly into the back-end systems. Attaching the extraction, posting, and validation instructions to the web form enables a pure Internet delivery with downloadable intelligent commerce agents. Furthermore, validation is performed at the location of the SME's application eliminating the opportunity for data errors to be returned into the large company's operating system. Figure 7 illustrates this concept.

Figure 7



Finally, the process needs to be packaged as a total service. The organization providing the infrastructure for the technology and service takes on the burden of setting everything up, supporting it, upgrading it, and taking all the inevitable support inquiries. Supply chain partners pay a predictable subscription fee to use the service and rely on the infrastructure provider to make it all work. Three key terms permeate this process: (1) speed, (2) no downtime and (3) service-based delivery.

Two Models for Integrating the Technology

Two paths typically exist for supply chain integration: (1) in-house systems and outsource, and (2) outsource only.

First is the case in which the large company has already connected some other large members of its supply chain via EDI. It may be considering the development of sophisticated connections with some of its most strategic suppliers. This firm may gradually migrate toward an XML format. However, at some point, it becomes impractical from a resource perspective to connect and integrate the remaining SME members of its supply chain. Before it can move forward, this company must determine where to “draw the

line” between what it currently owns and what it should outsource with a Supply Chain Integration Service.

In this case, a dual approach is to “own” and to “outsource”. The EDI capabilities that have already been developed will be owned and retained. Meanwhile, an outsourcing approach similar to Sears’ may be used for SMEs within the supply chain.

Some large companies may not have yet entered the B2B eCommerce domain. Supply chain integration via eCommerce of any kind was not an area of interest. For these firms, no investment has been made. Neither technical nor administrative support services are part of the company’s current capabilities; therefore, a single outsourcing approach may be a better choice. Now, with the advent of solutions like a Supply Chain Integration Service, a company no longer has an excuse for not moving forward because outsourcing the service is so economical.

Summary and Conclusion

Five laws regarding small and medium-sized enterprises (SMEs) in the supply chain have been presented. The first three laws state that large firms have established a degree of connectivity due to EDI. However, different solutions are required to obtain total connectivity because SMEs are different. And different factors must be considered for these firms to be integrated into the supply chain.

Law Four explains that targeted technology, a proven process and dedicated resources will be required for total connectivity. Then Law Five presents an overview of what the technology must look like to go beyond business rule connectivity to integration and collaboration. Finally, the point is made that a combination of either dedicated resources or outsourcing should be used for connecting and integrating SMEs to the larger firms within the supply chain.

The conclusion is that SMEs are different. Neither total connectivity nor integration will be obtained using the same model for SMEs as for large firms. But total effectiveness and efficiency will not be obtained until the correct model is used. Firms that have adapted a correct model for SMEs will have a competitive advantage over those firms that have not determined how best to integrate the total supply chain. As the global managing partner for Andersen Consulting’s (now Accenture) Supply Chain practice says, “The Internet and supply chain management will be inextricably intertwined. Those companies that recognize

and leverage this reality position themselves for a bright and profitable tomorrow.”²⁵ But to maximize the Internet and the power of supply chain management, small and medium-sized enterprises must be included. This will require a targeted solution that contains the appropriate speed, flexibility and support systems.

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