

The Digital Transformation: Technology and Beyond

From the January/February 2005 issue of Supply Chain Management Review

DONALD J. BOWERSOX, DAVID J. CLOSS, and RALPH W. DRAYER

Supply Chain Management Review January 1, 2005

True supply chain excellence will only come from making a digital business transformation. It's a transformation that exploits all that technology has to offer, facilitates supply chain collaboration, and leads to new levels of operational excellence. More than a one-time project, the transformation is a journey—and the time to start that journey is now.

The model for creating business value has changed. Companies today participate in extended supply chains, where real operational efficiency and revenue enhancement come from greater visibility, integration, and synchronization among connected partners. In short, collaboration among the partners in the extended supply chain—collaboration beyond the physical walls of the enterprise—is the new arena for value creation.

Collaboration occurs when companies work together for mutual benefit. It happens when supply chain partners leverage each other's operational capabilities so that in combination they perform better than they could possibly do alone. Collaboration can occur at all points along the supply chain—from design through procurement to final distribution. When done effectively, it enables companies to share information that can dramatically shorten processing time, eliminate value-depleting activities, and improve quality, accuracy, and asset productivity—all of which are fundamental to long-term success.

Supply chain collaboration can produce dramatic improvements in operational and financial performance. But there is no silver bullet to achieving real collaboration and the associated benefits. It requires hard work and some radical changes in thinking and behaviour. It demands business-process integration and customer focus as well as a mindset that views supply chain relationships as strategic differentiators. In short, for a firm to achieve true collaboration, it must go through what we call a digital business transformation (DBT). DBT is the journey of reinventing how daily business is conducted to fully exploit information technology and to facilitate supply chain collaboration to achieve unprecedented levels of operational excellence.

And DBT clearly is a "journey," not a consulting project or a one-time improvement initiative. It's the process of reinventing a business to digitize operations and formulate extended supply chain relationships. The DBT leadership challenge is about re-energizing businesses that may already be successful to capture the full potential of information technology across the total supply chain.¹ In essence, DBT is the conversion of business operations from Industrial-Age to Information-Age technology. It's about reinventing and positioning business operations, processes, and relationships to fully exploit information technology.

The greatest barriers to such a transformation are not technical or legal. Rather, they relate to prevailing managerial and employee attitudes, practices, and traditions around what constitutes best practice. Most acknowledged best practices were established decades ago using the technology then available to address problems or challenges that for the most part no longer exist. Actions that once were considered best practice are increasingly becoming unnecessary or obsolete. Yet it's the perpetuation of these traditional practices that thwart significant breakthroughs toward new and more meaningful ways to work.

This article lays out the case for undertaking the digital business transformation journey, noting the pitfalls that can impede progress and the bountiful opportunities that lie along the way. The sidebar on page 25 enumerates the six paradigms of DBT that can help guide the journey.

The Digital Challenge

Reinventing business operations to exploit information technology and facilitate supply chain collaboration means examining every facet of every job. It means asking the hard question, "Do current actions add value to our core or key customers?" If so, what is the quantifiable

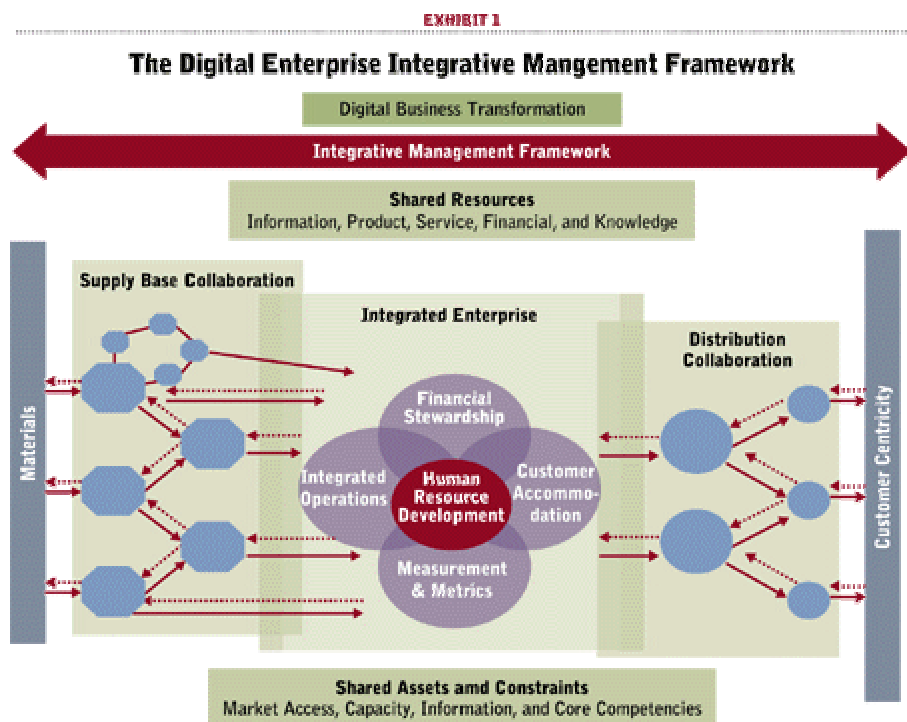
value proposition, and how can it be maximized? If not, how can the resources used to perform this action be redeployed? The digital transformation depends on fully understanding how to use the power of emerging generations of Internet-based network applications such as those being developed by Internet2.⁴ These applications will provide a communication backbone for integrated operations and event management competency. Importantly, use of this technology must be accompanied by a willingness to change traditional organizational practices.

Expanding Internet capabilities provide an information framework that potentially can replace traditional one-to-one, one-to-many, or many-to-one communication with Web-based, simultaneous, many-to-many connectivity. Within that framework, all participants in a supply chain simultaneously have access to the same strategic and operational information. At the same time, they have the ability to communicate plans and actions. Traditional command-and-control practices can be replaced with open and shared information access. This facilitates the synchronized distribution of information and knowledge across the supply chain, which serves to motivate and accelerate the pace of value creation. Quite frankly, even the best of firms today have much to learn when it comes to exploiting this emerging information infrastructure.

It's important to emphasize that DBT is about much more than process redesign to exploit information technology. It is also about structuring business operations to facilitate and fully leverage supply chain collaboration. Already, we see such business models emerging. Companies like IBM and Cisco, for example, are repositioning themselves as extended and comprehensive networks of service providers, giving even the smallest companies they serve access to maximum information technology. IBM also is developing networks of contract manufacturers, such as Celestica and Solectron, to outsource the traditional tasks of assembling modules and subsystems. By orchestrating the activities of their tier-one suppliers, automakers like General Motors, Honda, and DaimlerChrysler present a similar example of supply chain innovation. This multifirm collaborative process is explored later in this article in the discussion of enterprise extension.

Finally, digital business transformation is about leadership. It is the ultimate challenge in change management because it impacts all organizational levels of an enterprise and its extended supply chain. The transformation starts with redefining the firm's strategic vision—that is, the shared composite of goals, competencies, and capabilities a firm deploys to create and sustain competitive advantage.

EXHIBIT 1



Source: Donald J. Bowersox, 2003

At this early

stage of the digital transformation, it's clear that some organizations are having a tougher time getting started on the journey than others. For example it's evident that A&P, Corning, Kodak, Motorola, Sears, and Xerox, to name a few, waited far too long to adapt to the digital imperative in both products and processes. Others, such as GM, Procter & Gamble, and IBM (all discussed later in this article) seem to be well on their way. In any case, one thing is clear: The digital business transformation is best initiated from a position of strength rather than weakness.

The Limited Brands (formerly The Limited), a diversified retailer whose stores also include Victoria's Secret and Bath & Body Works, is a case in point. Following the direction of chairman and founder Leslie Wexner, Limited Brands has begun a careful examination of its fundamental value propositions. Recognizing that value is only created by customer loyalty to its brands and stores, a high-level management team has begun the painstaking process of reinventing how Limited Brands conducts business. Under the leadership of Nicholas LaHowchic, president of Limited Logistics Services, the team is taking a no-holds-barred approach as it examines every activity of every existing work practice to assess its value contribution. If an activity directly supports store or garment brand success, the team seeks to identify what processes and technology can be leveraged to achieve maximum efficiency, effectiveness, and relevancy of that practice. If the activity does not support store or brand success, it is a candidate for elimination.

The real story here is not so much Limited Brands' willingness to begin the digital business transformation. Rather, it's the willingness of management to commence the DBT journey from a position of market and performance strength rather than waiting until it might become a necessity for survival.

Three Dimensions of the Transformation

Exhibit 1 illustrates an integrative management framework for the digital business transformation. To fully embrace this framework, a company needs to put aside (at least temporarily) most of its traditional ideas about organizational structure. The traditional line-and-command, functionally focused organizational chart is replaced by an integrated supply chain structure built on these three shared values, or dimensions, each of which is discussed below:

1. Enterprise core processes that focus on maximizing customer value.

2. A shared real-time information and operational connectivity that creates a "response-based" or demand-driven network of supply chain relationships among the participating companies.
3. Commitment to operational excellence, expressed as customer centricity.

The framework in Exhibit 1 illustrates a supply chain consisting of multiple enterprises that are integrated and focused on one objective: Achieving and maintaining customer centricity. Key resources (information, products, services, and so forth) are shared from the supply base to the distribution partners. Similarly, assets and constraints are integrated and shared across that same spectrum. The resulting cross-enterprise collaboration produces value—both for the supply chain partners and, most importantly, for the customers.

Enterprise Core Processes

The heart of Exhibit 1 is the integrated enterprise. In the digital business context, departments and operating entities that have traditionally dominated organizations are subordinated and replaced by five core enterprise processes: human resource development, financial stewardship, integrated operations, customer accommodation, and measurement and metrics. These core processes represent the fundamental competencies that all organizations must incorporate to avoid stagnation and achieve sustainable profitable growth. Stagnation in this context is defined as performing at or near a given industry average. A firm's supply chain structure and logistics are intrinsic to achieving excellence in each of the five enterprise core processes. All five core processes must combine to facilitate cross-enterprise supply chain competencies and capabilities.³

As the framework suggests, every business must interface with customers and suppliers. Two important insights follow from this reality. First, supply chain relationships represent a firm's strategic initiative to align suppliers and customers into collaborative relationships to gain competitive advantage. Second, each supply chain structure and strategy resulting from that strategic alignment is unique. In situations where many different suppliers simultaneously collaborate with the same customers, each supply chain relationship has a well-defined and unique structure.

Real-Time Connectivity and Responsiveness

A second important dimension of digital transformation is real-time connectivity and decision making. Web-based information connectivity is driving a major shift in the "anticipatory" model of operations that has guided businesses for the past century. The holy grail of that anticipatory structure was the forecast. Participants in the distribution channel believed that if you got the forecast right, good things would follow. But in reality, the forecast seldom presented a correct assessment of what customers actually purchased, thereby introducing variability and the resulting bullwhip effect.

Real-time information connectivity is moving us away from this traditional forecast-guided business structure—wherein all value is created in anticipation of demand—to an agile, response-based structure that reacts rapidly to demand requirements. This response-based structure is geared toward quickly and accurately identifying actual customer demand and then rapidly fulfilling that demand. Response-based supply chains exploit the full capabilities of all channel partners through the sharing of synchronized information to jointly develop complete solutions that satisfy customers.

The transformation from an anticipatory system to a response-based structure won't happen overnight—nor should it necessarily. The managerial challenge is to move the transition forward at a rate enabling the firm and its supply chain partners to fully realize the benefits of DBT without overlooking any of the potential opportunities.

The power of real-time connectivity and responsiveness is most evident in a firm's planning and scheduling capability. Technology such as advanced planning and scheduling (APS) systems facilitate responsiveness and flexibility by increasing accuracy of order commitments while simultaneously reducing production scheduling leadtimes and inventory buffers. To understand how APS can be effectively implemented to achieve these goals, consider IBM Microelectronics Division—a producer of semiconductors, related electronic packaging, and

subassemblies for internal IBM divisions and external customers. Historically, the company developed, fabricated, packaged, and tested product at 12 sites around the world. The planning process was done independently at each of these sites and then the individual plans were aggregated into a combined plan. This approach resulted in long planning cycles and data inconsistencies. This, in turn, led to extended customer commitment times and even conflicts when inventory or production capacity was promised to multiple customers.

To address these issues, IBM Microelectronics Division began a transformation to reengineer the total planning and fulfillment process. The objectives were to provide instantaneous customer response through real-time order promising, on-time shipment consistency across all sites, faster inventory turnover, and electronic connectivity with customers.

Using APS technology, the division implemented a demand/supply rationalization process that allows for weekly integrated planning across all 12 sites while setting capacity constraints for all products. The demand-allocation process enabled instantaneous inventory commitment and fast and accurate delivery. Among the operating improvements that the Microelectronics Division realized by using this interconnective technology are:

- 97 percent of high-volume parts committed through available to promise (ATP).
- Order response time reduced from four days to one, with over 65 percent of ATP orders committed in less than one day.
- On-time delivery to promised commit date increased from 93 percent to 97 percent.
- Delivery performance to customer request improved from 45 percent to 70 percent.
- Assets reduced by \$80 million.
- Average inventory reduced by \$20 million.
- Ability to implement Web-enabled business processes developed.

Operational Excellence

The third dimension of the digital business transformation is a commitment to achieve and sustain operational excellence. Senior leadership must drive this commitment, which must extend throughout the organization. This commitment is based on a candid—and sometimes even brutal—acknowledgment of what constitutes sustained superior service performance from the customer's perspective. We call this "customer centricity" because it clearly focuses channel-wide behavior on creating customer value.

The essence of operational excellence is to effectively and efficiently keep promises to customers. This requires operations to continuously adjust to changing customer needs. Perhaps the best and most comprehensive measurement of operational excellence is the perfect order. This metric means that every order is delivered complete, on time, damage free, and invoiced correctly. Because the perfect order represents the result of all operations, it also serves as an excellent measurement for supply chain analysis.

When it comes to serving customers, very few firms today come close to operational excellence. The reality is that most senior managers do not have even a remote idea of their existing operational performance in terms of a specific customer or product. The yardsticks used to measure performance are typically presented as averages. Yet while averages provide a general view of operational competency, they fail to identify specific service breakdowns. More importantly, they mask the root causes of service failures. This failure to view operations in terms of compliance to specific expectations and promises made to individual customers may be the greatest of all shortcomings in modern business leadership. Customer centricity demands that a firm commit to perfect-order execution. Equally important is a commitment to identify the root cause of any service breakdown that occurs, followed by corrective action each and every time an order fails to meet customer expectations.

In addition to focusing an organization on the customer, a commitment to operational excellence brings with it one other powerful advantage: It allows the enterprise to position supply chain operations to drive top-line revenue growth and help achieve its strategic business objectives.

Operational excellence yields huge dividends when it is extended externally to supply chain partners. In particular, leading-edge firms are beginning to use information technology to achieve new levels of effectiveness and efficiency by collaborating with their supply chain partners. This creates a new form of enterprise extension referred to as cross-enterprise collaboration.⁴ Such collaboration enables firms to establish long-term arrangements with customers as well as material and service suppliers in an effort to realize the benefits of integrated operations.

Enterprise extensions are designed to leverage capabilities and resources across the supply chain. Collaborating partners are positioned to focus on their unique competency and expertise to provide an integrated offering to customers. The objective of cross-enterprise collaboration is operational excellence that synergistically creates value. The example below highlights how GM did just this.

The 1990s found General Motors in serious financial trouble. One of the world's largest corporations, it was struggling with bloated and inflexible management, unexciting cars, constraining union contracts, and difficult supply chain relationships. These relationships ranged from unhappy suppliers that felt they had been squeezed to service providers that had to respond to unique component- or plant-related requirements. Supplier and sourcing decisions often were made independently by divisions and individual plants. For example, each assembly plant could select its own parts and service suppliers. As a result, similar parts were being purchased from different suppliers—sometimes by plants located in the same town. The results were lost opportunities to achieve economies of scale with suppliers and poor asset utilization for logistics service providers.

To help ensure its long-term viability, GM had to make substantial changes in the way it did business. While GM views vehicle assembly and global logistics strategy as core competencies, it wasn't convinced that it had to continue doing the analysis and management of supply chain flow internally. Further, the company felt that having an outside specialist perform these tasks could lead to new opportunities for further scale economies.

This line of thinking ultimately led to the creation of Vector Supply Chain Management (Vector SCM), a joint venture between CNF and General Motors with CNF the majority partner. Vector SCM was created in 2000 to design, implement, and manage supply chains for components, work-in-process, and finished vehicles. While GM is Vector's first customer, the plan is to commercialize the service for other major accounts as well. With this business model, Vector became one of the first firms to actually implement the concept of an integrated fourth-party logistics provider (4PL).

The objective was for Vector to perform ongoing analysis of GM's supply chain requirements using state-of-the-art planning tools in conjunction with a comprehensive shipment history database. The analyses would focus on GM's global flow of parts, components, and vehicles with an eye toward identifying opportunities for synergy and coordination. Once the opportunities were identified, Vector would select lead logistics providers (LLPs) to implement the plan.

In practice, the Vector SCM venture has led to numerous opportunities for shipment consolidation and lane balancing. On an ongoing basis, Vector collects volume and performance data from the LLP and manages that relationship for GM. The results to date have exceeded expectations:

- Order-fulfillment leadtimes reduced by 50 percent.
- On-time delivery of parts to assembly-line station increased to 99.9 percent.
- Damage-free outbound shipments of vehicles increased to 99.5 percent.

- Vehicle delivery-date reliability increased to more than 85 percent.
- Production and material constraints reduced by 70 percent.
- Work-in-progress inventory costs reduced by 30 percent.
- Logistics costs reduced by 15 percent.

In brief, the Vector SCM joint venture illustrates an innovative combination of outsourcing and enterprise extension to achieve operational excellence.

Sustaining the Transformation

The final dimension of DBT is sustaining the competitive advantage once it has been achieved. The information age allows no time for resting on one's laurels. The most successful companies understand this and continually strive to improve upon previous accomplishments. In a very real sense, sustained success is a process of continuous renewal. It's just as important to businesses as it is to living organisms. The following example shows how Procter & Gamble (P&G) has continuously renewed itself over the years—particularly with regard to the relationship with its largest customer, Wal-Mart.

P&G's willingness to reinvent itself dates back to 1920 when the company made the bold decision to begin selling direct to its largest customers as opposed to selling through brokers or distributors. In later years, the emergence of information technology such as bar-code scanners and handheld computers prompted P&G to pioneer small-scale experiments with a few retailers to build and share electronic databases, forge closer ties, and streamline the supply chain to deliver higher value to consumers. In one such experiment, P&G prototyped the granddaddy of collaborative business processes—continuous replenishment. This initiative began with P&G automatically shipping Pampers to a grocery chain in St. Louis without the store's buyers having to place orders.

P&G broadened the scope of the St. Louis prototype and used it as the foundation for its much-publicized collaborative partnership with Wal-Mart. And the rest, as they say, is history. The P&G/Wal-Mart continuous replenishment program succeeded because of a trusting business relationship and senior management's support for an initiative that would produce mutual benefits. Sam Walton summed up the philosophy behind this collaborative approach best: "Let's invent a system wherein you ship me product, and I'll ship you money. Quote me a net price, and I'll give you my distribution center inventory turnover hourly. You manage the ordering, shipping, and billing and meet my turnover requirements. You keep the money you make from the savings, and I'll keep mine. Let's work together." Another of Walton's quotes is relevant here as well: "Think of my stores as an extension of your brands. Would you then think differently of how we do business?" You bet P&G did! The result was a collaboration that has sustained the extended enterprise across three decades.

Today, P&G continues to innovate and drive improvement in its supply chain operations. The company's current supply network operating strategy is called the consumer-driven supply network (CDSN). It incorporates a number of new supply chain capabilities, technologies, integrated systems, and processes to enable the company and its supply chain partners to sense and react to real-time consumer demand. P&G is targeting to get some impressive results from CDSN by 2008, starting with a 50-percent reduction in total supply chain inventory; a 50-percent reduction in response time from consumer purchase to delivery, and a 20-percent reduction in supply chain costs.

Procter & Gamble's willingness to continually reinvent itself has led to significant competitive advantages and a position of industry leadership. Along the way, the company had to develop and sustain a culture committed to questioning nearly everything with a willingness to change even time-honored practices.

Questions for the Journey Ahead

The Wal-Mart/P&G collaboration is a fascinating story—not only for what it achieved but also as a testament to the power of collaboration. What are the limits of working together for

mutual benefit in this new age of information technology? What might be achieved as a result of digital business transformation?

An inquisitive CEO and the supply chain professionals working with him or her might wonder how well their organization is positioned to begin the DBT journey. Answers to the following questions will help them determine whether or not they're on the right track to DBT:

- Are our core processes customer-centric?
- Is my firm willing to continuously "rewrite the rules" to meet the evolving needs of end consumers?
- Have we reviewed and established the value proposition concerning enterprise core processes?
- Are we willing to share strategic information, responsibilities, and resources with our supply chain partners?
- Have we incorporated planning technology to synthesize common supply chain requirements and determine tactics to meet consumer needs while maximizing asset utilization?
- Are we willing to integrate operationally with other firms, potentially even competitors, to facilitate enhanced supply chain responsiveness and performance?
- Does the digital business transformation vision fit our firm?

If the answers to these questions are mostly "yes," you're ready to consider starting the DBT journey in earnest. But if they're mostly "no," you've still got some work to do before you can begin. But don't wait too long. Yes, DBT is a journey and not a sprint. But you don't want to give the competition too much of a head start.

Footnotes

¹Michael Hammer, *The Agenda*, (New York: Crown Business, 2001).

²Internet2 is a research and development consortium led by more than 200 universities in partnership with industry and government to develop and deploy advanced network applications and technologies. These applications and technologies will enable collaboration among people and provide interactive access to information and resources in ways not possible on today's commercial Internet. (www.internet2.edu)

³Donald J. Bowersox, David J. Closs, and Theodore P. Stank, "How Supply Chain Competency Leads to Business Success," *Supply Chain Management Review*, September/October 2001: pp. 70-78.

⁴Donald J. Bowersox, David J. Closs, and Theodore P. Stank, "How to Master Cross-Enterprise Collaboration," *Supply Chain Management Review*, July-August 2003: pp. 18-27.

The "Six Fs" of Going Digital

Six paradigms seem to frame the challenge of digitally transforming business. We call these paradigms the "Six Fs" of going digital. They speak to the mindset that leaders must adopt as they begin to reconfigure every aspect of their organization to contribute economic value.

1. Fact-Based Management: Fact-based management is a commitment to—even an obsession with—developing precise information on every facet of what the organization does and needs to do. Fact-based management provides answers to questions such as, Why do we provide this service? What value does it add to customers? What are our precise performance expectations? How exactly do we meet and measure these expectations? Facts are not averages. Facts deal with specific performance results in terms of specific customers. Managers must learn to understand and rapidly act on these results at the specific product level and customer purchase location.

2. Flexible: Driven by facts, successful firms demonstrate an inherent ability to rapidly adapt operations to pursue a new course of action. Confronted with a breakthrough opportunity,

they are agile enough to make adjustments quickly and commit the resources necessary to capitalize on the opportunity.

3. Focus on Cash: A business exists to generate cash. Quarterly or annual earnings are not the fuel of long-term success. The only meaningful measure at the end of any day, week, month, or year is the cash balance. As they make the digital transformation, companies must remember that cash pays bills, cash pays salaries and wages, and cash pays shareholder dividends. The focus must be cash first, cash second, and cash always.

4. Fast Return on Investment (ROI): A business needs to make continuous investments in new products, services, technology, people, and facilities. All investments are made with an expectation of financial return. The new mandate, however, is not just high rates of return but high rates of return fast. Payback periods need to be short and rapidly yield positive returns—which translates to cash.

5. Fungible: Fungible means that business processes are modular in design with maximum interchangeability. Modularity allows flexibility in process design and maximum incorporation of the principles of postponement and acceleration. The operational characteristics of agility, flexibility, sustainability, scale, scope, and responsiveness are all attributes of fungible organizations.

6. Frugal: Capital investment, cash velocity, and a flat organizational structure with focused human resources are characteristics of a frugal enterprise. Frugal enterprises are lean in every conceivable way. Overhead is minimal. Operations are focused on cash generation. Lean is an enterprisewide attribute that must permeate every facet of every process. In frugal enterprises, the real benefits are cash and dividends, not fringe benefits or luxurious environments. At the end of the day, employees work for income and owners invest for dividends. With business success, both constituents will benefit from the enterprise's success.

Donald J. Bowersox is the John H. McConnell University Professor and David J. Closs is the John H. McConnell Chaired Professor, both at the Broad College of Business, Michigan State University. Ralph W. Drayer is chairman of Supply Chain Insights and former vice president of customer service and logistics at Procter & Gamble.

© 2005, Reed Business Information, a division of Reed Elsevier Inc. All Rights Reserved