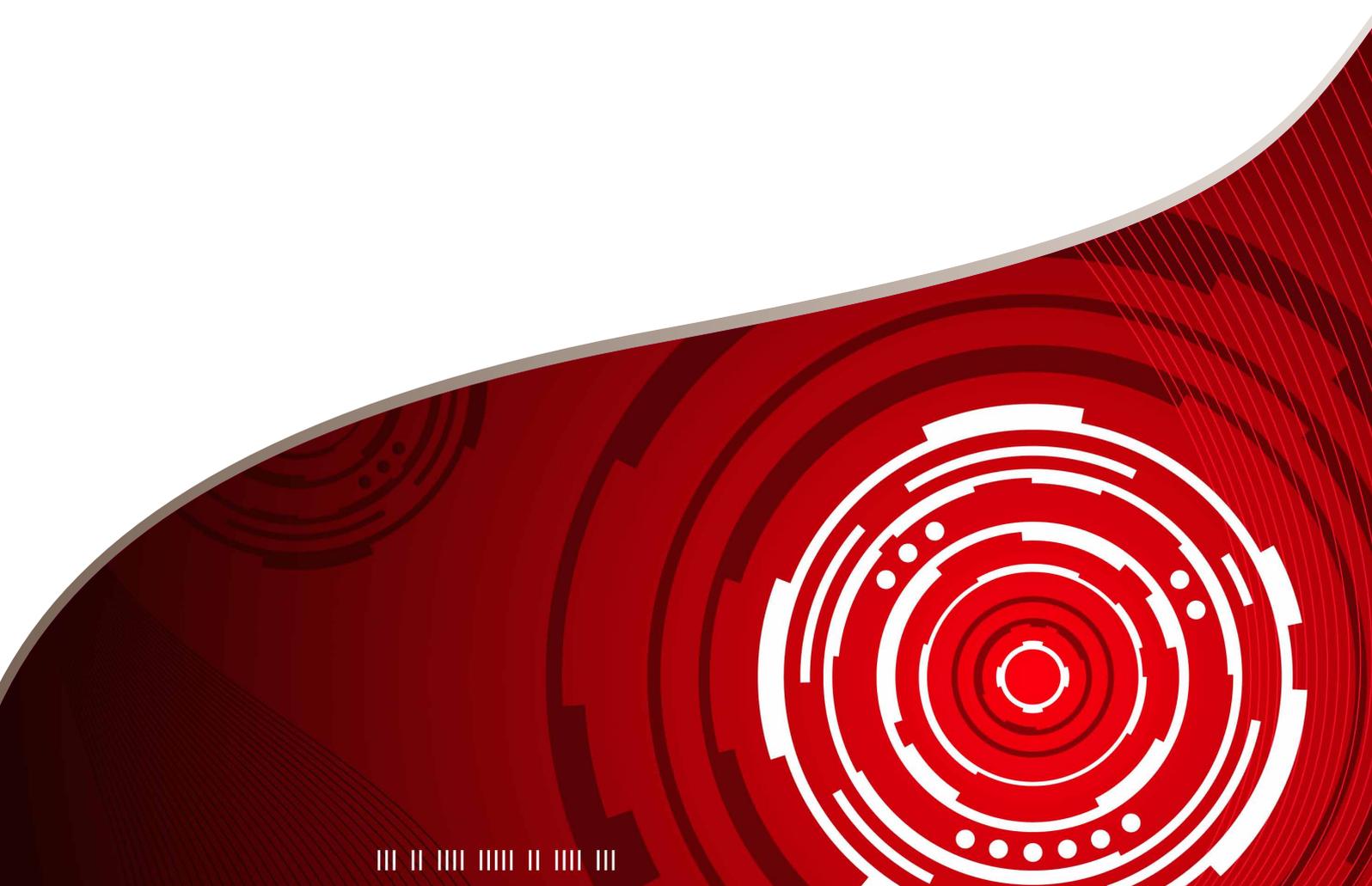




Digital Transformation of Supply Chains

Creating Value – When Digital Meets Physical



Abstract

Digitization has touched upon all aspects of businesses, including supply chains and operating models. Today, technologies such as RFID, GPS, and sensors have enabled organizations to transform their existing hybrid (combination of paper-based and IT-supported processes) supply chain structures into more flexible, open, agile, and collaborative digital models. Unlike hybrid supply chain models, which have resulted in rigid organizational structures, inaccessible data, and fragmented relationships with partners, digital supply chains enable business process automation, organizational flexibility, and digital management of corporate assets.

In order to reap maximum benefits from digital supply chain models, it is important that companies internalize it as an integral part of the overall business model and organizational structure. Localized disconnected initiatives, and silo based operations pose a serious threat to competitiveness in an increasingly digital world.

We believe a holistic approach to digital transformation of supply chain, starting with a digital strategy and a digital operating model will set the direction for integrated execution. This will not only enable organizations to realize the untapped potential of existing capabilities, but also to achieve higher performance and ultimately create greater value.

Operations in the New Digital World

Technology is rapidly changing the landscape of most consumer oriented businesses in a fundamental way. Consumer buying behaviors and demand patterns are being significantly affected by high Internet penetration, ubiquitous information availability, and rapidly growing social networks. This has a significant impact on consumer oriented industries such as music, publishing, consumer electronics, retail and financial services. But will this technology adoption by consumers have any major impact on the supply chains in traditional industries which continue to produce physical goods? Will the application of emerging technologies in supply chains, across industries, help organizations better fulfill the needs of their customers?

The answer is an unequivocal yes. As there is a fundamental performance difference between traditional and digital supply chains. Traditional supply chains rely on a mix of electronic and paper-based processes and documentation. The organizational structure is often characterized by functional and geographic silos which do not share information openly, thereby leading to sub-optimal performance. Digital supply chains, on the other hand, have the capability for extensive information availability, and enable superior collaboration and communication across digital platforms resulting in improved reliability, agility and effectiveness. For instance, the U.S.-based land transportation company J.B. Hunt started using sensor based technology and Global Positioning Systems (GPS) to improve visibility of shipments and improve fill-rates. Advanced planning, scheduling and communication with truckers and customers alike helped J.B. Hunt to increase EBIT margin from 3% to over 11% within 4 years resulting in a quintupling of its share price¹.

We don't believe that specific technologies are required for achieving higher performance. However, we do strongly believe that the potential for value creation lies in digitizing the operating model to a complete Digital Operating Model;

a model that enables organizations to reap significant benefits through smart and consistent application of currently available standard digital technologies. In this paper, we focus on how digitization will change the value delivery process, eliminate deficits of existing hybrid supply chains, and create unique opportunities. We conclude by presenting a holistic approach to the digital transformation of supply chains.

Digital supply chains have the capability for extensive information availability and superior collaboration that result in improved reliability, agility and effectiveness

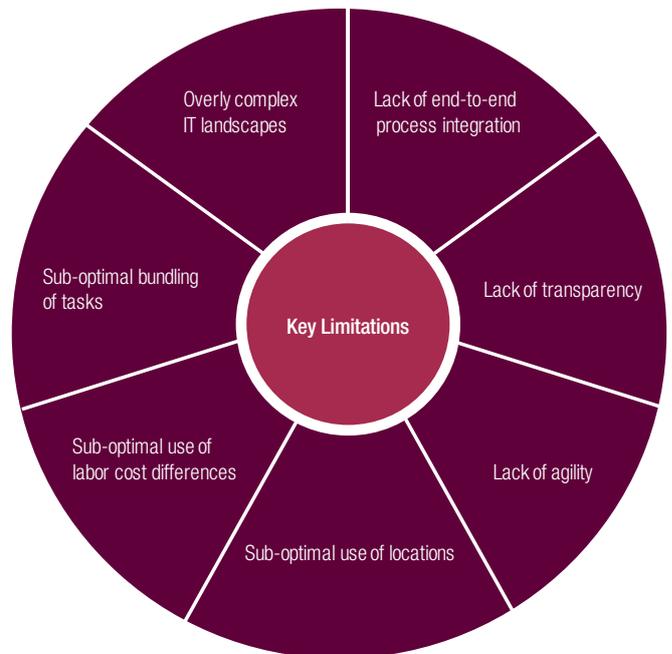
Deficits of Hybrid Supply Chains

Today most organizations operate on hybrid supply chain models that combine paper-based and IT-supported processes. As paper-based information is only available locally, organizational design is largely based on local factories or branches serving local customers. Coordination and governance is based on local profit centers which optimize the performance of a region, country or branch and which often do not share information openly with other organizational units. Profit-center heads often wield strong organizational power and hence applications are designed to support local processes or functional islands. These divergent local processes and IT applications lead to inconsistent and redundant data at the corporate level and create several inefficiencies (See Figure 1).

In global organizations, there are often several hundred applications supporting supply chain processes, leading to lengthy implementation cycles and overly high maintenance costs. Although these organizations may use IT-enabled process automation, it does not necessarily go beyond a specific business function or a local business unit, still leaving processes isolated. Disparate IT systems also bring in inconsistency and redundancy in data, making it difficult for top management to get basic information such as global revenue across the organization from a certain business partner in a particular month. It even makes internal benchmarking of operational data difficult.

Other common inefficiencies come from the multi-location structure of hybrid supply chain models. Local branches often have to work with a small number of employees and thus bundle strategic with operational tasks. If these tasks are separated and strategic tasks are bundled together in a central location, there would be greater effectiveness due to a higher degree of specialization. For example, a leading original equipment manufacturer in the automotive industry did not have an accurate quantitative method for defining, recording, analyzing and mitigating risk in the design and manufacturing processes for parts sourced from suppliers. This resulted in cost penalties, delayed time to market, and a diminished brand reputation. They implemented a central quantitative risk mitigation strategy that could be extended across the supply chain to create visibility and collaborative control of risk in new product introductions².

Figure 1: Key Deficits of Hybrid Supply Chains



Source: Capgemini Consulting analysis

Divergent local processes and IT applications lead to inconsistent and redundant data at the corporate level and create several inefficiencies

As local profit centers optimize local profit, this often leads to a sub-optimal result on a corporate level, since internal transfer prices almost never give the right incentives to collaboration. In a Digital Operating Model, local production units can be managed as cost centers so that profit centers can be based on customer segments or products. This supports a much better allocation and sharing of resources.

Hybrid supply chains execute their activities in multiple locations simultaneously. Though this model serves to maintain costs and facilitates operations, the lack of common access to information for all the locations hampers an organization's ability to take advantage of the cost differences that exist between locations. Due to the multi-local nature of hybrid operating models,

there is also a significant lag in reacting to global events – whether it is a natural disaster, a financial crisis or the integration of a new acquisition.

Currently many organizations are tackling these challenges separately with ongoing initiatives to automate processes, consolidate master data, make the supply chain more responsive or set up new shared services. Though these initiatives may have their merits, there is a faster path towards superior performance by designing a Digital Operating Model, as there are strong interdependencies between the organizational design, financial governance and KPIs, processes, data, and IT applications of a company. In the following section we look at the key realizable benefits of a Digital Operating Model.

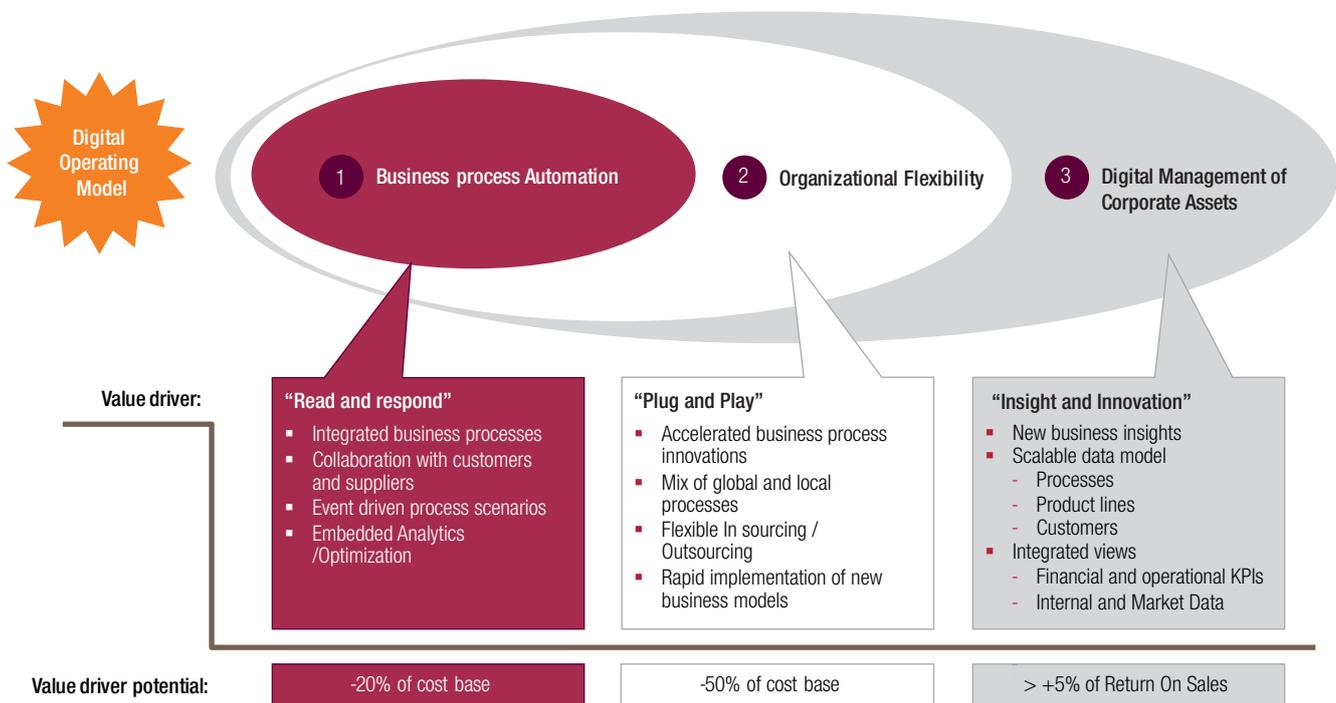
Benefits of Digitally Transformed Supply Chain

Ubiquitous information availability is at the core of digital supply chains. With the right organizational design and governance, they can enable superior collaboration and communication across digital platforms resulting in improved reliability, agility and effectiveness. This performance difference will force organizations with traditional supply chains to adapt to the new digital realities or run the risk of falling behind competition.

A digital operating model is all about implementing digital capabilities along the organizational layers of governance, processes, data & performance management, and IT. It allows for required levels of integration and standardization of processes. The benefits of a Digital Operating Model are broadly divided into three categories (See Figure 2).

Process automation and centralization help organizations make their personnel more efficient. Better visibility enables companies to manage their own as well as contracted assets in a more cost effective way and optimize the customer and product portfolio. From our experience, process automation typically results in up to 20% cost saving for the relevant cost base, while centralization, including off-shoring, helps save up to 50% in cost. Further, with digital management of corporate assets, companies can improve EBIT margin by 5% and in some cases, even more.

Figure 2: Value Enhancement through Service Orientation



Source: Capgemini Consulting analysis

Process Automation

Straight through processing, the complete execution of an end-to-end process without the need for re-keying or manual intervention has been identified as the ultimate automated process design target. It is important that all the data relevant to fully completing a transaction is available to an employee in a well-structured manner. For instance, complete data for a transportation manager would include details such as transit times, rates, and weight limits for all the suppliers and warehouses. Similarly, for a customer service agent, processing customer orders would mean the agent has access to the complete contract and product master data.

For the management of physical flows, it is important to have a closely knit web of checkpoints and milestones that are tracked and monitored. This will ensure that the physical processes are in tandem with the digitally planned and documented processes.

- Ready-mix concrete suppliers rely heavily on demand forecasts and truck route schedules to determine the next day's loads. Despite this, they face the risk of losing cement due to last minute cancellations and traffic congestions. Supervision with the support of technology that connects dispatchers, truck drivers and customers will enable dispatching of ready-mix cement trucks into the areas where the greatest activity (on the basis of pre-orders) is expected. This results in improved delivery time and reliability metrics.
- An Australian distribution company shipped products to retailers around the world while simultaneously also accepting online orders from individual consumers. Growing operations brought with them several challenges including reduced order accuracy, increased picking time thereby resulting in high inventory. They implemented a warehouse management system that enabled them to optimize warehouse activities by automating the picking and receiving processes and by generating various productivity reports. The system also integrated with the financial systems to track backlog orders and monitor safety stock levels thus improving inventory positions, and creating robust benchmarking capabilities³.

Physical flows captured by digital finger prints help achieve much better visibility of all corporate assets

Straight through processing, the complete execution of an end-to-end process without the need for re-keying or manual intervention, has been identified as the ultimate automated process design target

Organizational Flexibility

With a Digital Operating Model, management has greater freedom to choose the appropriate degree of centralization needed to support specialization or minimize process costs given different local labor costs and productivity levels across locations. Off-shoring and outsourcing of functions depends on the capability of an organization to manage processes independent of the location of the customer or the physical flows. To do this effectively all process documents have to be accessible on a digital platform (an Electronic Document Management system) and the process has to be supported by a digital workflow.

A major benefit for an organization when it centralizes certain specific functions is higher value through better quality and higher productivity. Furthermore, central master data management helps avoid double entries and inconsistencies; while supply chain planning activities benefit from a bigger pool of optimization objects.

For example, Samsung, with presence in 24 locations and more than 11,000 staff in Europe, had a fragmented and complex landscape of logistic service providers (LSP). They redesigned the operating model to integrate the organizations of the LSPs and Samsung. A central function was set up for planning and controlling the product flow from port to customer, through automated processes. Cost data were made available automatically without manual intervention and delays. Additionally, the integration of carrier (selection, evaluation, invoicing) and inbound flow (terminal planning, customs status) information was achieved. This solution helped Samsung build a flexible and integrated organization, increase load efficiency, improve tracking and customer service, enhance transport efficiency using best-in-class carriers and redesign transport solutions⁴.

Digital Management of Corporate Assets

Physical flows captured by “digital finger prints” create improved visibility of all corporate assets. The utilization of a specific production line, truck or administrative function can be made visible with little extra cost. The major benefit of a fully Digital Operating Model in terms of visibility lies in the integration of operational and financial data (which today are often separated up to a profit center level). For instance, customer orders can be evaluated against individual process costs instead of average cost. In some cases connecting internal data with external facts such as market share or competitors’ prices can lead to meaningful new insights.

Consider the case of Amazon: they are responsible for front-end customer relationships and back-end logistics. Their fulfillment model links sellers of various products and consumers while being responsible for end-to-end processes such as consumer relationships, order management, inventory management and fulfillment activities. After sellers send products to Amazon’s fulfillment centers, Amazon’s business partners upload listings into Amazon’s online system. The online system provides PDF labels and shipping statuses, receives and scans inventory, and records item storage dimensions. It also locates the products using methods such as advanced web-to-warehouse, high-speed picking and sorting and fulfills orders placed directly or by sellers. This way, both partners and customers are able to track their inventory and shipments. This digital management has helped Amazon achieve high performance and profitability standards⁵.

As information becomes available at the micro level, it allows companies to treat a single customer order as a profit center or even a single process as a cost center. Aggregation of all these transactions results in much more accurate performance measurement of a specific customer, industry segment, or location, as it avoids the distortions created by average costing.

A Digital Operating Model brings greater freedom to choose the appropriate degree of centralization that supports specialization, given different local labor costs and productivity levels across locations

A Holistic Approach to Digital Transformation of the Supply Chain

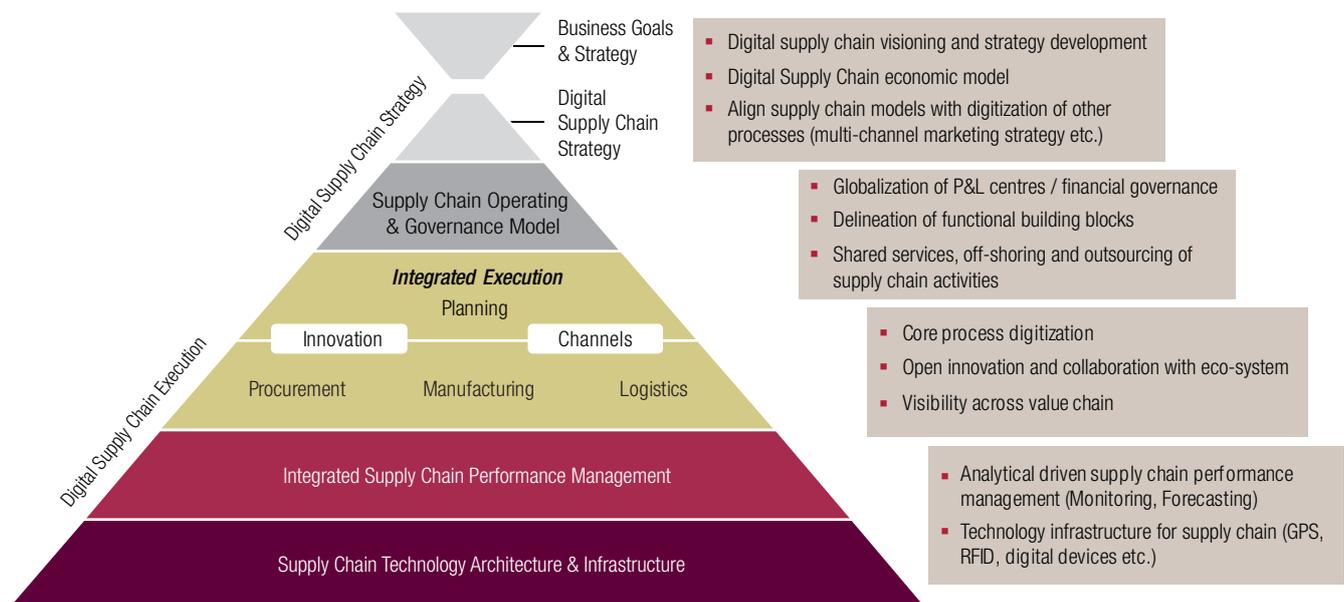
One of the most common problems faced in the digital transformation journey is the temptation to implement digital initiatives in silos or through a technology centric approach.

When organizations implement disconnected digital initiatives across functions, there often arises a competition for resources resulting in inefficiencies and inter-departmental conflicts. This creates a risk that the initiative will be viewed as a one-off project rather than as a transformation program. In our view, digital transformation is more about an enterprise-wide business transformation and less about technology.

It is important that a digital supply chain strategy be an integral part of the overall business model and organizational structure of a company. Transforming the entire organization to a Digital Operating Model clearly has the highest potential, but also bears the highest complexity and risk.

Regardless of the scope of the transformation we believe there are five transformation dimensions to be considered (See Figure 3).

Figure 3: Framework for Digital Transformation of Supply Chain Management



Source: Capgemini Consulting analysis

Digital Supply Chain Strategy

It is essential for an organization to integrate digital initiatives into the overall supply chain strategy in order to generate and measure long term value. A thorough analysis phase will highlight the value creation potential in the existing supply chain. The identification of business benefits requires top management expertise and inputs regarding currently perceived pain points and industry best practices.

Typical outcomes of an analysis of current pain points are the identification of examples of broken processes, local instead of global optimization, low visibility (for example, on product/customer profitability, or process quality) or sub-critical size of local business units. A synthesis of these pain points will lead directly to the design principles and value potential of a Digital Operating Model.

Supply Chain Operating and Governance Model

A Digital Operating Model supports a more flexible organizational design as information is no longer location dependent. In order to realize the full potential of being a global organization, companies must take a closer look into internal alignment committees and procedures, service level agreements, and transfer pricing schemes. For instance, demand forecasting and supply network planning require the integration of information and processes across functions and regional units. If this is systematically done, it unlocks the hidden synergies in manufacturing and logistics networks alike.

Organizations need to design end-to-end processes which give employees all the information needed for straight through processing

For example, Cisco anticipated exponential growth and realized the need for a scalable business model. They decided to use the Internet as the foundation for a networked eco-system. They also leveraged the collective capabilities of all their supply chain partners and linked customers, prospects, partners, suppliers and employees in a multi-party, multi-location electronic network. This provided them with scalability and agility that allows the company to grow with market demand and reduce its product development timelines. The interconnected supply chain generated about \$695 million in cost savings for Cisco. Reconfiguration of the eco-system with the consistent use of technology has helped the company design a best in class supply chain model⁶.

Integrated Execution

It is important to integrate the different supply chain functions such as product development, procurement, production, maintenance, and logistics across locations in order to minimize “waste” or non-value added activities such as double entry of data, the reconciliation of information from different sources or the correction of customer invoices. The main aim is to design end-to-end processes which give employees all the information they need for straight-through processing.

For example, ABB, in-line with its integrated global supplier strategy, built an adaptable and agile supply chain through technology architecture with its suppliers and other value chain functions at multiple locations. They implemented common processes across the globe for the relevant business domains by deploying various shared global applications, redesigning processes to improve flexibility to respond to uncertainty, and building a dynamic supply chain instead of a static one, thereby fulfilling the interests of multiple players⁷.

Integrated Supply Chain Performance Measurement

Using Web 2.0 technologies, every order or transaction can be traced in a Digital Operating Model. Tagging technologies such as barcodes or RFID provide real-time data feeds for physical movements. Virtualized data centers make available information that was concealed, until now, by processing and storing data for multi-function and multi-location supply chains. Combining this operational data with financial information, along with data from external sources like market data or benchmark information, can help in better decision making compared to the reporting techniques often used today.

Supply Chain Technology Architecture and Infrastructure

Technology architecture is the design logic for business processes and IT infrastructure and reflects the integration and standardization requirements of the organization's operating model. Though many technology requirements may already be in place, the challenge is to select and implement digital technologies and integrated platforms that employ reusable and exchangeable components with minimal investment in time and effort. Walmart's extensive use of technologies such as demand pattern analysis, RFID, wireless tracking devices, warehouse labor management systems, vehicle management systems, and voice-directed picking devices for continuous improvement in its supply chain, is a best in class example⁸.

If an organization aims to successfully implement a transformation program, it will have to address all the five dimensions discussed above in a consistent and well thought out manner.

Conclusion

CXOs and supply chain leaders must take advantage of the opportunities that come with digital operations. They should embrace digitization, reconfigure the supply chain, and overcome traditional geographic or functional silos. Highly automated end-to-end processes, flexible bundling of activities and improved visibility are the hallmarks of a fully digital supply chain. Being digitized need not necessarily mean applying the latest digital technologies. It is more about aligning digital initiatives with supply chain goals and adopting a Digital Operating Model to realize the untapped potential of existing resources and capabilities resulting in a higher level of performance.

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Authors

Martin Raab

Vice President, Head of Supply Chain Management - Austria, Germany, Switzerland
martin.raab@capgemini.com

Belinda Griffin-Cryan

Senior Manager,
belinda.griffin@capgemini.com

Contacts

United States of America

Jim Nelles

Vice President,
jim.nelles@capgemini.com

France

Romarc Roussie

Principal Consultant,
romarc.roussie@capgemini.com

United Kingdom

Steve Wilson

Vice President,
steve.wilson@capgemini.com

Netherlands

Ton van Dolder

Vice President,
ton.van.dolder@capgemini.com