THE IMPACT OF DIGITAL TRANSFORMATION ON THE SUPPLY CHAIN

LOGILITY VOYAGER SOLUTIONS

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The Impact of Digital Transformation on the Supply Chain

You may be tired of seeing the words *digital* and *digital transformation* by now, but the need for companies to make this transformation is more real than ever. In current times of slow economic growth and Amazon challenging almost every industry's traditional business model, almost every company is looking over its shoulder for the next Google, Tesla, Netflix, Uber, or Airbnb. Companies fear becoming the next Harvard Business Review case study of a company that missed the digital transformation imperative.

The supply chain industry is no exception. The digital transformation of supply chains involves painstakingly creating the so-called digital twin concept, which models and mirrors the actual physical supply chain network. With automated processes and near real-time information, companies can say goodbye to inefficient manual processes and costly investments in unneeded assets (e.g., inventory), and respond more quickly and accurately to any potential business disruptors.

Supply Chains: Today and Tomorrow

Traditionally focused on reducing costs, supply chain management (SCM) and the associated technology are now used to drive growth and mitigate risks. This shift in focus requires a total digital transformation of SCM. Yet, this is complicated by disparate enterprise software system landscapes, global operations, large data volumes, and the uncertainty regarding data quality and integrity.



Figure 1. The now and the future of digital supply chain transformation (source: Logility, Inc.)

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Figure 1 depicts the supply chain as we know it versus that of the future. Today's supply chains involve tedious and ineffective manual data gathering and manipulation, manual collaboration, and manual "what-if" scenarios. Supply chains of the future will offer near real-time connections, digitized collaboration and scenarios, and automatic simulation capabilities. Also, traditional cadence-based planning and decision-making will give way to continuous event-driven planning and decision-making.

Moving Toward Continuous Planning and Execution

Supply chain planning is moving from cadence-based periodical planning to realtime planning. Traditional monthly, quarterly, and annual sales and operations planning (S&OP) reviews will continue, but planning and execution will converge to create continuous planning. Automated algorithms are creating new possibilities. Demand, supply, and financial data can be processed in real time, whereas dynamic pricing can shape, sense, and respond to demand. Think of demand and supply sense-and-respond capabilities integrated with financial optimization.

Most supply chain decision-making will be automated to take into account massive information streams too large for humans to handle and/or recognize optimal patterns (of which many may be counterintuitive). Automated processes can also accelerate decision-making, improving customer service and reducing costs.

When decisions require human attention, advanced analytics and machine learning will evaluate trade-offs (e.g., margins, revenue, return on asset [ROA], or risk profiles) and recommend scenarios based on objectives. Humans will rarely need to determine which scenarios to run. Intelligent systems will automatically spin up the best scenarios and present them for quick comparison and decisionmaking by business analysts (planners).

Aside from the technological changes, how will digital supply chains impact the supply chain planning process? Companies will have to add continuous-based planning enabled through supply chain visibility and automation. Cadence-based planning sets the plan, whereas continuous-based planning is used to sense alterations to the plan, analyze potential alternatives, and respond in an optimal way.

The extent of process automation through algorithmic planning, machine learning, workflow, and events will determine whether additional human resources are required to accommodate continuous-based planning. To some extent, continuous-based planning takes place even today, but in an informal way often referred to as firefighting (rush orders and expediting) and with less than optimal results.

Enter the Supply Chain Control Room

The idea of the supply chain control room (see figure 2), or situation room, is to provide visibility of the supply chain, including all inventory and status of vendors, subcontractors, and logistics providers. Supply chain control towers should:

- Provide holistic visibility (digital twin) of the supply chain, including access to all data required to make decisions as quickly as needed.
- Operate as a closed-loop planning system, enabling humans or algorithms to execute decisions effectively. Without this setup, control towers would be mere unidirectional overlays.

A supply chain control room should allow for effective collaboration management of the entire supply chain, including:

- Continuous Planning. The ability to create and compare multiple what-if scenarios to assess alternatives and trade-offs to develop the optimal plan that aligns with corporate objectives. This area should also include available-topromise (ATP) calculations across multiple subsidiaries and a planners' workbench.
- Execution. With the merging of planning and execution, visibility to distribution
 as well as inbound and outbound transportation is critical. Companies should
 also look at quality management and traceability functionality as well as better
 support for contract manufacturing.
- Support. This area includes customer/channel-focused analysis, offerings, and collaboration.



Figure 2. Supply chain control room (source: Logility, Inc.)

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The Future of SCM Is the Customer

To reach the digital supply chain ideal, companies must evolve their business processes and infrastructure to focus on their customers. This includes defining new business models, building test-and-learn capabilities, and driving process innovation rather than simply automating existing processes and practices.

Concretely, companies must build teams with deep knowledge and skills in analytics, communication, collaboration, and supply chain best practices. They should also implement a single supply chain planning (SCP) platform that integrates data from across the enterprise and can support a digital supply chain.

This starts with end-to-end visibility of the supply chain to enable operational, tactical, and strategic decisions. Once this visibility becomes table stakes, the real differentiator will be how companies use it to augment decisions, model scenarios, mitigate risk, and seek out new business opportunities. Competitive advantage will come from the degree to which the entire supply chain is aligned and synchronized, and a company's ability to use its supply chain "digital twin" to sense, plan, and optimally respond.

Embedded and Pervasive Analytics

Pervasive, role-based, contextual, and actionable analytics will also be critical across digital supply chains. Analytics focused and aligned to enable all integrated business planning requirements across the enterprise is the Holy Grail. To cater to various users and departments, advanced analytics must be numerical and visual, and available in volumetric and financial units. Digital supply chains will use descriptive, diagnostic, predictive, prescriptive, and cognitive analytics.

Descriptive analytics examines data to tell us what happened. Descriptive technologies enable humans to view data in visual formats such as reports, hierarchies, dashboards, and scorecards. Over the last decade, the advances in descriptive analytics visualization capabilities have dramatically improved supply chain decision-making.

Diagnostic analytics uses what-if scenarios, root cause, segmentation, and other tools to explain why something happened.

Predictive analytics can, as its name suggests, predict what will happen. It uses historical data inputs from what-if scenarios, sensitivity curves, and similar tools used in advanced planning and scheduling (APS) software to score data with predictive models and provide recommendations for optimization and a list of exceptions for review.

Prescriptive analytics uses stochastic optimization methods and trade-offs to provide inputs based on sensor data streams and recommend actions based on



Figure 3. The various parts of a digital supply chain (source: Logility, Inc.)

a given situation. This form of analysis uses inputs like the weather, traffic congestion, and flow sensing.

Lastly, cognitive analytics involves the use of machine learning and artificial intelligence (AI) to gain new insights into the supply chain and develop automated responses or recommendations based on these insights.

Sensor technologies such as internet of things (IoT) devices and IoT software platforms drive advanced analytics' evolution.

Automated Decision-making

While descriptive, diagnostic, predictive, and prescriptive analytics provide decision-making support, they can't automate decisions. Algorithmic businesses can drive speed, scale, and insights needed to leverage cognitive capabilities for even greater impact through automation. While the term "algorithmic business" is relatively new, the practical use of algorithms is well established in many industries. The difference today is the growth of smarter and faster machines that have made algorithms more accessible to every organization.

Algorithmic planning efforts must focus on customers. For example, using predictive analytics to predict a disruption and then prescribe an action can significantly improve the customer experience. In this approach, there is no

predetermined data model, rather the focus is on learning patterns from the data. The computer output is an analysis of these patterns.

The step after pattern recognition and data mining is machine learning including deep learning (or cognitive computing). These AI concepts can deduce new insights or recommended actions based on the natural language processing (NLP) and self-learning capabilities. Examples are autonomous self-driving transport vehicles and local delivery via drones in difficult to access areas.

SCP software should be able to decode all incoming data streams, recognize data patterns, and align the supply chain to use automated resolution (optimally respond to an issue with an appropriate action with the need for as few people as possible to touch the data).

One of the key principles of digital supply chains is converging people and machines, i.e., an "augmented workforce" via AI tools. Exception-based planning and execution using probabilistic modeling helps businesses achieve their objectives. In a perfect world, advanced planning platforms would allow companies to automate 80% or more of their routine planning and free up planners so they could spend time on continuous-based planning and other higher-value activities like tactical and strategic what-if analysis and risk mitigation. However, in reality, until most processes are truly automated, most companies may have to recruit more staff to adopt a continuous-based planning capability.

Data as Digital Glue

Master data management (MDM) is critical for providing consistent and highquality data for supply chain planning. Astute MDM software should be able to manage data from disparate sources around the enterprise and the supply chain (internal and external, structured and unstructured). Some advanced MDM systems have embedded AI capabilities (e.g., pattern recognition) within the system and can identify the right data, clean incoming data, and import and amend only the data that has changed, with workflow and alerts capabilities for data maintenance.

Strong MDM capabilities are essential for processing big data and using AI. Flexible enterprise system integration capabilities based on pre-built templates, standardized connectors, and fast rules-based data transformations can speed up merger and acquisition (M&A) value attainment.

Logility Case Studies

Groupe Dynamite: Algorithmic Planning and Machine Learning

Groupe Dynamite is a Montreal-based fast-fashion retailer with two brands at the heart of its success, Garage and Dynamite. It operates more than 380 stores

employing more than 5,500 people in Canada, the United States, and the Middle East, plus an e-commerce site.

The Challenge:

The group needed to transform its manual processes for forecasting, allocation, and replenishment to meet growing business needs and support rapid growth as the brands expanded in the American and international markets.

The Results:

Since implementing Logility Voyager Solutions[™], Groupe Dynamite now develops forecasts down to the store level, accounting for consumer variances including climate, culture, economy, and fashion trends.

Specifically, Groupe Dynamite has:

- Increased auto-replenishment to 80%, freeing planners to focus on more strategic value-add activities
- Decreased initial merchandise distribution from 70% to 50%, giving the business greater flexibility and better margins
- Reduced size variance by at least 3% at the store level
- Become a more proactive versus reactive organization
- Better ability to predict trends and take advantage of inventory replenishment priorities based on individual store needs
- Reduced Weeks of Stock (WOS)

Ashley Furniture: Designing the Perfect Order

Ashley Furniture is the third largest home furniture manufacturing company, providing case goods, mattresses, upholstered goods, and home accessories sold by more than 6,000 retailer partners.

The Challenge:

Ashley Furniture needed to fuel profitable growth while creating a customer-first experience by improving its perfect order index with fast and efficient delivery without increasing safety stock and its associated costs.

The Results:

Logility Voyager Solutions help Ashley Furniture right-size inventory across its global supply chain network and reduce safety stock.

Specifically, Ashley Furniture has:

- Improved customer satisfaction
- Expanded visibility and planning throughout the global supply chain
- Reduced safety stock
- Optimized inventory at the item level
- Activated management by exception so the biggest issues get first attention
- Avoided the need for additional distribute center space

Making the Digital Transformation: The Next Steps

Digital transformation is clearly not a case of integrating technology for the sake of it, or simply making today's processes a bit more efficient. It's the redesigning of cross-functional processes and the implementation of organizational learning.

Plan Your Implementation

How do businesses make a digital transformation? Do they digitalize one product category at a time, or everything at once? New capabilities are often best implemented progressively, starting by piloting them for one product category or a small business unit, for example. Once you've refined the capabilities at the pilot stage, you can then implement them across the entire business.

Transform Your Workforce

What kind of training do planners need to adapt to a digitalized workplace? Or do you need to hire data scientists for planning?

First, planners need deep knowledge of a company's products, suppliers, customers, and supply chain capabilities, and a clear understanding of company priorities and objectives so they can analyze data and determine the best response.

Second, they need good communication and collaboration skills because they will often need to communicate with stakeholders across the business to build consensus among multiple business functions.

Lastly, they need to be comfortable analyzing internal and external data. An ideal candidate would be well versed in the company's SCP platform, hold an undergraduate degree in supply chain management and have completed a supply chain rotational program, and have experience in analytics.

About the Author

Predrag (PJ) Jakovljevic focuses on the enterprise applications market. He has over 20 years of industrial experience within the discrete manufacturing sector, including the machinery and equipment, automotive, construction and engineering, and electronics industries.



Prior to joining TEC, Jakovljevic was a senior consultant in the package-based solutions (PBS) group of CAP Gemini in Houston, Texas (US), with Baan's Manufacturing and Logistics modules as his main field of expertise. At CAP Gemini, Jakovljevic was involved in system demonstrations, software gap

analysis for prospective clients, and Baan implementation assignments.

Before CAP Gemini, Jakovljevic was employed as a senior consultant for Deloitte & Touche Consulting Group in Johannesburg (South Africa), where he specialized in Baan's Manufacturing and Logistics modules, and engaged in the processes of ERP package selections, as well as in proposal preparation. Jakovljevic served as a team lead for manufacturing, and for service and maintenance package system integration. As a consultant he has been involved in business requirements definition and software gap analysis, business process mapping to software functionality, software configuration and parameter setup, and key user training.

Jakovljevic holds a degree in mechanical engineering from the University of Belgrade in Serbia. He has also been certified in production and inventory management (CPIM) and integrated resources management (CIRM), and is an Association for Operations Management (APICS)-certified supply chain professional (CSCP).

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