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## *Realization of the Digital Supply Chain in the Enterprise Business Application Environment*

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*Abstract: It is anticipated that emerging digital technologies in the supply chain will upend almost every aspect of what is referred to as "standard business procedures." In the current digital era, where nearly everything will be connected to almost everything through the IoT and digital supply chain management, a critical business priority for practically every manufacturing company, finds itself at the center. This article examines the particular competencies and techniques required for managing instability and uncertainty in enterprise business application, as well as how digital supply chain management information system capabilities can result in improved business performance through enterprise business. Key ideas in digital supply chain modelling have been identified to minimize the difficulty and increase flexibility in the digital supply chains. Key techniques for supply network planning and synchronization have also been identified to optimize business performance and goals, many of which conflict with one another.*

*Keywords: Enterprise Resource Planning, Digital Supply Chain, Big Data, SAP, Enterprise Business Application, IoT.*

### I. INTRODUCTION

We are living in the most innovative period of business history for corporate businesses across all industries and their conventional supply chains. Five defining trends have been enabled by revolutionary innovations that have matured and reached scale together: hyperconnectivity, supercomputing, cloud computing, smarter world, and cyber security. The digital supply chain, a combination of shorter and more flexible product lifecycles, is essential in the modern business world. Consumers want new products and services to be developed and delivered more quickly in a secure way, which means businesses must adapt their organizational structures, business processes, and response times. The conversion of conventional supply chains into demand-sensitive digital supply chain is a crucial aspect of this shift. Businesses can enhance their relationships with customers and gain a deeper understanding of customer preferences by utilizing new technologies [1]. Enterprise businesses can obtain a competitive advantage through supply chain management digital transformation by optimizing resource utilization, improving transparency and efficiency at every stage of the supply chain, becoming more responsive to market demands, and raising the standard of decision-making. Supply chain stakeholders must refocus their efforts from cost-cutting to enabling new digital processes, making businesses more connected and agile, and creating value out of these new technological enablers. Digital supply chain management is very useful in order to efficiently integrate suppliers, manufacturers, and distributors in performing the tasks of acquiring raw materials, converting those raw materials into intermediate and finished products, and distributing those products to clients in the appropriate quantities, at the appropriate times, and at the appropriate locations [2]. In order to meet service level requirements while keeping costs to a minimum, digital supply can be adopted as an effective strategy. In addition, digital supply chain management includes overseeing a network of interconnected tasks that plan, coordinate, and regulate the flow of components, finished goods, and materials from the supplier to the client. Strategic, tactical, and operational

decisions must be made throughout the supply chain, ensuring the management of material, financial, and information flows. A new generation of digital supply chain management software known as Advanced Planning Systems (APS) was created by vendors such as SAP to address operational inefficiencies brought on by disconnected and sequential steps in production planning. The improved efficiency of production planning was made possible by consolidating all pertinent constraints into a single database and using operations research techniques like constraint solving and linear programming. This enhanced planning outcomes and increased flexibility by cutting down on planning cycle times. The weaknesses of APS SCM solutions was exposed when experts investigated these solutions outside of their own organizations. In a cross-company setting, the local objectives and decentralized planning domains of the involved suppliers and customers typically prevent the availability of the detailed data required for central optimization. This has a special impact on the automotive sector, as numerous independent suppliers create dispersed, intricate global supply networks with multiple levels. A third generation of digital supply chain management—SCM in the digitalized economy—is set to emerge few decades after the initial supply chain solution. Huge technological advancements and shifts over the past few years are poised to revolutionize business practices, altering many facets of our day-to-day interactions as suppliers, manufacturers, consumers, and customers. The rapidly evolving digital economy will undoubtedly have a profound impact on supply chain procedures and design.

## II. LITERATURE REVIEW

The most efficient states of supply and demand are guaranteed by a fully integrated supply chain management system, which promotes effectiveness, dependability, and efficiency in the procurement process. Increased globalization and technological advancement in recent years have given businesses a competitive advantage. As a result, companies are working to improve their capacity to compete favorably in the ever evolving and cutthroat business world, which has led to the emergence of digital supply chain management systems. Digital supply chain management systems have become more popular as a result of advanced technologies like big data, blockchain, and cloud computing. The sustainability of supply chain procedures is impacted by the digitization of the chain. A company's strategic attempts to achieve social, environmental, and financial objectives by connecting buyer-supplier and inter-organizational business processes are referred to as sustainable supply chain management.

## III. THE ELEMENT OF DIGITAL SUPPLY CHAIN IN THE ENTERPRISE BUSINESS APPLICATIONS

Emerging technologies are those that are being developed now for digital supply chain or in the coming years that have the potential to significantly change the business and social landscape [3]. A few systems showcased the tangible implementation of cutting-edge technologies that have a significant influence on digital supply chain operations both now and in the future. A few cases were gathered and created as part of an innovation study conducted by the SAP Digital team in collaboration for the transformation of the digital supply chain [4]. It has always been difficult to predict consumer trends and future behavior in the supply chain, but new big data technologies and techniques, along with predictive and prescriptive analytics, can make it easier to identify emerging trends and enable businesses to respond faster to emerging opportunities through the digital supply chain [5]. Accurate forecasting in the supply chain requires a lot of data, such as what customers purchased and the future product's appearance, as automotive suppliers 'only' provide components or modules for finished goods. When it comes to a corporate Internet of Things (IoT) scenario, one of the main components can be regarded as the application of a digital product history [6]. Every product has an identity and history that can be recovered using a built-in tracking device, RFID, or barcodes. This applies to each component, element, packaging unit, and devices. Customers, suppliers, distributors, service providers, and the divisions in charge of production and development can all access this critical information. The advantages of a digital supply chain for product suppliers rely on the product's complexity and value. These days, goods are frequently shipped all over the world, sometimes taking weeks or even months to arrive. Products must be visible and transparent throughout the supply chain, which means they must be geo-located, so that we can always know where they are. Numerous IoT-related technologies are capable of continuously monitoring a physical object's location and transmitting this data to a central data hub. It is crucial to increase

flexibility by modularizing digital supply chain processes and decrease human intervention and error rates by automating processes in order to react swiftly to shifting demand markets. Robotics deployment can facilitate an agile digital supply chain system by cutting waste, boosting repeatability, and boosting throughputs—particularly when used for automated commissioning. Industrial suppliers find this use case to be particularly appealing, particularly for the spare parts industry.

#### **IV. CHALLENGES IN THE DIGITAL SUPPLY CHAIN**

The expansion of digital supply chains internationally has led to an increase in supply chain complexity. A remote supply chain's challenges include having more business partners, having trouble tracking products, not having enough infrastructure for international logistics and transportation, and having to wait longer for products to reach their final consumers [7]. Unfortunately, because of the high initial investment cost and uncertainties surrounding the viability of applications, digital transformation is actually more of a digitalization than an improvement. These difficulties can be addressed by commercial relationships, which give organizations access to partners, vendors, consumers, and service providers. Specifically, the network can automate purchasing processes to enable real-time business within a complex network of interlinked supply chains. The network can function as a single point of contact for data interchange, including sales orders, purchase orders, process data, geo-location data, and so on. Effective supply chain management digital transformation in the applications is used to advise enterprise businesses and supply chains that have not yet begun the digital transformation process about the benefits of these apps and the challenges involved [8]. While some enterprise businesses are undergoing digital transformation, others have only undergone digitalization and have not yet begun this process.

#### **V. INNOVATIVE TECHNOLOGIES IN THE DIGITAL SUPPLY CHAIN**

The majority of business technology is already available to organizations today as a pay-per-use, on-demand service. Businesses can refocus their attention on operating and improving their digital supply chains rather than creating and maintaining massive IT infrastructures for type of adaptable on-demand business IT. In the near future, digital supply chain performance will be significantly impacted by cloud computing, the technology that underpins this scenario and will disrupt supply chain management [9]. In order to centralize IT management and handling and lower their requirement for infrastructure investments, leading industries are thinking of digitizing their enterprise business systems onto private or corporate clouds. IT workers are still frequently concerned, though, about whether the on-demand infrastructure can adequately and consistently support essential business operations. Enterprise businesses anticipate that in the long run, their mission-critical and core processes will be hosted on private or corporate clouds to minimize risks; however, supporting processes can be adequately handled on public clouds. Today, enterprise business agrees that cloud computing will play a bigger role in supply chain management in the near future, particularly for non-critical and supporting IT systems. But, during the next three to five years, the execution systems—also known as the systems of record—will not be moved to the cloud. Enterprise businesses are looking for more effective ways to oversee the entire digital supply chain. More significantly, though, they want to be able to easily access all decision-relevant data on a single tool or device so that they can monitor every facet of the entire supply network—the use case of the digital supply chain. It can make a difference between remaining ahead of the competition and dropping behind if one is unable to recognize and react quickly to any kind of change to any aspect of any enterprise business digital supply chain. The relevant supply chain stakeholders are able to work together and make timely decisions based on updated information when they have access to pertinent data from various digital supply chain segments. A central view of supply chain performance should also be possible with such a SC control tower, serving as the single source of truth for all digital supply chain KPIs.

Additionally, the digital supply chain ought to be drillable down to any level of interest, and root-cause analysis for KPIs that are outside of range needs to provide insights into the actual causes of performance issues rather than just their symptoms. The financial evaluation of alternative business decisions and what-if analysis and simulation provide decision support, completing the comprehensive scope of the digital supply chain concept. Digital supply chain activities are made more

transparent and dependable by concurrently sharing information technologies and data with all supply chain stakeholders. At this point, digital transformation is essential because it improves communication among supply chain participants and makes digital supply chain management possible. The term "Industrial Revolution" refers to the use of new technologies to digitalize industrialization, physical production, and cyber technologies. The supply chain's digital transformation has made it possible to implement more sophisticated automation and inter-system integration. When enterprise systems are examined historically, material requirement planning (MRP) is the most well-known production planning and control technique [10]. It garnered a lot of interest from researchers. It generated planned production orders and sought to identify precise material requirements based on product trees, stock information, and MPS. Business enterprise systems that facilitate key business operations between departments and other businesses is known as enterprise software. Corporate applications are designed to improve efficiency by managing corporate operational data. In general, enterprise software is not adaptable. These are difficult-to-maintain programs with little documentation [11]. Despite this, because supply chains support intricate business processes, they continue to be highly significant for digital supply chain.

Enterprise Resource Planning (ERP) is defined as systems and software that have been developed to enable or support businesses' efficient use and end-to-end management by combining all available resources, including financial, physical, and human resources [12]. ERP systems enable information to be tracked at all times and offer global visibility both inside the company and across its connected supply chain. A supply chain's operational decisions are made with greater quality when it has access to this real-time information. ERP systems monitor data and view data from this perspective [13]. ERP can be compared to the digital nervous system that powers an organization's skeleton and enables it to react swiftly to suppliers and customers. The majority of ERP vendors create web-based versions of their systems to adapt to dynamic business environments. Many different processes that aim to integrate supply chains are supported by ERP systems. When ERP modules take the place of information systems, this is easier to accomplish at the organizational level. ERP systems in this instance integrate and support digital supply chain. ERP systems are therefore important in terms of productivity, supplier satisfaction, and customer satisfaction [14]. ERP systems must be customized to fully support supply chains and business processes, though, as they have certain limitations. ERP systems are frequently not made to work with other independent apps because they are rigid, complicated, and uncooperative. Consequently, the ERP's adaptation Supply chain technology boosts profitability by providing the customer base with more exceptional value. Businesses that have a better understanding of the intricacy of their digital operations and supply chains, as well as those that have implemented digital transformation processes and systems, can offer accurate, timely, and incomplete access to transactional data, content, and related supply chain information. They can also facilitate efficient planning and supply chain execution both within and between organizations.

## VI. CONCLUSION

Supply chain management procedures need to be digitalized now, making use of cutting-edge technologies. Practical agendas or roadmaps towards a desired degree of digitization are therefore required. Digital supply chain stakeholders must find out how to use new technological innovations in the enterprise business and integrate them into a coherent agenda to strategically drive digitization within corporate supply chain management. This need is frequently sparked by corporate digital strategies. Surprising conclusions are drawn when comparing the degree to which individuals and organizations can adopt new ideas. Businesses that have retroactively incorporated new technology into antiquated systems and processes face a significant disadvantage from those who are willing to take a more radical approach, commit greater resources, and implement more successful changes. Businesses that have a better understanding of the intricacy of their digital operations and supply chains, as well as those that have implemented digital transformation processes and systems, can offer accurate, timely, and incomplete access to transactional data, content, and related supply chain information. They can also facilitate efficient planning and supply chain execution both within and between organizations.

**References:**

1. Junge, A. L. and Straube, F. (2020). Sustainable supply chains–digital transformation technologies' impact on the social and environmental dimension. *Procedia Manufacturing*, 43, 736-742.
2. Holmström, J., & Partanen, J. (2014). Digital manufacturing-driven transformations of service supply chains for complex products. *Supply Chain Management: An International Journal*, 19(4), 421-430.
3. Tseng, M. L., Islam, M. S., Karia, N., Fauzi, F. A., & Afrin, S. (2019). A literature review on green supply chain management: Trends and future challenges. *Resources, Conservation and Recycling*, 141, 145-162.
4. Ivanov, D., Dolgui, A., & Sokolov, B. (2019). The impact of digital technology and Industry 4.0 on the ripple effect and supply chain risk analytics. *International Journal of Production Research*, 57(3), 829-846.
5. Gravili, G., Benvenuto, M., Avram, A., & Viola, C. (2018). The influence of the Digital Divide on Big Data generation within supply chain management. *The International Journal of Logistics Management*, 29(2), 592-628.
6. Atzori, L., Iera, A. and Morabito, G. (2017). Understanding The Internet of Things: Definition, Potentials, And Societal Role of A Fast Evolving Paradigm. *Ad Hoc Networks*, 56, 122-140.
7. Tiersky, H. (2017). The 5 key drivers of digital transformation today. Retrieved from <https://www.cio.com/article/3198121/it-industry/whats-now-indigitaltransformation.html>
8. Menon, S., Shah, S. and Courtoubis, A. (2019). An Overview of Smart Manufacturing for Competitive and Digital Global Supply Chains. In 2018 IEEE International Conference on Technology Management, Operations and Decisions (ICTMOD) (pp. 178-183). IEEE.
9. Albukhitan, S. (2020). Developing Digital Transformation Strategy for Manufacturing. *Procedia Computer Science*, 170, 664–671.
10. Chen, Y., Miao, W. M., Lin, Z. Q. and Chen, G. L. (2008). Adjusting MRP for dynamic differentiation of identical items for process customisation. *Production Planning and Control*, 19(6), 616-626.
11. Benlian, A. and Hess, T. (2011). Comparing the relative importance of evaluation criteria in proprietary and open-source enterprise application software selection – a conjoint study of ERP and Office systems. *Information Systems Journal*, iVol. 21, 503 – 525.
12. DePuy, G. W., Usher, J. S., Walker, R. L. and Taylor, G. D. (2007). Production planning for remanufactured products. *Production Planning & Control*, 18(7), 573–583.
13. Chopra, S. and Meindl, P. (2007). *Supply Chain Management: Strategy, Planning, and Operation*. New Jersey: Pearson Prentice Hall, p. 57.
14. Hartley, J. L. and Sawaya, W. J. (2019). Tortoise, not the hare: Digital transformation of supply chain business processes. *Business Horizons*, 62(6), 707-715.