Digital supply chain management: An Overview

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Abstract Many global supply chains are unequipped to cope with the world we are entering. For that reason, supply chain managers need to shift their attention from cutting costs to enabling new processes, and make corporations more connected and agile to create value across the enterprise. New digital technologies that are emerging everyday are on their way to disrupt nearly all the areas of traditional business processes. The key business priority of almost every industry will find itself in the centre of this upcoming digital era. The process of digitization affects almost everything in today’s organizations, including supply chain management and puts huge pressure on organizations to change. Hence it is crucial for managers to understand the implication of digitization on their organization and employees. Current scenario emphasises on the importance of management of people and organization issues in digital transformations. The effect of digitization includes varied impacts on economy as a whole; create tremendous opportunities and challenges for businesses. In the current world of globalization digitization is not a choice but an imperative for all businesses across all industries. Manufacturing processes and work, business model, products and services are the main targets of digitization. The digital transformation enablers and framework discussed in this study- comprised of six techniques of Big data, Cloud services, Unique identification and display innovation, Robotics, Sensors and geolocation, and nanotech and 3D printing - can serve as enablers of digitization.

1. Introduction

Growth of business world today has created tighter market competition, because the existing industrial markets has globalized and have penetrated the international boundaries. At the same time to survive and to maintain a sustainable competitive advantage in this global market, it is necessary for organizations to identify emerging digital technologies that can be used to develop a new business model. In today’s competitive world the way manufacturing operations are being executed has forced the organizations to adopt advanced manufacturing technologies like 3D printing, rapid prototyping, make use of internet of things for using information and analysis. In this competitive and turbulent environment the target of every business is to satisfy the customer with exact product quality, quantity and price in optimum time.
These are effectively addressed by implementing supply chain management which involves operations management, procurement, production, information technology and logistics. Therefore it is necessary to present the current developments in these areas and how the emerging technologies can be used in these processes to attain competitive advantage. Today, in addition to have a highly standardized and efficient supply chain, companies also need to alter business streams to adjust to customer demands. Researchers predict the movement into the digital world and expect a digital SCM for the coming years. Traditional supply chains will transform into demand sensitive networks.

Digitalization refers to “the increasing penetration of digital technologies in society with the associated changes in the connection of individuals and their behaviour” (Gimpel and Roglinger et al. 2015). Digitization will create great opportunities for organizations and supply chain practices. Many organizations want to become more “digital” because they have observed the criticality and value of digital technologies for their growth and their own businesses, and the management support is also increasing for such initiatives (Bughin et al. 2015). However, the implementation of digital technologies in current supply chain requires a detailed understanding of its impact and benefits on business. It has been observed that digitalization of supply chain processes will present solution to the serious supply chain worries. But, formation of a practical implementation in order to achieve the target level of digitalization is still a complex topic. The remaining of the paper is arranged as follows:

The next section presents the literature review.

Section 3 defines the digital supply chain management and the scope of digitization in supply chain management

The framework of Digital supply chain is discussed in section 4.

Section 5 describes the benefits of digitalization in supply chain management.

At the end section 6 gives the conclusion of the study.

2. Literature Review

The wider global trends have affected corporations of all sizes. Globalization and the evolution of e-commerce have opened up opportunities for growth, but present challenges, such as the supply chain visibility and complexity at the same time. “The extensive use of Internet is making customers more impatient both in retail that is business to customers (B2C) and business-to-business (B2B) segments. The future consists of estimating the influence of e-commerce on wholesale, retail, and distribution, as well as the mixing of offline and online worlds, and the increasing growth of alternatives to home deliveries. The consumers of the future do not want to wait – they want to order and receive the product as soon as possible, and companies have to respond to these challenges” (Farahani P et al. 2015a). In essence, the consumer buying behaviour and demand patterns are significantly affected by the high Internet penetration rate, the constant new information accessibility, and the possibility for comparison in terms of product features and pricing (Accenture, 2015). The high internet penetration rate has significantly changed the consumer buying behaviour and demand patterns, which imposes heavy pressure on the supply chain managers. According to Farahani et al. 2015a, b following challenges and trends are identified for the next couple of years these are: Globalization and sales growth, Supply chain visibility, Process standardization and automation, Supply chain collaboration, Flexibility in responding to the volatile markets, and innovation and new business models.

The rapid adoption and incorporation of the new market requirements is the key to maintain a competitive advantage in the future. It is important to understand the trends and impacts on supply
chain management to respond to the changes and optimize operations while benefiting from emerging
digital technologies. Supply chain managers are tasked to keep their company on the leading edge of
competition and this will be achieved by developing strategies that build upon capabilities and
opportunities, particularly, within the context of digitalized supply chains. Digitalization not only
changes the way of working but it also increases the rate of change that companies are facing. Emerging technologies such as 3D printing, internet of things, and social media are having a notable
impact on current and future supply chain management model. It is expected that emerging
technologies can provide answers to some of the most meaningful challenges in SCM, leading to cost
and complexity reduction, an increase in volume flexibility, or a rise in service level management.
Figure 1 has shown some of the selected digital technological innovations that will exert much impact
on SCM practices.

3. Current status of technologies used in supply chain management in India

In present competitive environment it is necessary for businesses to use modern technologies to
improve their productivity and streamline their supply chain. “Technologies that are being used
presently in SCM in India are electronic data interchange (EDI), bar coding and scanning, enterprise
resource planning systems (ERP), radio frequency and identification (RFID), social media and
electronic commerce, computerized shipping and tracking” (Prashant R Nair et al. 2009). But these
technologies are saturated and are not sufficient to achieve competitive advantage in today’s global
market because use of excessive internet has changed the consumer buying behaviour and demand
patterns that create huge pressure on supply chain managers. Hence there is a need to shift to digital
technologies to remain competitive in this global market place.

Figure 1. Emerging technologies that enable digital supply chain transformation.
4. Digital Supply chain management

Emerging digital technologies are new technologies that are currently developing or will be developed over the next few years, which will substantially alter the business and social environment. Digital supply chains have the capabilities to process an extensive amount of information and to empower supply chain partners to move together to collaborate and communicate across digital platforms.

Hoberg et al. (2015) explained that digital transformation is the process of organizational change in which digital technologies (such as cloud computing, 3D printing, internet of things, big data analysis) are used to change, how a company generates value in its products, how it interacts with its suppliers, partners and customers and how it competes in global market. Hence digital supply chain management can be defined as powerful innovative technologies that is capable of changing the traditional way of doing various processes of supply chain like supply chain planning, task execution, interacting with all the participants of supply chain, achieving integration among the members of supply chain and enabling new business model. Digital transformation is a change and hence every initiative of organizational change should be managed with extreme care (Wade and Marchant 2014). Digital transformation cannot be achieved by the effort of single person rather it is a portfolio of initiatives that work together to achieve the change.

As suggested by Farhani, Meier and Wilke 2017, every supply chain consist of various activities that are executed to procure raw materials, convert that material into final products, store that as finished product inventory and at the end deliver them to the ultimate customers. They have divided SCM into seven dimensions which are suppliers, production, inventory and logistics, customers, information technology, human resources and performance measurement (see figure 2).

![Figure 2. Seven dimensions of digital supply chain management.](image)

5. Digital Supply Chain Framework

According to Rutkowsky S et al. 2015 supply chain managers who want to digitalize their current supply chain approaches will have to find out the opportunities and challenges facing their current processes. They also need to consider digital transformation of whole organization including its
products and services and the interaction of partners, suppliers and customers with their company. Defining the digital transformation agenda of SCM is important but how SCM can contribute to the digitalization of the business model is also important. The extent to which the SCM must transform itself will also depend on whether the company has entered the market with a digital business model from the beginning as a digital native, or has adopted it later on as digital migrant.

- Supply chain integration refers to integrating regional supply chains into an integrated, global supply network boost sales growth and rise supply chain visibility, enabling a flexible response management.
- Digital planning includes collaborative demand planning with the customers and has already started investing in re-designing their demand planning processes based on solutions and technologies, like demand sensing.
- Collaboration is the key to maintain competitive advantages.
- The analysis of selling patterns and buying behaviour is very attractive to all industries, because it allows a better understanding of customers’ requirements through demand sensing and up-to-date sales information.
- Digital business model suggests building a business network and have the common vision to bring their key business partners on a platform aiming at the creation of an easy interaction point.
- Effectively managing the supply chain and rapidly adapting new market requirements implies the maintenance of competitive advantage.

6. Benefits of Digital Supply chain management

The following benefits can be attributed to the digital supply chain management:

1. Greater transparency leading to better decision making.
2. Reduced inventory levels because more just-in-time procurement will be used.
3. Clear visibility of inventory levels because of fully integrated system throughout the entire value chain.
4. More decentralized warehousing in order to reduce delivery times.
5. Reduce the delivery times since it will reduce the number of stages in the selling chain.
6. Better understanding of customer’s requirement through demand sensing and up-to-date sales information.
7. Higher sales, higher profit margin, strong bonding with customer.
8. Improved supply chain flexibility and reducing the risks and costs involved in supply chain.
9. More number of alternatives will be available in the decision-making process leading to better supply chain management decision.
10. Maintenance of competitive advantage.

7. Conclusions:
Revolutionary changes will happen due to digitalization of supply chain management. This paper has attempted to highlight some of the issues that underscore the importance of digital supply chain management, its challenges and how these challenges can be converted into competitive advantage. Applying new technologies such as big data, cloud computing and internet of thing can help overcome these challenges. Digitalization will help in improvement of supply chain visibility. Use of innovative digital technologies will allow the Modularization, simplification and standardization of product and processes. Companies should realize the importance of new business models which generate additional value to the product range and achieve new demand channels of increasingly digital customers. Hence it is necessary for the supply chain executives to find out the answers of the question that is how to use these digital technologies to extract benefits from that and how these technologies can be implemented in their current supply chain processes.

Throughout the discourse of this paper, various benefits and challenges of applying emerging technologies to supply chain management have been outlined. The study has shown that investing in and implementing emerging technologies will create a sustained competitive advantage for companies through enhancing access to information, reducing costs, improving products quality, as well as responsiveness, and collaboration abilities.

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