

Relationship of the buyer and supplier in Procurement 4.0

Asst.Prof.Mr.S. Srinivas Rao¹, Dept of Mining Engineering, Malla Reddy Engineering College (Autonomous) Maisammaguda, Dhullapally post, via Kompally, Secunderabad-500100 India

Asst.Prof.Mr. .G. Vishal Babu², Dept of Mining Engineering, Malla Reddy Engineering College (Autonomous) Maisammaguda, Dhullapally post, via Kompally, Secunderabad-500100 India

Abstract

It is only the start of researching what impact Industry 4.0 can have on business functions such as procurement and supply management. For this reason, this paper explores the changes to the relationship of the buyer and supplier in Procurement 4.0. Based on literature and a company visit, this paper provides an overview of the new way procurement is being done. It shows that there will be a supplier platform, with the goal to facilitate free information flow between buyers and suppliers. Factors that will influence that outcome include the support of management, technology, the will for collaboration and trust, regulation, standardization and new procurement skills.

Keywords: - Industry 4.0, Buyer, Supplier

1. INTRODUCTION

After mechanization, assembly lines and automation, digitalization and artificial intelligence are now coming into play.

“4.0 is an industrial revolution that is making manufacturing more efficient through digitalization and artificial intelligence. These technologies plug businesses into their ecosystem, enabling them to respond to demand in real time.” - Réal Julien. He is an entrepreneur with over 25 years of experience in purchasing, it is clear that the 4.0 revolution is here to stay. And it will bring changes to every department of

manufacturing, businesses, including the purchasing department.

Supply chain optimization and automation

With industry 4.0, all the management systems of organizations can perform many administrative operations automatically.

For example, an employee who devoted considerable time to tasks such as expense accounts or bank reconciliation can save precious time today simply by delegating tactical operations to artificial intelligence. Just imagine the savings of time and money that can result!

But despite this potential for savings, the purchasing departments of Canadian

businesses are slow to get on the industry 4.0 bandwagon. This is why J2 attaches great importance to raising the awareness of managers, who may not realize the impact of artificial intelligence in procurement management.

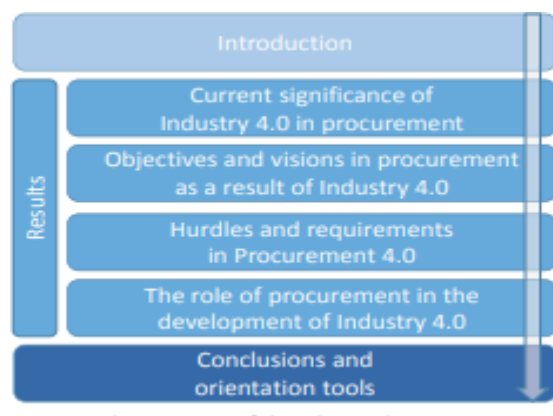


Fig:-1 Architecture of the paper

2. TECHNOLOGIES IN INDUSTRY 4.0

Big Data

Big data is the main facilitator of all following technologies explained in this section. It describes the massive amounts of structured and unstructured data generated by all the devices connected to the Internet that are constantly used (SAS Institute Inc.). This includes e.g. smart phones, autonomous cars, computers, online activity, and production processes. The data as such does not have much meaning, it only becomes valuable when it is refined and analyzed. So, Big Data Analytics can contribute to in detecting trends and so helps to forecast (Sauter et al.,

2015). For organizations, this is a method to optimize business operations and processes. Therefore, can lead to benefits such as lower costs, time savings, support in new product development and decision-making (SAS Institute Inc.).

Cloud Computing

According to the National Institute of Standards and Technology in the United States “Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services)” (Mell &Grance, 2011, p. 2). So, instead of having to rely on actual, limited hardware to operate with, the cloud can serve as an alternative. Some major advantages of using the cloud are that it is accessible anywhere (as long as there is a supporting internet connection), which enables the cooperation of different actors in different geographical locations and can be used on demand, while providing endless computing capacity (Armbrust et al., 2010).

Internet of Things (IoT)

The IoT is one of the important backbones of Industry 4.0. It describes the interconnection of objects through the Internet. First developed in the 1990s, it only really became prominent when number of devices connected to the network exceeded the number of inhabitants of our globe, around 2009 (Witkowski, 2017, p. 766). The IoT is a network made of a huge number of objects which are equipped with IP address, just like computers have to identify themselves (Scheer, 2015). These kinds of devices are often referred to as smart objects or smart products. There are three distinguishing features of the Internet of things [I-4.0], namely] context, omnipresence and optimization. The first refers to the possibility of an advanced object-interaction with an existing environment and its immediate response to change. The characteristic of context allows objects to provide information such as location, physical condition or atmospheric conditions. Omnipresence illustrates the fact that objects today are much more than just connections to a user network of human-operators. In the near future, they will communicate with each other on a large scale. Optimization is the expression of the functionality which every object possesses” (Witkowski, 2017, p. 766). The features of IoT support and facilitate the idea of I-4.0, as

e.g. information about the products can be generated and analyzed during the production process and products can be tracked from the beginning of production till the end of their life cycle

3. STUDY ON INDUSTRY 4.0

Supply chain optimization and automation with industry 4.0

To begin with – and as pointed out before – the collaboration with partners in the supply chain will turn to a platform-based system. Hence, there will be enormous amounts of data shared between all partners included in the network, eventually leading to a free flow of information. In the following part, this paper will identify, as well as discuss, factors that will be needed to take into consideration and summarizes the most important aspects in Table 1. Over all, one aspect that has been mentioned, is that the procurement function of a manufacturing company is often not taken into account, when deciding on I 4.0 developments within the company. Glas and Kleemann state that Industry 4.0 would not be successful with an integration of Procurement 4.0 since it is P-4.0 is a “fundamental conceptual element of Industry 4.0” (p.58). Nonetheless, procurement creates the connection point which stands in contact with business partners and thus, can facilitate the process of transformation into

an I 4.0 companies. Without the integration of procurement into the digital strategy of the company, neither the development of P 4.0, nor the integration into a supplier network would be possible. As a matter of fact, P 4.0 is in the need for smart procurement technology, and thus needs to receive substantial investment. This way P 4.0 can help to develop I 4.0. The next factor that can be identified is the technology since it can be seen as one of the most important aspects for the developments in I 4.0 and facilitation of digital communication and exchange of information between businesses. Every research paper on the topics of I 4.0 or P 4.0 have exemplified the technology advancements, some in more detail and some more general, such as Lasi et al. (2014), Monostori (2014), Porter and Heppelmann (2014), etc.. Nonetheless, it has been claimed that technologies, as they are, can currently not support the new evolving procurement. Therefore, focus should be led to the development of such (Kleemann&Glas, 2017). Also, they have argued that technology itself is not capable of solving the problems occurring in Procurement 4.0, e.g. sharing of highly sensitive data. In fact, technologies are the underlying base of the developments and a lack of it, or not advanced-enough technologies, will result,

amongst others, in a non-functioning cloud-based networking system. Additionally, in P 4.0 autonomous order systems will take over a big part of the procurement functions and thus, eliminates some of the jobs in procurement.

The Current Significance of Industry 4.0 in Procurement

What is the significance of the developments of the new digital era for companies and procurement in particular? How are companies dealing with these developments? The relevance of Industry 4.0 in procurement in the present day and whether its significance for the future is being recognized is presented below. At the beginning of the interviews, the respondents were asked to evaluate the influence of Industry 4.0 on their company and its procurement department. The participants consistently rate the influence that Industry 4.0 has on their company on the whole as very high and expect it to tend to strengthen over the coming years. In the responses to this question, the participants use words such as significant, strong, revolutionary, gigantic and enormous. The experts all agree that digitalization will lead to fundamental changes in the way in which companies and people currently work. Despite the consistent evaluation of the influence of Industry 4.0 on

companies as a whole, there is no clear assessment of the influence that Industry 4.0 will have on procurement. While some experts believe that its influence on procurement will be minor in comparison, others are of the opinion that procurement cannot be viewed as a separate entity from the company as a whole and therefore believe that its strong influence applies equally in this corporate area.



Fig;-2 Flow chat

The above Fig:-2 shows different definitions and opinions concerning the concept of „Industry 4.0“. While some experts describe Industry 4.0 as the establishment of a network between all of the partners in the supply chain, others use synonyms such as automation and self-control to outline the concept. The use of the term „automation“ in this context is interesting given that this factor can definitely be attributed to the third industrial revolution. This gives rise to the question of whether these responses also refer to the process of becoming autonomous. At this stage of the study, it is already evident that there are a number of different perceptions of the concept of Industry 4.0 that frequently have different scopes. The differences in the definition of the concept are particularly evident when it comes to the number of stages that respondents believe are involved in the value chain.[1] Some respondents focus on the networking, digitalization and development of autonomy of all internal interfaces within a company, while other companies also factor in all external interfaces. The explanations provided by the companies with regard to this factor tend to be rather short, not very concrete and lacking in expressiveness.[2] [3] This already indicates that a large amount

of different information is available with regard to the concept of Industry 4.0 and that the content-based classification of the concept is still partially unclear. A clear boundary between Industry 4.0 and the preceding era (Industry 3.0) is also not evident. The experts were asked about their personal opinions with regard to the current progress being made in the implementation of Industry 4.0 applications in practice at their company and in its procurement department. The opinions were classified according to a scale of 1-7 that represents the companies level of progress with regard to the implementation of Industry 4.0 applications. The lowest mark on the scale indicates that no „4.0 technologies“ have been implemented in a company or its procurement organization to date.

4. DISRUPTING THE SUPPLY CHAIN INDUSTRY 4.0

The Intelligent Supply Chain

“Smart logistics,” such as automated warehousing, cargo tracking and remote fleet management, can be transformative. Recent advancements in supply chain technology give companies real-time insights into status and location. Cloud-based GPS and Radio Frequency Identification technologies (RFID) can provide instant updates on geography, including when cargo is in transit.

Real-time tracking can be used to gauge transportation performance and delivery route inefficiencies. Automation and business intelligence technologies have been central to improving adaptability and optimizing the supply chain for variable customer demand. Internet-connected sensors can detect supply chain disruptions or quality issues and address the issue or adapt production flows in real-time with minimal human intervention. The result when done right is increased visibility, responsiveness and resilience across the entire supply chain ecosystem.

Demand-Driven Supply Chain Management

Demand-driven supply chain management isn't new; what is new is the sheer amount of data available and our ability to draw insights from it. Traditional methods of demand forecasting are based on historical demand levels, but that single data point may not be reflective of the current demand environment. Embedded sensor technologies can monitor, collect and report information from the surrounding environment and respond to remote instruction. Smart analysis of that data can vastly improve the accuracy of demand forecasting and replenishment.[4] While still not a perfect science, predictive analytics and machine learning can account

for these additional variables to more reliably predict demand, recognize patterns and anticipate changes.

Formation of the Digital Thread

The digital thread is a communication framework for sharing information to all data consumers upstream and downstream, creating a constant feedback loop. It isn't just about connecting data and systems; it also requires the integration of workflows and people. Improved data communication will enable the whole product chain to become more responsive in terms of changes in design, manufacture, volumes, rework and through-life service provision. Ultimately, establishing this digital thread between suppliers, your organization and customers is the cornerstone of the evolution from supply network to integrated value chain, where suppliers and customers collaborate to achieve efficiencies and lower costs. The real value of the digital thread comes from better business intelligence and greater intimacy with supplier performance and customer behavior.

Value Co-Creation

The integrated value chain is predicated on a new level of transparency and information sharing, including constant, bidirectional communication and inter-company visibility into everything from inventory condition,

supply status and shipping delays to future-focused factors predicting shifts in demand. Best practices are shared with internal and external stakeholders to increase efficiencies and improve interoperability. And end-to-end visibility is largely a function of being able to access data across business networks or a "network of networks." The idea is that the synthesis of data from all supply chain entities is more valuable than data input from a single network. This sets you up for synergistic co-creation of value, where savings and opportunities are generated and shared between business partner organizations, resulting in "win/win/win" relationships.

Evolving Customer Expectations

Many manufacturers are reevaluating their distribution models as consumer shopping habits change. Today's retail and manufacturing customers have little tolerance for delayed or incorrect orders, meaning logistics and distribution from warehousing to order fulfillment to shipping must happen at lightning speed. As a result, some manufacturers are moving from direct store to centralized distribution and real-time inventory management, allowing order points to be less tied to warehouse inventory levels and more responsive to demand. In addition, growing consumer demand is driving a shift

from standardization to customized products and modular manufacturing. Additive manufacturing and rapid prototyping techniques are enabling a “fail fast” mentality, more complex design, smaller parts and less waste. These technologies have the potential to restructure supply chains, as manufacturers and even their customers switch to using on-premise additive manufacturing capabilities. This could result in the reduction of a company’s geographical footprint and sourcing of raw materials. Hyper-customization is the future of manufacturing, requiring linking customer requirements directly to the supply chain.

Cyber Risk

Industry 4.0 is breaking down the traditional barriers that can stymie innovation and collaboration, but in doing so, it’s creating more opportunities for bad actors to break in. Supply chain cyber risk increases exponentially. Sophisticated attackers frequently exploit third-party vulnerabilities to gain access to their ultimate target. Any security gaps in manufacturers’ supplier networks can serve as ingress points for hackers. [5] On the flip side, manufacturers can also be the ingress point for hackers to reach their supply chain partners and end customers, resulting in reputational damage and lost business, particularly if the victim

organization is deemed cyber-negligent. All suppliers should go through an evaluation process that identifies cyber risks. The identified exposures should then be addressed with contractual provisions and clear minimum standards. The measures taken should be commensurate with the risk and the value of the relationship.

5. CONCLUSION

It can be concluded that through the introduction of Industry 4.0, business functions will face changes as they adapt to the revolutionized situation. In this paper, the relationship between buyer and supplier has been investigated with regard to the Procurement 4.0 developments. Although it still cannot be fully predicted what impacts I 4.0 has on the procurement function, an approximation shows that the interconnectivity between companies will grow. This will most likely happen through the integration of suppliers into a cloud-based platform. The goal of such a platform is to enable the flow of data and information, so that smart data analytics like artificial intelligence can act as support for decision-making, as well as automate procurement functions to the extent that autonomous ordering is made possible. This will lead to more cost-, resource- and time efficiency,

and so, possibly to a better performance of the business.

6. REFERENCES

- [1] Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., . . . Stoica, I. (2010). A view of cloud computing. *Communications of the ACM*, 53(4), 50-58.
- [2] Batran, A., Erben, A., Schulz, R., & Sperl, F. (2017). *Procurement 4.0: A survival guide in a digital, disruptive world*: Campus Verlag.
- [3] Croom, S., & Brandon-Jones, A. (2007). *Impact of eprocurement: experiences from implementation in the UK public sector*.

Journal of Purchasing and Supply Management, 13(4), 294-303.

- [4] Dallasega, P., Rauch, E., & Linder, C. (2018). Industry 4.0 as an enabler of proximity for construction supply chains: A systematic literature review. *Computers in Industry*, 99, 205- 225.
- [5] Glas, A. H., & Kleemann, F. C. (2016). The impact of industry 4.0 on procurement and supply management: A conceptual and qualitative analysis. *International Journal of Business and Management Invention*, 5(6), 55-66.