

Procurement 4.0: Drivers, Challenges, Remedies, and Benefits

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Abstract

Procurement is the process that manages business relationships of suppliers, including negotiations or services, and plays a key role for the success of many companies. In this work we discuss some of the important aspects around procurement (and towards Procurement 4.0), including the main drivers, challenges, remedies, and benefits. The main drivers are related to efficiency improvements, risk minimization and reducing human efforts in procurement process. The challenges include the adaption to Procurement 4.0, data security and lack of employee trainings. The mainly remedies concern technology and data management. The benefits of improved procurement are process optimization with digitization, skilled supplier selections, on time demand fulfillment, and on time invoicing management. Recommendations for industrial procurement are provided aiming for achieving improved operations.

Keywords

Procurement 4.0, Challenges, Benefits, Industrial Procurement and Tools.

1. Introduction

Today's complexities of global commercialization impose more efficient and resilient businesses to cope with the fast-changing, dynamic and competitive market (Kuhlman 2018). For this, there is a need to streamline the businesses to be adaptive to such a fluctuating environment. However, diverse are the ways of improving the efficiency of business whereby the procurement process is one of the main attributes under consideration (Bienhaus and Haddud 2018). Still, many businesses' workflow has convoluted patterns and outdated manual processes in which capital and time are wasted.

Procurement is the process that manages business relationships of suppliers, including negotiations or services (Harland et al. 2019). These elements play a significant role in retailers when handling distributors, manufacturers, and suppliers. Procurement affects most of the business functions as it ensures that the services and items are acquired properly so that companies' processes and projects can be proceeded efficiently (Heckman 2020). Hence, this step is a complex stage of the production of products or processes that requires experts to manage appropriately. In its current state of the organizational structure, the future of procurement moves to encapsulate the industry 4.0 capabilities in its realm (Ghadge et al. 2019). Experts in this area refer that there is a trend to interconnected industrial production in an automated fashion. For that, there are a series of changes to be overcome for an achievable Procurement 4.0. This must be more precise and faster than current practices and policies in response to the organization's requests for a more agile, resilient, and interconnected process. In a parallel comparison with the evolution of the industry since the steam power transformation in mechanical movement, procurement 1.0 supported basic relational functions that were mostly manual and reactive (Guarnieri & Gomes 2019). Procurement 2.0 moved around the development of services in an integrated framework of diverse processes. Procurement 3.0 was based on collaborative work to a certain extent automated. In today's commercial arenas, Procurement 4.0 supports the augmented information with cognitive analytics and adaptive functions that form the industry 4.0 pillars of the information and computing technologies (ICT), modeling and solving algorithms (MSA), and mechatronics (MEC) (Rejeb et al. 2018).

Muhammad et al. (2021) analyse the application of AM in handling disruptions in the automotive supply chain network and enhancing its resilience power. The automotive supply chain has been badly affected by the increasing ripple effect due to the COVID-19 pandemic impact on the global supply system. In this context, professionals and global automakers inquire about the potential of AM in boosting the capacity of the automotive supply chain network. By using the Indian automotive industry as a case model, the authors identify major barriers towards AM wide deployment, including lack of government legislation, limited management support, limited varieties of raw material, and workers restriction. Mitigation mechanisms using AM in the upstream automotive supply chain are also discussed.

Professionals and academics around the world refer to procurement as digitization, smart manufacturing, or industry 4.0. However, it is not the term, but the understanding of the utilization of a combination of technologies. However, there are organizations and businesses that are facing issues due to implementation which is not new to be faced. It is because businesses and organizations always face issues with new implementations. For this, the organizations and businesses should be aware of the benefits of its implementation and remedies so that the issues can be resolved accordingly. Procurement 4.0 is the combination of cutting-edge technologies having strategies for operations and data management.

In such a scenario, human resource (HR) departments are engaged in hiring procurement experts for management positions to smoothly handle the complexities of the various advances to be made for an implementable Procurement 4.0 (Stone et al. 2020). This paper will be exploring Procurement 4.0 in its challenges, remedies, drivers, and recommendations.

The structure of this work includes the objectives, research questions, drivers, challenges, remedies, and recommendations of procurement operations, followed by a conclusion.

1.1. Objectives

In line with the above discussion, the objectives are designed as follows:

1. To explore the drivers of Procurement 4.0.
2. To investigate the challenges of procurement.
3. To determine the remedies to such challenges.
4. To explore the benefits of Procurement 4.0.
5. To provide recommendations for improved procurement operations.

1.2. Research Questions

In the line with above objectives, the research questions are designed as follows:

1. What are the drivers of Procurement 4.0?
2. What are the challenges of Procurement 4.0?
3. What are the remedies to the challenges of Procurement 4.0?
4. How to explore the benefits of Procurement 4.0?
5. What are the recommendations for industrial procurement?

1. PROCUREMENT 4.0: DRIVERS, TOOLS, CHALLENGES, AND REMEDIES

There are various characteristics of Procurement 4.0 which highlight its benefits (Nicoletti, 2020). Procurement 4.0 is powerful and supports the organization towards the initiatives for industry 4.0 for collaboration, especially outside the organization.

1.3. Drivers of Procurement 4.0

The drivers of Procurement 4.0 are basically the ease of operations that it can provide to the organizations. In line with this, the reduction in human efforts is also another driver for the implementation of Procurement 4.0 as it will lead to zero human error (Bag et al. 2020). Technological advancement and requirements of technological implications in the fast-paced environment are other drivers for Procurement 4.0 (Yang et al. 2021). For this, the companies are trying to implement using IoT (Internet of Things) which provides the companies with significant support for interactions by IoE (Interaction of Everything) This IoT- IoE capability increases the availability of the components with which the transmission of data can be done smoothly. The idea of AoT (Automation of Things)

also contributes as a driven force whereby large-scale and complex-scope decision-making integrated with artificial intelligence are the main elements of the I4 in Procurement 4.0.

The drivers of procurement 4.0 are minimizing the risks, increasing productivity, along with gaining a competitive advantage in the market. Adding to this, it is essential to mention that the companies and businesses around the world who are aware of the benefits of procurement 4.0 know that by its implementation they will have the risks and issues minimized regarding the entire operations. Adding to this, by minimizing the risks, the companies and businesses can achieve a competitive advantage. However, for increasing the productivity of employees, it is essential to provide training regarding the new technologies so that the entire implementation can be done smoothly with better outcomes.

1.4. Tools for Procurement 4.0

There are various tools that also can be used in Procurement 4.0 for data monetization (Rasanjani et al. 2019). Companies' issues in inventory and warehouse management can be solved by the use of big data and artificial intelligence approaches. This further saves the data and makes it confidential and secure. Moreover, it provides easy operations in the inventory by using software for data collection and data analysis that allows compiling the information of the company to strategize its business purposes. With the data collection, its analytics should predict the benefits for the organization and its customers (Nicoletti 2018). The organizations can strategize based on the demands as per the data collection with which the organizations can fulfill the demands of the customers.

The tools for procurement include billing, purchase order delivery and creation, approval workflows, spend data analysis, three-way matching, vendor management, catalog management, approval workflows, and real-time budgeting.

1.5. Challenges of Procurement 4.0

Many challenges in procurement are found, especially in the supplier interaction as well as in the interaction with customers. By having the location traced for the raw materials and products from the sources to the sinks (at the product delivery), better management can be done by the implementation of GPS and a proper communication method to provide ease of concatenation of the information (Tripathi and Gupta 2020). However, the location can be tracked by the GPS system. The companies can easily track their location through this system. This system also ensures fluent communication, unlike traditional methods that require different gadgets for operations. The data by Procurement 4.0 is compiled in a small device which is easily manageable by the organizations (Fatimah et al. 2020). Other challenges involve the presence of the employees for customer services and supplier interactions.

The challenges are basically the barriers to adoption of procurement 4.0 which includes lack of interdepartmental communication, employee and organizational inertia, cultural changes, lack of training and resources for training, data confidentiality and security, and lack of suppliers' capabilities and willingness. Challenges also majorly include the friction among the employees towards implementation of the new technologies, specifically procurement 4.0 as it carries various technologies for making the business or organization to be digitized. Better management and leadership are needed for smoother implementation. The employees also should be told about the benefits of procurement 4.0 for the organization and the employees, which can make them comfortable with these changes.

1.6. Remedies of Procurement 4.0

The remedies are that Procurement 4.0 makes it easier for the organizations to manage the data either from the office or the inventory/factory/warehouse or from home. In line with this, it can also manage the employees and can show their presence in the applications.

The remedies of procurement 4.0 revolve around six areas which are service procurement, digital category, new procurement value proposition, supplier management and having digital supply chain, digital tools and processes, capabilities, and organization, along with innovative procurement data utilization. Training basically is also required for having smoother implementation, as the employees who are not skilled enough are hesitant towards implementation of new technology. For which, skilled employees are needed, for which HR management can hire more skilled employees, and also can provide training to unskilled employees by trained professionals.

2. Benefits of Procurement 4.0

There are various benefits of using Procurement 4.0 such as the access to location-independent data which includes flexibility, traceability along with data of employees working from the office or from home. Moreover, it further provides process transparency, and central data, followed by automation in the flow of information which can lead to low process costs. In line with this, Procurement 4.0 can further provide integration of suppliers globally and the networking to a much better extent. In accordance with this, it has traceability of processes along with more data security. Also, it has higher savings and better price purchases. In line with this, it results in reducing manual tasks and human efforts to a major extent. This highlights the elimination of the manual tasks followed by the paperwork, which will ultimately lead to fewer errors and improve data quality. In addition, the benefit is towards the first aspect which involves leading to changes economically, socially, and politically (Kuhlman, 2018). This is important and it involves the following:

- a. Procurement 4.0 results in fast innovation and development cycles that involve high innovation capability that is significant for various organizations. In line with this, it provides customized sales to the organizations which can help to fulfill the requirements and demands of the customers. This trend will be leading toward the customization of products also. This will represent “one unit lot” of production (Glock and Grosse 2021). There will be flexibility which is essential for the organizations in this changing environment. Moreover, it will be including decentralization which will be helpful for the companies in dealing with the requirement of new models. There will be faster decision-making procedures which are also essential for multiple organizations. Moreover, the organization for this has to be flat, as it will be having smooth implementation and it will lead to sustainability which will push towards ecological and economic production. This further be leading to awareness of people and organizations regarding ecological issues (Roscoe et al. 2019).
- b. There is also a second aspect which is needed to be considered which is the technological push that will be provided by Procurement 4.0 to the industries and different organizations. This will involve the use of apps, laptops, smartphones, and 3D printers (Mandal, 2021). In industrial practice, such innovations are however not widely used.
- c. Procurement 4.0 provides the organizations with the identification of the best supplier portfolio so that the organizations can have proper raw materials along with better supplier interaction that can understand the organizations due to experiences in the field (Bär et al. 2018). It can further be accomplished by Procurement 4.0 which provides ease in attractive terms, and cross-functional excellence, that can incubate and stimulates collaboration (Högel et al. 2018). Industry 4.0 has accomplished a revolution which is known by the name Procurement 4.0 which empowers CPOs (Chief Procurement Officers) along with other workers in the supply chain for using better data for leveraging the “cyber-physical systems.”
- d. The reason for emphasizing procurement or Procurement 4.0 is that it supports external and internal interfaces. It further has an impact on other business areas (Felch et al. 2018). For example, a correctly entered and processed order confirmation not only speeds up the procurement process but also guarantees that incoming invoices are processed smoothly and quickly. The traditional manual processes in the organizations require changes towards technological advancements which are provided by Procurement 4.0. In this, the manual processes along with using documents traditionally are omitted and the organization gets completely digitized which reduces human efforts. This also helps in better procurement management by the companies by digitizing the processes. Hence, digitization is the foundation of Procurement 4.0 for reaching the organization’s full potential. This is effective and is an accelerator by automating the processes which require electronic data. Also, the operational tasks can be supported through its autonomous processes. For example, a large industrial plant manufacturer wanted to order (critical parts from the suppliers but the delivery was delayed. This is the worst scenario as the delivery is late and it can put at risk the manufacturer as he will not be able to deliver the product to the client in the desired time. Hence, in such a scenario, the manufacturer must pay the contractual penalty (Helo and Shamsuzzoha 2020). For this reason, transparent delivery and ordering processes in procurement are necessary. This is supported by Procurement 4.0 which helps in smoothing supply processes. If the processes are visualized by SAP add-ons and are digitalized, any discrepancies can be spotted by the department of procurement which can react per the transparency quickly (Shankar 2018). Procurement 4.0 can hence result in faster processing, higher reliability, and cost reduction, along with faster response time.
- e. Procurement 4.0 leads to process optimization with digitization. The goal of procurement is to have the processes automated. This can be automated overall or can be automated or digitized step-wise, based on the budget of the organization for the adoption of this technology (Yu et al. 2022). Standardized processes

are best for the companies as these are repeatable, measurable, and can hence be automated. There is another game-changer which is the availability of real-time data which enhances and increases the speed by which the buyers can react to the changes in the market. The consistent information flow by the optimal network in the supply chain can help the organization in having higher added values. The networks like integrated systems can be decentralized which can help the professionals, suppliers, and procurement departments (Jahani et al. 2021). The challenges of moving from industry 4.0 to Procurement 4.0 involve meeting the future market needs; followed by the challenges in digital transformations which are often refused by the workers and employees who are often comfortable with traditional approaches.

3. Recommendation for Industrial Procurement

As for the industrial procurement, it is recommended to focus on centralizing the information, identification of inefficient processes, creating the policy for standardized procurement, strategic sourcing, feedback system establishment, professional development investment, the establishment of clear expectations, sourcing selecting/streamlining suppliers, educating the workforce, embrace lean procurement, negotiate better, investment in the talent for supply chain, information sharing, investment of automation in procurement, and evaluation of key performance indicators. It is recommended in the future to focus on the digital technologies in designing the supply network along with the relevancies of processes by utilizing smart technologies. Determination of irrelevancies in processes is important. It is recommended to consider the smart technologies which can influence the workers along with focusing on economic and social circumstances (Roscoe et al. 2019). In line with this, it is important to consider the instability and uncertainty in the market that can be tackled with the Procurement 4.0 application. Also, there are various operations management issues that need to be considered so that the implementation of Industry 4.0 can be done correctly and successfully. It is recommended to analyze the issues like inventory management, fleet assignment problems, and vehicle routing problems (Harland et al. 2019). It is recommended to focus on the impact of various SC processes, procurement, and smart systems which have not been studied in previous studies.

As previously mentioned, industries are not fully using technological innovations as such, for which it is recommended to provide technological aid for supporting physical work, along with the adoption of technology in processes. Examples include Automated Guided Vehicles (AGVs) that have programmed routes (De Ryck et al. 2020). In line with this, it is recommended to further consider networking and digitization like artificial intelligence, simulation, virtual reality, and digital protection which can support the production in organizations. In addition, there are technological advancements around the world that require the consideration of technical components in procurement. For this, it is recommended to allow the software to collect data and analyze it by using sensors. This can further be done by placing tags on the products which can also help in tracking goods and keeping the inventory well managed. Also, as computers require more space, miniaturization of components and machines is needed for better performance as well as for reducing the storage and CPU requirements, resulting in more space (Afzal et al. 2019). In line with this, it is essential to adopt nanotechnology as it is the part of miniaturization which enables better processes and Procurement 4.0 implementation. Finally, it is essential that companies and businesses provide training to their skilled and unskilled employees in all facets of Procurement 4.0.

4. Conclusion

In line with the above discussion, it has been concluded that Procurement 4.0 is crucial for different companies operating around the world. For instance, there are different drivers of Procurement 4.0 to tackle multiple challenges that are explored in the context of the implementation of Procurement 4.0. In this paper, we provided remedies that can help in smooth Procurement 4.0 implementation, in addition to main benefits and recommendations for organizations so that they can successfully implement Procurement 4.0. It is worth to highlight the need to focus on innovation, technological improvement, and personnel training for improved Procurement 4.0.

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