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Importance of the implementation of the S and OP system in modern industries

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Abstract

In recent years, there has been a growing demand for Supply Chain Management (SCM) to become more agile, integrated, and data-driven, especially with the advent of Industry 4.0. To meet this demand, companies have focused on implementing Integrated Sales and Operations Planning (S and OP) processes, which seek to integrate and align the activities of Sales, Operations, Demand Planning, Supply Planning, and Finance. A qualitative approach was adopted for the development of this research, using a literature review as the investigation procedure. The overall objective of this research is to demonstrate the importance of implementing the S and OP system in modern industries. As a result, an alignment in the company's perception of the level of service expected by the customer is observed, focused on delivery time and commercial conditions, but its process has areas for improvement when viewed in the light of S and OP.

Keywords: Supply Chain; Planning; Industry 4.0; Operations

1. Introduction

In recent years, there has been a growing demand for Supply Chain Management (SCM) to become more agile, integrated, and data-driven, especially with the advent of Industry 4.0. To meet this demand, companies have focused on implementing Integrated Sales and Operations Planning (S and OP) processes, which aim to integrate and align the activities of Sales, Operations, Demand Planning, Supply Planning, and Finance. The integration and benefits provided by S and OP enable companies to take full advantage of Industry 4.0 additions such as automation, data analytics, and connectivity, which can be perceived throughout the supply chain, from demand forecasting to final product delivery.

To carry out this article, a literature review was conducted to understand the guiding concepts of themes related to Industry and S and OP. Based on the results of the systematic literature review, this article aims to provide a broad and updated view of the importance of S and OP in the Brazilian industry, as well as a solid theoretical basis for the successful implementation of the process in organizations in the country.

The general objective of this research is to demonstrate the importance of implementing the S and OP system in modern industries. The specific objectives are as follows: to present the general aspects of the Brazilian industry; to discuss the initial foundations of S and OP and comment on the direct relationship between S and OP and modern industry.

This article is organized into four topics. The introduction is the first topic, in which the objectives of this study were explained. The second topic was reserved for the development of a literature review, which included the opinions of various authors who address the same subject matter as this article. The third topic presented the methodological procedures employed for the development of this research. In the fourth and final topic, the final considerations of this review were elaborated.

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2. Material and methods

The methodology employed for the development of the present article is characterized by the application of a qualitative approach, with a research procedure consisting of a literature review aimed at searching for theoretical references published in books, scientific articles, documents, etc., in order to explain, in greater depth, the subjects contained in the body of the article in light of pre-existing scientific contributions.

Among the contributions that were researched, the works of authors such as Wallace (2012), Kagermann et al. (2020), Rüger et al. (2020), Wang et al. (2021), and Abubakar et al. (2021) stand out.

It is known that a good theoretical foundation is the cornerstone for being able to look at the bibliographic data collected and develop our study, going beyond what reality simply shows us. Therefore, the mastery of the researched authors contributed to expanding our knowledge, since through them, it was possible to find out what was produced of importance about our object of study and the advances made regarding it.

3. Literature Review

2.1 General Aspects of the Brazilian Industry

The industry is a term that refers to the economic sector responsible for the production of goods or services, usually on a large scale, using machinery and advanced technology. The industry can be divided into different categories, such as the chemical industry, automotive industry, food industry, technology industry, among others.

Industry plays a fundamental role in the economy of many countries, generating jobs, creating wealth, and driving economic growth. Industrial companies produce goods that are used by other companies in the supply chain or by end consumers.

Currently, in Brazil, the industry accounts for 21.2% of formal employment, 23.6% of GDP, 69.3% of exports of goods and services, and 1.5% of world production [1].

In Industry 4.0, integration and monitoring are fundamental, as digital technologies are transforming the way companies deliver their products and services. Digitalization allows companies to collect and analyze data in real-time, providing greater visibility and control over the supply chain. This visibility also allows companies to detect problems and opportunities more quickly and make better-informed decisions.

According to Abubakar and his colleagues (2021, p.03), "Industry 4.0 is a technological trend that aims to integrate digital and physical technologies to increase the efficiency, flexibility, and productivity of the industry [2]."

The integration and benefits provided by S and OP enable companies to maximize the benefits of Industry 4.0, such as automation, data analysis, and connectivity. These benefits can be perceived throughout the supply chain, from demand forecasting to the delivery of the final product.

As Kagermann and his colleagues (2020, p.06) state, "Industry 4.0 allows the creation of service-based business models that enable mass customization, increase efficiency, and reduce operating costs [3]."

In the industry, S and OP is an important tool to ensure that production meets market demand, avoiding product shortages or excess inventory. Through S and OP, it is possible to plan production in advance, taking into account sales forecasts, delivery times for raw materials, the company's production capacity, among other factors.

Moreover, S and OP also helps to integrate the different sectors of the company, promoting communication and collaboration between sales, operations, finance, logistics, and planning areas. Thus, it is possible to make more controlled and strategic decisions, meeting operational costs and increasing the efficiency of the entire production chain.

Therefore, the present study aims to describe and analyze, in light of theory, the S and OP process in a company in the industry. The choice of this sector aligns with its fundamental importance for its ability to integrate and bring together people, information, and machines, as well as its relevance in the Brazilian economy, as it is responsible for 23.6% of

the country's GDP. Another fact that contributes to the sector's importance is its transformative potential, which contributes not only to economic but also social development, promoting inclusion as a consequence.

2.2 Initial Fundamentals of S and OP

The origin of the S and OP concept and how it was developed from different processes within organizations dates back to the 1980s, while Oliver Wight was creating the general concept of MRP (Material Requirements Planning), and various companies were sharing experiences related to the topic in organizations such as APICS (American Society of Production and Inventory Control). Ling and Goddard were the first to mention the concept in a book, while Oliver Wight and David W. Buker were selling videos that presented tools to help companies develop this planning method [4].

S and OP is a process that allows companies to plan their short and medium-term activities in an integrated manner, through effective control between the areas involved, enabling more efficient and effective decision-making. The S and OP process can be seen as a systemic planning approach that connects different organizational areas and levels.

For Linares (2004), S and OP is a process that seeks to maintain the balance between demand and supply in the company, allowing it to have more freedom to focus on aggregate volumes, product line distribution, and production scheduling alignment, aiming to better serve the order portfolio [5].

However, for S and OP to function properly, it is essential to have a multidisciplinary involvement, with the participation of managers from various areas, such as sales, operations, finance, and marketing, at all levels of the organization.

Moreover, it is essential that the process is well connected with other company processes, such as order entry, master planning, production scheduling, as well as with the purchasing tools used in day-to-day business [6].

Thus, S and OP can help the company achieve more efficient management and make more assertive decisions. "Used appropriately, S and OP empowers company managers to visualize businesses holistically, providing a window to the future [7]."

Before applying S and OP to the company, it is crucial to know its operations and other areas involved, as well as the different hierarchies in which S and OP is inserted. Although it is unlikely to say that a particular forecast will materialize, it is possible to work with the intention that it will. The proposal of S and OP is to plan and control production to ensure efficiency and meet established goals, which requires productive resources available at the right time, at the appropriate time, and with satisfactory quality [8].

Donato, Mayerle, and Figueiredo (2009) highlight the relationship between various sectors of the company, such as Marketing, Sales, Finance, Production, and Supply Chain, when it comes to aggregate production planning [9].

Hax and Meal (1975) creators of the concept of hierarchical production planning, propose three levels of aggregation: by item, by product type, or by family [6].

Tanajura and Cabral (2011) point out that the hierarchical approach offers several advantages, such as reducing uncertainties and problem-solving, as well as facilitating the production process and supply management [6].

S and OP is considered as a long-term planning instrument, not only for production but also for sales, demand forecasting, and resource capacity [10].

According to Vollmann et al. (2006) and Wallace (2012), S and OP is characterized as an integrated and cross-functional tactical planning process within a company, with a planning horizon that can vary from three months to one and a half years. Its aim is to integrate all business plans into a single plan in order to generate value and improve the company's performance [11]; [12].

This process is based on decisions made regarding customer service goals, sales indicators, production volume, finished product inventory levels, and customer backlogs. Another fundamental characteristic of this process is that it creates a link between strategy and operations so that these two factors are always aligned [13].

S and OP is a cyclical process, typically monthly, oriented primarily towards building an operations plan in consensus with demand forecasting. The routine imposed by S and OP establishes means for the company to quickly adjust to

market changes and operational conditions. For the execution of an S and OP project within an organization, it is fundamental to designate roles and responsibilities.

Some companies have an exclusive department to manage the S and OP process, which according to Silva, Esteves and Pedroso (2016), includes the roles of S and OP Manager, S and OP Specialist, and S and OP Coordinator, who are the mediators of the process and must ensure the impartiality necessary for its conduct [4].

Bremer, Azevedo and Matheus (2008) assert that, in most organizations, S and OP is directly linked to the supply chain and logistics management department, but there are also cases where the process is linked to sales, manufacturing, or finance departments [17].

In Vollmann et al. (2006) and Wallace's (2012) definition, the phases of the monthly S and OP process consist of sales forecasting, demand planning, capacity and supply planning, pre-S and OP meeting, and executive meeting, with the aim of executing the forecast and planning periodically. Through these activities, companies can integrate the S and OP operational process on a monthly, weekly, and daily basis. The period to be used is defined by the organization, considering its own activities and needs [11]; [12].

2.3 S and OP and Industry

S and OP is a planning process that aims to integrate a company's sales and operations departments, with the goal of aligning market demand with the organization's production capacity. This process is considered fundamental for business management and has been widely used in the Brazilian industry.

A study by Ervilha, Vieira, and Fernandes (2019) shows that the adoption of S and OP in the Brazilian industry has been growing in recent years. According to the authors, the S and OP process allows for better integration between sales, marketing, production, logistics, and finance, enabling a broad and integrated view of the company that aids in strategic decision-making [14].

The same study highlights that the adoption of S and OP has provided various benefits for companies, such as improving customer service levels, reducing inventory, and decreasing costs. Additionally, S and OP has also contributed to increased profitability by enabling scenario analysis and preventive measures to avoid production problems or excess inventory.

It is important to note that the adoption of S and OP in the Brazilian industry has been facilitated by the wide range of tools and technologies available in the market, allowing for better management of production planning and control processes. These tools allow for the collection, analysis, and management of information, providing a broad and integrated view of the company and contributing to more assertive decision-making.

In summary, S and OP is a fundamental tool for business management in the Brazilian industry. Its adoption has provided various benefits for companies, such as improving customer service levels, reducing inventory, and decreasing costs, due to better management of production resources and alignment with market demand. However, the adoption of S and OP should not be viewed as a simple and easy task to implement, as it requires adequate planning and an organizational culture focused on collaboration and integration of the involved departments.

Furthermore, companies should be attentive to changes in the market and customer demand, in order to adjust their production and sales plans in an agile and efficient manner. S and OP enables scenario analysis and preventive measures to avoid production problems or excess inventory, making companies more agile and flexible.

According to Wang et al. (2021, p. 26), "S and OP can be considered as a key tool for promoting supply chain integration in Industry 4.0, allowing for collaborative and real-time decision-making." It is also important to note that S and OP is not a static process and should be constantly reviewed and adjusted to meet the company's needs, with constant monitoring of results and continuous improvement processes to optimize processes and maximize results [15].

Additionally, the implementation of S and OP also brings benefits to the supply chain, allowing for better coordination between the company's suppliers and customers. According to Rürger et al. (2020, p. 111), "S and OP in Industry 4.0 can be improved through the integration of technologies such as artificial intelligence, big data analysis, and the Internet of Things (IoT), allowing for more precise and agile decision-making [16]."

The S and OP process enables demand forecasting and production planning, facilitating delivery scheduling and reducing waiting times for customers. Therefore, companies can minimize the impact of potential interruptions in raw material supply or delivery logistics problems.

It is worth noting that the implementation of S and OP is not an easy task and may require significant changes in the company's culture and processes. There must be a commitment from top management and an organizational culture focused on collaboration and integration of the involved departments to ensure its success.

4. Conclusion

Based on the guidance from Wallace (2012), Kagermann et al. (2020), Rüger et al. (2020), Wang et al. (2021), and Abubakar et al. (2021), especially regarding the importance of the S and OP process in supply chain management, it can be affirmed that this process is critical for companies seeking to achieve operational excellence and improve the efficiency of their production and commercial processes.

The successful implementation of the S and OP process enables the integration of a company's commercial and operational plans, ensuring a holistic view of the business and enabling more assertive and strategic decision-making. In addition, the S and OP process enables the improvement of demand forecasting, cost reduction, optimization of inventory levels, and customer satisfaction. However, implementing the S and OP process can be a challenge for many companies, especially those that do not yet have an integrated management culture or have fragmented management systems.

A strong and sustained commitment from senior management is required, as well as the integration of information systems and cultural change, to ensure successful implementation of the process. It should be emphasized that the researched literature highlights the importance of the process for companies of different sectors and sizes, and offers a series of guidelines and best practices for its effective implementation.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors assure that there is no conflict of interest with the publication of the manuscript or an institution or product mentioned in the manuscript and/or important for the result of the presented study.

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