Enhancing Sales and Operations Planning via Integrated Business Planning

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Abstract: Today's markets are facing many uncertainties and challenges such as supply chain risk and demand uncertainty. If companies solely focus on competitive relationships with other stakeholders, it will turn out very challenging for them to maintain or grow their market share. Given its impact on competitiveness, several top managers have increased their interest in Sales and Operation Planning (S&OP) process, aiming to develop plans that provide decision makers the ability to direct their business to achieve competitive advantage on a continuous basis by integrating customer-focused plans for new and existing products with the management of the supply chain. Moreover, an Integrated Business Planning (IBP) conjugates S&OP with finance as a sign of mature S&OP. Literature lacks in the discrimination of the definition IBP and S&OP leading to a possible confusion to the reader. In the scientific community IBP is used as a synonym of S&OP, and it is necessary to clarify the definition of these two concepts in the academy. In fact, IBP is primarily used by companies to identify a financial planning tool. Thus, the innovative contribution of this paper is to clarify the concepts of S&OP and IBP, their points of contact and the differences and to investigate if and how IBP and S&OP can evolve, integrate, and possibly unify. Moreover, the aim of this paper is to perform a systematic literature review to analyze the future evolution of S&OP through its maturity model.

Keywords: Supply Chain Management, Sales and Operations Planning, Integrated Business Planning.

I. INTRODUCTION

Sales and Operations Planning (S&OP) is an emerging Operations Management topic with growing interest from academics and practitioners (Kreuter et al. 2022, Bagni et al. 2022). In today's markets, S&OP process plays a crucial role to strengthen the company's competitiveness since many organizations are facing tremendous pressure, both because of new disruptive technologies, global competition, reduced product life cycle, market volatility and growing uncertainty (Apaolaza et al. 2022, Pero et al. 2021, Amico et al. 2022b). Therefore, in this evolving and challenging competitive arena, S&OP supports the companies in aligning their business plans, thus improving their customer service level, whilst reducing the corresponding operational costs (Bozutti and Esposto 2019).

S&OP is considered a best practice in business planning and many companies are implementing it in their daily activities. However, the high interest in S&OP is reflected by the growing number of studies available and applications in industry (Neto et al. 2022). Nevertheless, there is still no unified perception and awareness of what S&OP embraces and how it works and – according to Kreuter et al. (2022) – there is no unified agenda for future research on S&OP practices. This prevents from creating a common understanding of S&OP. The awareness of S&OP theoretical foundations can help researchers and practitioners interpret research findings to better understand and solve real-life problems (Kreuter et al. 2022). This issue is relevant for both academic and practitioners because in the competitive arena, today many companies are still working with immature S&OP processes and should work on an evolutionary path to reach the ideal stage. From an academic perspective, to develop a joint knowledge of an emerging management topic as S&OP, it is crucial to collect and explore empirical evidence. Herein, practitioners' contributions can provide significant complementary material to academic research. The evolution of S&OP process is crucial since recently S&OP has been also addressed as a support for companies to maximize opportunity, minimize risk (Goh and Eldridge 2019), efficiently handle trade-offs, and reduce the bullwhip effect since it aligns demand with supply. Due to the extreme unpredictability of businesses, it seems likely that risks stemming from supply chain (Franceschetto et

al. 2022, Amico and Cigolini 2023) and organizations offset the aim of S&OP to make a balanced plan (Darmawan et al. 2020, Amico et al. 2022a, Cigolini et al. 2022a). Examples of these risks include supply delays, demand surges and declines. Furthermore, S&OP process is usually applied by companies to address the important issue in supply chain management of matching demand and supply (Fildes et al. 2019).

Despite the importance of such a topic, the literature about the evolution of S&OP process is almost scant and addressed in different ways among academic and practitioners. Thus, the aim of this paper is to analyze the future evolution of S&OP by addressing S&OP maturity model. Moreover, this paper aims to clarify the main differences between S&OP and Integrated Business Planning (IBP) since academia tend to refer to IBP as a synonym of S&OP while practitioners consider IBP as a tool for financial planning, thus, there is no consensus among scientific community and practitioners about IBP topic.

A systematic literature review is a suitable approach to understand the discrimination between S&OP and IBP and to address the evolution of S&OP though its maturity models. Hence, to clarify the concepts of S&OP and IBP both for the scientific community and practitioners as well as to analyze the evolution of S&OP process considering the maturity models available in literature, the following research questions (RQs) are formulated and discussed through an in-depth systematic literature review:

RQ1. What are the main differences between S&OP and IBP in academia and in industries?

RQ2. What is the future evolution of S&OP process considering its maturity models?

II. METHODOLOGY

The systematic literature review is built around three pillars. The first one consists in planning the review, to identify potential gaps in the study of S&OP and IBP and their future development. The second one consists in conducting the review. It begins with a protocol to identify the most appropriated papers and is followed by a two-phase screening. Finally, the third pillar consists in reporting and disseminating the main statistics related to the selected papers.

To plan the systematic review of literature a research protocol was provided to ensure an effective research approach. Systematic literature review is extended beyond scientific publications and embraces material from practitioners published in the grey literature, which appears to be appropriate since S&OP is significantly grounded in industry (Kreuter et al. 2022). While conducting the review, the protocol was applied and then the studies are selected following a tollgate approach (see Figure 1, Kayikci et al. 2022, Amico and Cigolini 2023). This approach is made of four steps. In the first step the following string is applied using Scopus database: *TITLE-ABS-KEY "sales and operations plan*" OR "sales & operations plan*" OR "S&OP" OR "integrated business plan*" OR "IBP".* The number of papers obtained is 3,365 and no timeframe restrictions was used. Furthermore, according to Kreuter et al. (2022) Journal of Business Forecasting was added and searched manually, as it is a known source for grey literature on S&OP.

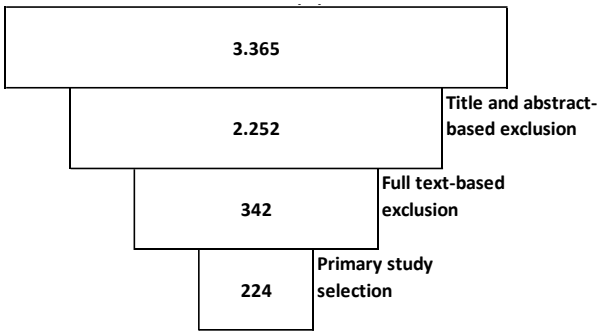

Figure 1. Tollgate approach

In the second step the articles resulting from the search were assessed considering the following three exclusion criteria: (i) studies not addressing S&OP or IBP topics; (ii) studies not in English; (iii) papers that could not be accessed. The papers obtained are 2,252. In the third step, the remaining papers were filtered by reading the full text as per the exclusion criteria, which resulted in a reduced sample of 342 papers. Within this stage, other relevant papers not presented in the pre-selected journals emerged from the references. Therefore – focusing only on peer-reviewed journals – 9 additional papers were considered. 4 of them were discarded and 10 were considered after a full reading. Finally, in the fourth step, 224 papers remained after the final selection. In the following section the most relevant papers selected have been discussed to answer the research questions.

III. RESEARCH BACKGROUND

Starting from RQ1, to clarify the concepts of S&OP and IBP both from the academic and industrial

perspective, the main definition related to S&OP and IBP have been addressed.

S&OP has been defined as a process to develop tactical plans that provide management the ability to strategically direct its businesses to achieve competitive advantage on a continuous basis by integrating customer-focused marketing plans for new and existing products with the management of the supply chain (Dittfeld et al. 2020, Pero et al. 2021, Cigolini et al. 2022b). Similarly, S&OP has been addressed as a dynamic process in which the company operating plan is updated on a regular monthly (or more frequent) basis (Wochner et al. 2016). According to Stentoft et al. (2020) S&OP is a senior management review process of establishing the operational plan and other key activities of the business to best fulfil the current level of sales forecast according to the delivery capacity of business.

S&OP process brings together all the plans for the business (sales, marketing, development, manufacturing, sourcing, and financial) into one integrated set of plans (Stentoft et al. 2020, Cigolini et al. 2022). It is performed at least once a month and is reviewed by management at an aggregate (product family) level. The process must reconcile all supply, demand, and new product plans at both the detail and aggregate levels and tie them to the business plan. S&OP is described as a cross-functional long-term planning process that links different business plans into one integrated set of plans with the main purpose of balancing demand and supply and linking the strategic plans to the operational plans of a firm. Hence, S&OP is designed as a means for internal coordination, pursuing consensus on sales forecasts and production plans (Goh and Eldridge, 2019).

S&OP aligns an organization both from a vertical (matching the strategic and the operational plans) and a horizontal (involving cross-functional teams across the planning stage) perspective. Providing a consensus on sales forecasts and production plans (Seeling et al. 2022, Franceschetto et al. 2023) enables the organizations to respond effectively to both demand and supply variability (Goh and Eldridge, 2019).

On the other hand, IBP is essentially a production planning process rather than a strategic process and it deals with companies' financial estimates and forecasts (Tonetti 2019). IBP is an expanded form of S&OP that spans a company's end-to-end value chain and ties strategic, profit-related objectives to short- and mid-term operational planning decisions. Moreover, IBP involves a cross-functional scenario analysis informing decisions about more profitable supplier collaboration, demand shaping, marketing, and pro forma financial forecasting (VICS, 2010).

IBP is fully aligned with growth and innovation metrics by evolving S&OP into a strategic business partner, considering how a successful IBP aligns company's operational decisions with forward-looking financial performance over several timeframes, representing complicated trade-offs, restrictions, and real-time business realities across the value chain (Schlegel et al. 2020). Along the financial metrics there are the Earned Value Added that allows a complete overview of the company profitability, the Cash-to-Cash Cycle and the Net Operating Working Capital to ensure the consolidation of the short-term financial position of the organization (Hahn and Kuhn 2011). Moreover, having a clearly defined set of metrics is crucial to achieving an elevated level of maturity in both S&OP and IBP. Although crucial for assessing the effectiveness and efficiency of the process, the literature lacks a clear example of a comprehensive set of metrics, both in case studies and theoretical frameworks. Indeed, research on the metrics used is fragmentary and limited, with papers only briefly mentioning some indicators, but failing to provide a complete picture (Stentoft et al. 2020).

Sales and marketing inputs, statistical forecast and portfolio management are the most recognized inputs both for S&OP and IBP processes. Furthermore, by replacing the forecasting activity with customer and supplier inputs, the uncertainty level is minimized, resulting in more reliable plans (Stentoft et al. 2020). As for the IBP process one of the most crucial outputs consists of the automatization of the preparation of the annual budget, for the S&OP process the output consists of the supply and demand planning activities to create a view that supports cross-functional meetings (Goh and Eldridge, 2019).

According to Tonetti (2019), clients have been unaware about the term IBP and how it connects to S&OP. Businesses have been sluggish to implement IBP, despite its relevance and many companies still have to develop a fluid S&OP process. Bozutti and Esposto, 2019 believe that IBP is merely a spruced-up S&OP exercise with finance thrown in, and it operates similarly to S&OP processes. Most proponents of this viewpoint are from the supply chain, and they appear to regard IBP as essentially a production planning process rather than a strategic process. They do not think the differences are

relevant. On the other hand, others see IBP as a tool for directing the company's strategic orientation (Schlegel et al. 2020). Their starting point is the company's financial estimates, not the sales forecast in terms of units. IBP is inherently aligned with the company's financial numbers and forecasts, something S&OP cannot do. Moreover, IBP begins with the company's financial predictions and differs from S&OP, which is the primary purpose of aligning production volumes with sales volumes as a tool for driving the company ahead. S&OP processes are methodical and follow a set of steps and their primary purpose is to determine a sustainable production plan in line with sales estimates (Seeling et al. 2022). The tools and aptitude for optimizing production plans are frequently lacking. The driving element is a feasible plan rather than optimal. Furthermore, when S&OP is used as part of an organization's strategic planning process, the bottom-up approach, which regards financials as an (optional) add-on, promotes production levels over determining solutions that improve profitability. One of the most significant advantages of IBP over S&OP is that it aids in the alignment of many departments and functions within a business toward a common goal. It also takes teamwork, trust, and cross-functional interaction easier (Kreuter et al. 2022).

Schlegel et al. (2020) focuses on how S&OP is different from IBP as the former one is related to supply and demand balancing and planning, and the latter one focuses on the financial implementation, and it is related to an outdated planning procedure. The proper S&OP process is a major part of demand management thus, the IBP is highly linked to how sales and operations are impacted. The effective improvement of spending and cash flow and accurate key performance indicators can ensure how the sales and operations can be improved.

S&OP process can be implemented to different degrees, thus entailing different performance. Indeed, those organizations that poorly implement S&OP or whose S&OP maturity is at the early stages suffer from customer dissatisfaction, inaccurate forecasts, and poor financial performance. Many practitioners have developed maturity models to figure out how mature is the S&OP in companies (Goh and Eldridge 2019). Hence, the maturity models are aimed at diagnosing what stage of the process the company is in, understanding the existing gaps, and figuring out solutions to close the gaps and move to the next level (Kristensen and Jonsson, 2018).

Now, shifting the focus to RQ2, to investigate the future evolution of S&OP through its maturity models, in today's competitive scenario, several firms are still working with immature S&OP processes and should work on an evolutionary path to reach the ideal stage (Rota and de Souza 2021). Hence, the roadmap consists in a first stage where the "as-is" processes are framed and compared to those of the ideal level (Scavarda et al. 2017). By comparing the current process with those required by the next level, companies can visualize the gaps and select proper initiatives to close them, carefully assessing the costs and benefits the change requires. Since S&OP maturity models assess technology needs and figure out how to improve and move to the next level, they can be intended as the starting point for triggering innovation and changes in the organization's processes. With this imperative to improve, organizations must look at moving to the next level, without being over-ambitious since moving more than one stage often results in failures (Ambrose et al. 2018).

Although the scientific community provides plenty of maturity models that mainly differ in the number and the names of the evolutionary stages, the evolutionary path across the maturity levels shows some commonalities. Indeed, all models assume that companies in the first stage do not have an active planning process in place and reactively address the incoming orders, whilst retaining proactive processes characterized by high collaboration and integration of plans at the final stage (Wolfshorndl et al. 2020).

Lapide (2005) outlines four levels, from marginal to ideal. In marginal development, S&OP does not comprise a structured approach, with sporadic and informal meetings arranged. Moreover, there is a lack of balance between the supply and the demand planning, which are developed disjointly. Lastly, the organization relies on spreadsheets to manually record data, instead of using more developed information systems. As S&OP maturity moves to the rudimentary stage and the successive classic stage, meetings are formally organized, and more advanced integrated systems are exploited. In the last stage, known as the ideal stage, plans are aligned with most customers and suppliers, and external and internal systems are integrated to pursue several objectives.

Cecere et al. (2009) identified four steps: reacting, anticipating, collaborating, and orchestrating. The

maturity levels differ in terms of balance between demand and supply, S&OP process goals, ownership, and metrics used to qualify the process and keep it under control. Wagner et al. (2014) stated that the model comprises five steps: underdeveloped; rudimentary; reactive; consistent; integrated and proactive. To qualify the maturity of an S&OP process, the dimensions to be investigated are process effectiveness (which includes the general characteristics and activities of the process), process efficiency (which relates to plans integration and alignment), people and organization, and information technology.

For benchmarking purpose, in many models the last maturity degree is labelled as an ideal S&OP process, which can hardly be achieved by companies (Scavarda et al. 2017). As claimed by Lapide (2005), while the stages can never all be fully executed, they represent an ideal evolutionary process companies should evolve into, by yielding and improving supply chain management.

Grimson and Pyke (2007) jointly developed a five-stage maturity model which is among the most academic and reviewed frameworks. Additionally, it is acknowledged as one of the most extensive maturity S&OP models since it comprises and further extends the study by Lapide (2005). According to Grimson and Pyke (2007), each level of S&OP process is qualified based on metrics such as the meeting structure and collaboration, the progress in the information technology system to support S&OP process, the degree of integration in planning, the organization, and the measurement system in place. Even though the authors discriminate between five maturity stages, the empirical evidence does not provide organizations performing the most mature S&OP implementation. Nevertheless, the aim of the maturity model for S&OP process does not lie in reporting what has been done so far, but it lies in outlining future evolutions and driving the organization to improve S&OP by seeking higher levels in the model. Indeed, the purpose of the framework introduced by Grimson and Pyke (2007) consists in helping managers understand how effective their S&OP processes are and how to progress to mature stages.

Together with the maturity models, some research digs deeper to understand the evolutionary roadmap that drives the companies from an initial S&OP process with low level of maturity to more mature solutions (Darmawan et al. 2020). Wochner et al. (2016) claim the importance of assessing and monitoring S&OP process performance in each step, starting from data gathering, demand planning, supply planning, pre-meeting, and executive meeting. Indeed, literature conveys the message that companies with more mature S&OP processes develop more precise and accurate metrics. The logic behind these metrics lies in that to get to more mature S&OP process, all the different steps (like data gathering, demand planning etc.) of S&OP must be improved. Climbing up the maturity levels without properly spending efforts in all the steps does not seem viable.

The effort and the complexity of the evolutionary development is not even, as it increases the more the maturity levels are advanced. This take comes from the loss of seriality which makes the transition significantly more difficult. Hence, at the very beginning, the S&OP improvement path is relatively easy as the different steps (like process, technology, people, communication) can be addressed in cascade. The four steps (process, technology, people, and communication) cannot be addressed individually, and their role can change across the maturity levels (Dolgui et al. 2019).

Furthermore, the role played by the factors influencing S&OP implementation and their relevance can change across the maturity levels (Fildes et al. 2019). For example, in the most advanced stages of the maturity model, organization and people are deemed to be increasingly more important. Indeed, changes in processes and information technology came relatively fast, whilst changes in organization and people require long time and efforts. This results in a greater importance to be given to the sharing of a proper mindset and culture within the company to progress in the S&OP implementation toward advanced levels.

According to Wochner et al. (2016) the S&OP process consists in change management by 60 percent, process development by 30 percent and technology by 10 percent. Because of the growing complexity to be handled, a successful S&OP needs proper technology support. As the authors stated, the S&OP process is a cross-functional process, involving mid-level managers and analysts from different areas.

Therefore, S&OP results in a major challenge for the companies since it requires people from different operational areas and backgrounds to agree on assumptions for operating the business. Regarding the process, the objective of the S&OP process is to integrate and align several functional departments through a collaborative approach. Finally, the planning stage must witness the

cooperation of different departments, to mutually develop demand and supply, thus ensuring a proper balance. This cooperation should occur according to a give-and-take approach by both supply and demand managers, where the capability of listening to others and the eagerness to learn are fundamental prerequisites.

Table 1 summarizes the taxonomy of the considered papers according to a chronological criterion, by showing the main area of research for each author and the main topic discussed in terms of S&OP factors (technology, people, process, and planning), IBP, S&OP evolution, S&OP maturity addressed by authors qualitatively or quantitatively. The taxonomy highlights a gap regarding mature S&OP models in relation to IBP processes.

TABLE I
TAXONOMY OF THE LITERATURE

Papers	S&OP factors					IBP	S&OP evolution	S&OP Maturity	
	Technology	People	Process	Planning	Supply chain performance			Quantitative	Qualitative
Lapide 2005	X	X	X	X					X
Grimson and Pyke 2007	X	X	X	X	X				X
Cecere et al. 2009				X					X
Voluntary Interindustry Commerce Solutions 2010	X			X		X	X		X
Wagner et al. 2014	X	X	X	X	X				X
Wochner et al. 2016				X				X	
Scavarda et al. 2017	X		X		X		X		X
Ambrose et al. 2018	X	X	X	X	X				X
Darmawan et al. 2018				X				X	
Kristensen and Jonsson 2018	X	X	X		X	X	X		X
Bozutti and Esposto 2019					X				X
Dolgui et al. 2019				X			X		
Fildes et al. 2019			X	X				X	
Goh and Eldridge 2019	X		X	X	X		X	X	X
Tonetti 2019				X		X	X	X	X
Wolfshorndl et al. 2020			X	X					X
Stentoft et al. 2020	X	X	X	X			X		X
Schlegel et al. 2020	X		X	X	X	X	X		X
Dittfeld et al. 2020			X	X					X
Rota and de Souza 2021				X					X
Apaolaza et al. 2022			X	X			X		X
Seeling et al. 2022			X	X	X	X	X		X
Bagni et al. 2022				X	X				X
Kreuter et al. 2022	X		X	X	X	X	X		X
This study				***X***		***X***	***X***		***X***

IV. CONCLUSIONS AND FUTURE PATHS

This paper explores, through a systematic literature review, the evolution of S&OP via IBP since the latter is a holistic business planning process that extends the principles of S&OP throughout the supply chain, product and customer portfolios, customer demand and strategic planning, to deliver one seamless management process. The aim of this paper is double. First, to clarify the definition of S&OP and IBP since these concepts are often overlapped both in academia and in organizations. Second, to analyze the future evolution of S&OP process by addressing its maturity models.

The literature review has shown that IBP is an extension of S&OP to embrace the entire business to create a seamless management process. IBP is a notion broader than S&OP at a higher organizational level. The goal of IBP is to ensure that all departments and functions are aligned with the organization's short, medium, and long-term objectives. The systematic literature review has been followed by a taxonomy of the considered papers showing that S&OP maturity models are analyzed separately from IBP. Although S&OP can bring many benefits on board, its implementation is a relatively complex task that involves many organizational levels and requires to connect many organizational departments whose objectives can be conflicting. As a result, many companies are struggling to take the best out from this planning tool. The fact that not all companies can grasp the advantages of the S&OP process to the same extent is correlated with the different sales and operations planning maturity level, as well as some inhibitors, that can make the S&OP implementation challenging.

In terms of management-related implications, this paper can be useful for practitioners since some companies may deliberately decide not to engage in the S&OP process because of three main reasons. First, for a knowledge gap about the S&OP process either at top management level or within the organization or even both. Hence, before implementing the S&OP, all the organization must be conscious of its opportunities and capabilities. To do that, cross-functional initiatives and training activities can prepare the organization to the S&OP processes. The second reason is related to an unrecognized need for the S&OP. Companies can be unconfident with the S&OP and they are in doubt about its relevance and impact. Similarly, some companies are not ready to start working on the S&OP since company may lack the resources that are essentials for the S&OP execution. The third reason is in the field of implementation skills. A company may lack the adequate level of resources that are essentials for the execution of the S&OP process. Additionally, past negative experiences that have led to unsatisfactory results can be deemed as a relevant inhibitor for the implementation of S&OP.

Finally, the issue of future research paths deserves further investigation because the scientific

community has already deeply analyzed S&OP maturity models but there are no studies on how these models can evolve by integrating other planning practices such as Collaborative Planning Forecast and Replenishment (CPFR). In fact, IBP may be integrated with S&OP via CPFR whose objective lies in synchronizing the service demand forecast between all customers and suppliers.

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