Pontifícia Universidade Católica
do Rio de Janeiro

Marcelo Xavier Seeling

Sales and operations planning Global Roll-up & Global Executive Meeting steps and the role of finance in the process: a multi-case study in the Latin American subsidiaries of multinational corporations

Tese de Doutorado

Thesis presented to the Programa de Pós-Graduação em Engenharia de Produção of PUC-Rio as partial fulfillment of the requirements for the degree of Doutor em Engenharia de Produção

Advisor: Prof. Luiz Felipe Roris Rodriguez Scavarda do Carmo
Co-advisor: Prof. Antônio Márcio Tavares Thomé

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I dedicate this work primarily to my beloved wife and parents. I also dedicate it to all the people who believe in building a better and fairer society through science and ethical work.

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Abstract

Seeling, Marcelo Xavier; Scavarda do Carmo, Luiz Felipe Roris Rodriguez (Advisor); Thomé, Antônio Márcio Tavares (Co-advisor). **Sales and operations planning Global Roll-up & Global Executive Meeting steps and the role of finance in the process: a multi-case study in the Latin American subsidiaries of multinational corporations**. Rio de Janeiro, 2022. 103p. Tese de Doutorado – Departamento de Engenharia Industrial, Pontifícia Universidade Católica do Rio de Janeiro.

The thesis investigates the sales and operations planning (S&OP) cycle steps, expanding the understanding about the under-researched Global Roll-up and Global Executive Meeting steps. It presents a multiple case study embracing five important Latin American subsidiaries of four multinational corporations. Two S&OP frameworks are used to guide the field observations and analysis, aiding to improve the S&OP phenomenon's characterization. Scholars and practitioners can gain first-hand knowledge about how Global Roll-up and Global Executive Meeting steps are conducted in multinational corporations to improve their planning processes. The role of finance in S&OP / Integrated Business Planning (IBP) cycles is also examined and discussed in detail providing useful insights to improve these processes in other organizations, addressing another research gap. Findings indicate that there are challenges to consolidate and use information gathered from multiple subsidiaries in different contexts worldwide but internal benchmarking and sharing of best practices are explored as well as business opportunities among countries regarding inventory excess, portfolio expansion possibilities, and spare capacity utilization. Additionally, observations led to the conclusion that early involvement of finance in the S&OP cycle is beneficial for the business, adding value to the decision making process in the initial steps and taking a central role in the Pre-meeting and Executive Meeting steps.

Keywords

Empirical study; supply chain; sales and operations planning; integrated business planning; consumer goods; chemical industry; pharmaceutical industry.

Resumo

Seeling, Marcelo Xavier; Scavarda do Carmo, Luiz Felipe Roris Rodriguez (Orientador); Thomé, Antônio Márcio Tavares (Coorientador). **Etapas de Global Roll-up & Global Executive Meeting do Planejamento de vendas e operações e o papel das finanças no processo: um estudo multicaso nas subsidiárias latino-americanas de corporações multinacionais**. Rio de Janeiro, 2022. 103p. Tese de Doutorado – Departamento de Engenharia Industrial, Pontifícia Universidade Católica do Rio de Janeiro.

A tese investiga as etapas do ciclo de planejamento de vendas e operações (*S&OP*), ampliando o entendimento sobre as etapas pouco pesquisadas do *Global Roll-up* e Global *Executive Meeting*. Apresenta um estudo de caso múltiplo, envolvendo cinco importantes subsidiárias latino-americanas de quatro corporações multinacionais. Dois modelos de *S&OP* são usados para orientar as observações e análises de campo, auxiliando na caracterização do fenômeno *S&OP*. Acadêmicos e profissionais podem obter conhecimento em primeira mão sobre como as etapas de *Global Roll-up* e *Global Executive Meeting* são conduzidas em corporações multinacionais para melhorar seus processos de planejamento. O papel do setor de finanças nos ciclos de *S&OP*/ Planejamento Integrado de Negócios *(IBP)* também é examinado e discutido em detalhe, fornecendo informações e ideias úteis para melhorar esses processos em outras organizações, abordando outra lacuna de pesquisa. Os resultados indicam que há desafios para consolidar e usar informações coletadas de várias subsidiárias em diferentes contextos em todo o mundo, mas *benchmarking* interno e compartilhamento de melhores práticas são explorados, bem como oportunidades de negócios entre países em relação a excessos de estoque, possibilidades de expansão do portfólio e utilização de capacidade ociosa. Adicionalmente, as observações permitiram concluir que o envolvimento precoce do setor de finanças no ciclo de *S&OP* é benéfico para o negócio, agregando valor ao processo decisório nas etapas iniciais e assumindo um papel central nas etapas de *Pre-meeting* e *Executive Meeting* do ciclo de *S&OP*.

Palavras-chave

Estudo empírico; cadeia de suprimentos; planejamento de vendas e operações; planejamento integrado de negócios; produtos de consumo; indústria química; indústria farmacêutica

Summary

List of figures

List of tables

1
Introduction

Chapter 1 presents a summary of the historical evolution of production planning and control, the sales and operations planning (S&OP) concept and the context and relevance of the studied theme; it brings the literature gaps regarding S&OP; displays the research question and the objectives of this thesis; and, finally, it explains the thesis structure by chapters.

1.1
Historical evolution of production planning and control

Historically, systematic approaches to the development of production management are often considered to have started with the first factories, in the 18th century (Gaither and Frazier, 2001). Adam Smith, in 1776, published "The wealth of nations" and discussed the economic aspects of production, analyzing the advantages of division of labor and task specialization (Slack et al., 2009), among other related subjects. Charles Babbage, in 1832, also explored the theme from a cost perspective, pointing out that division of labor allows the payment of salaries according to the complexity of each task and individual productivity (Gaither and Frazier, 2001).

In the sequence, in the last decade of the 19th century until the first decades of the 20th century, Frederick Winslow Taylor created the Scientific Management movement with other contributors, deepening and broadening the study of division of labor, adding important concepts, such as: standardization of processes and tools, applying the scientifically determined best-way to execute a task; the standard time; the idea of collaboration between operational and management teams of the company, being roles and responsibilities defined with equity; the recruitment and the selection of the best workers with the right profile for the job; and operational training to execute efficiently each specific standardized task (Slack et al., 2009). Standard time also helped to improve production planning as it allows predicting when a batch would be finished (Maximiano, 2015).

In parallel, Henry Ford applied the division of labor concept in the moving assembly line in the automobile manufacturing process, in 1914, allowing the mass production of his Model T car (Womack et al., 2007). His idea was adopted by competitors and was spread to other industries (Maximiano, 2015). When production is planned by a central department based on forecast demand and pushed along the manufacturing line to the market, the approach is called make-to-stock (Slack et al., 2009).

The mass production made it difficult to assure the quality control of the finished goods though. Walter Shewhart, in 1931, published "Economic control of quality of manufactured product", disclosing his statistical method of process control, using quality control charts constructed from samples collected. During World War II, the method proved to be efficient and less costly, gradually becoming popular and has been adopted in different industries worldwide (Maximiano, 2015).

In the post-World War II context in Japan, Eiji Toyoda and Taiichi Ohno, creators of the Toyota Production System (TPS), were the pioneers of the Lean Manufacturing concept (Womack et al., 2007). The basis of the TPS is elimination of waste through two pillars: Just-in-time production and Jidoka. The Kaizen concept of continuous improvement of the processes is also key in the TPS (Maximiano, 2015). Just-in-time production means receiving the materials needed for manufacturing very close to the moment that they are going to be used, with the right quantity and in the right quality. In the Kanban system, the production is pulled. Ideally, the later process withdraws only the needed quantity of material from the earlier process, and the information regarding this request is sent backwards in the manufacturing plant. The demand from the market pulls the production and determines the plant flow. The concept is extended to key suppliers and customers in the supply chain. Kanban promotes integration and synchronization in the production within the company's industrial plant and along the supply chain (Ohno and Bodek, 2019). The Jidoka concept, the automation with human touch, gives autonomy to workers to stop the production line and correct problems as soon as they are identified, avoiding more waste (Maximiano, 2015).

Lean Manufacturing encompasses, among other concepts and tools, the production of small batches of a family of similar items in manufacturing cells, made possible by quick machine setup times (Krajewski et al., 2015); the concept of Heijunka, which means leveling the production to keep a continuous flow (Maximiano, 2015); and operation with low inventory (Slack et al., 2009). During the 1960's, Toyota Motor company grew and consolidated its position as a global automobile manufacturer. In the 1970's, the oil crisis made Toyota cars very competitive worldwide because they were compact, economical and durable (Maximiano, 2015).

Around 1950 and in the following decades, the western industry generally functioned within a scheme of departmentalization with strong boundaries between the business functional areas, which pursued different goals although deployed from the same company's global objectives (Vollman et al., 2005).

Big industrial companies have managed their operations using formal Production Planning and Control Systems (PPCS) to use efficiently its capacity to satisfy anticipated demand. PPCS encompass aggregate capacity planning, material requirements planning, and production planning and control. Before the 1960's, companies often used Reorder Point Systems (ROP) (Sridahan and Kanet, 1995) to manage the inventory. In a ROP system, materials are replenished every time their inventories reach a defined minimum level (Krajewski et al., 2015).

Beginning in the 1960's, with the advent of the computers, many traditional ROP systems were replaced by Material Requirements Planning (MRP) systems (Sridahan and Kanet, 1995). A MRP system determines which materials are needed for manufacturing and when they are needed, according to a production plan. It verifies the components, parts or raw materials used to manufacture all the finished goods in the portfolio of products and calculates their requirements based on information such as sales orders, sales forecast and the inventory position. The production lead times and the suppliers' lead times are considered to determine when manufacturing and purchasing orders must be placed. The concept was expanded, during the 1980's and 1990's, creating the Manufacturing Resources Planning (MRP II), which incorporated the analysis of the financial and engineering capabilities of the company to execute the plan (Slack et al., 2009).

In the 1990's, the Enterprise Resource Planning (ERP) systems were developed to improve the integration among the different business functional areas (e.g., operations, sales, finance, human resources, logistics) within the company and they usually have imbedded PPCS such as MRP and MRP II (Vollman et al., 2005). The ERP system integrates and automates essential sales, financial and operational functions. It provides data from the general ledger (GL), accounts payable, accounts receivable, payroll to support the decision making. It registers all inbound and outbound movements and production, and supports inventory, order and supply chain management. The system may be interfaced with other specialized satellite systems (e.g., human resources management – HRMS, customer relationship management – CRM, and include e-commerce capabilities) and with other companies (suppliers and customers) (Biel, 2020).

Since that time, market-trends have indicated that manufacturing companies are being required to excel in a variety of dimensions such as reducing manufacturing cost, launching new products quicker, delivering faster to customers, increasing the portfolio of products, improving operational efficiency, responding to demands dynamically changing in make-to-stock business environments, and increasing quality standards. (Sridahan and Kanet, 1995). Moreover, Vollman et al (2005) indicate that customers' expectations keep growing; the internationalization of companies and the globalization continue increasing, making the supply chains more complex; companies are outsourcing more the activities that are not part of their core business and as a consequence interconnectedness of suppliers and their customers has also increased.

In this context, new technologies (e.g., machine learning, simulation) to help improving production planning have been applied by industrial companies (González et al., 2020). Similarly , sales and operations planning (S&OP), which is a supply chain planning process has been implemented by a great number of organizations worldwide (Noroozi and Wikner, 2017) and is the theme of this thesis discussed herein.

1.2
Sales and operations planning concept, context and relevance

S&OP is a business process that balances customer demand with supply capabilities aiming to enhance enterprise's profitability. It reconciles horizontally the plans from different business functional areas (e.g., sales, marketing, operations, and finance) and ensures a vertical alignment between the company's strategic plan and operations (Olhager et al., 2001; Wallace and Stahl, 2006; Grimson and Pyke, 2007; Wang et al., 2012; Thomé et al., 2012a; Feng et al., 2013; Tuomikangas and Kaipia, 2014; Wagner et al., 2014; Noroozi and Wikner, 2017).

It is usually performed in five steps (Lapide, 2005a; Thomé et al., 2012a) but it may have two additional steps in big local companies and in multinational corporations: 1) Global Rollup, when S&OP information gathered from subsidiaries worldwide is consolidated; and 2) Global Executive Meeting, when most senior executives of the corporation analyze the information from the subsidiaries and make decisions (Wallace and Stahl, 2006).

A successful S&OP implementation may improve business and supply chain performance; increase profit by decreasing costs and increasing revenue; and improve operations regarding customer service, demand forecast, inventory management and manufacturing resources utilization (Thomé et al., 2012a; Noroozi and Wikner, 2017). Thomé et al. (2012b) perform a systematic literature review with 271abstracts and 55 papers that offers evidence of the positive effect of S&OP on firm performance. Thomé et al. (2014a) analyze 725 manufacturers from 34 countries and apply a structure equation modeling approach achieving sound results that indicate the positive effect of internal S&OP on the manufacturing operational performance. Adding to that, Nemati et al. (2017) apply mathematical modelling to compare three situations found in organizations: a S&OP fully implemented, a S&OP partially implemented, and decoupled planning. All three mathematical models are designed to represent multi-site manufacturing companies, with large portfolios, and many suppliers and customers. Finally, the models are applied in a real case, a dairy company in Iran, demonstrating the superior supply chain performance results of the S&OP (fully

integrated S&OP is slightly better than partially) in comparison with decoupled planning.

S&OP has become widely recognized as an important supply chain management concept for academics and practitioners (Thomé et al., 2012a; Tuomikangas and Kaipia, 2014; Nemati et al., 2017; Kreuter et al., 2021). Key suppliers and customers may be included in the cycle in mature implementations to improve planning, increasing supply chain integration (Lapide, 2005a; Grimson and Pyke, 2007; Baumann, 2010; Wagner et al., 2013).

The interest on S&OP has grown significantly in the last decades, with an increasing number of industry implementations worldwide (Lapide, 2005a; Ambrose and Rutherford, 2016; Kreuter et al., 2021) and a robust research body growth reflected in recent literature reviews on the subject (e. g., Thomé et al., 2012a; Tuomikangas and Kaipia, 2014; Noroozi and Wikner, 2017; Kristensen and Jonsson, 2018; Kreuter et al., 2021).

1.3
The S&OP literature gaps and research opportunities

Despite of all the efforts invested, the S&OP process is not completely understood yet (Qi and Ellinger, 2017). Kristensen and Jonsson (2018) suggest the development of more descriptive studies on S&OP to "explore the level of S&OP adoption and the performance of S&OP across industries" as a future research topic. Therefore there is still much room for additional empirical studies on S&OP, resulting in research opportunities open to be deeper investigated (Grimson and Pyke, 2007; Thomé et al., 2012a; Ivert et al. 2015a; Goh and Eldridge, 2015; Hulthén et al., 2016; Jonsson and Holmström, 2016; Noroozi and Wikner, 2017; Kreuter et al., 2021), including the lack of studies on the S&OP process characterization (Pedroso et al, 2016), describing how the process is performed in different contexts. Moreover, what is embraced by S&OP and how it works are subjects which still can be more investigated (Scavarda et al., 2017).

Another research opportunity regards to incipient S&OP initiatives towards a global integration perspective (Pedroso et al., 2016; Lim et al., 2017). There is still a paucity of analysis in the literature about the extension beyond the

standard five-step approach to S&OP (Wallace and Stahl, 2006) to include the Global Roll-up and the Global Executive Meeting steps, in companies with global operations.

Additionally, despite of early attempts to describe the role of finance under the heading of Integrated Business Planning (IBP) in the practitioner's literature (Viswanathan, 2006; Oliver Wight, 2018), there is still a lack of analysis about the role of finance in the S&OP process and about the differences between S&OP and IBP. According to Van der Drift (2018a, 2018b), from Involvation Consulting firm, even though many researchers have considered IBP as another name for the existing S&OP process in a high mature implementation level, it has a broader scope, integrating and aligning the medium-term business functional areas plans, with a central role performed by finance, to deliver the company's strategy. This is far from unanimous. In the other hand, Baumann (2010) names the highest steps of his S&OP maturity model as IBP and Inter-enterprise IBP, describing a similar scenario, including financial planning integration and focus on the enterprise's result, among other characteristics.

The subject finance in S&OP and IBP is important because this functional area is key for the success of the process even though the focus of the majority of the researches are on the roles of operations, sales and marketing. Most frequently S&OP has been investigated from a supply chain perspective. Additionally, the debate whether S&OP and IBP are the same thing or they are different processes or even if IBP is an evolution of S&OP is still open and this research work brings its contribution to the discussion of this theme.

To address these research gaps, the findings and main lessons learned from a multiple case study performed in five subsidiaries of four multinational corporations are presented. Two recognized S&OP frameworks, which are Wallace and Stahl's (2006) and Thomé et al.'s (2012a), are applied as guidelines to analyze the processes implemented in these organizations.

Moreover, this thesis contributes with the extant literature in S&OP in three important ways. First, the research contributes to characterize the S&OP process in different contexts, while increases the number of empirical studies regarding the theme. Second, it examines the under investigated Global Roll-up and Global Executive Meeting steps, going beyond the standard and traditional

S&OP five-step cycle. And third, this study provides specific insights regarding the under-researched role of finance within multinational corporations' S&OP. The thesis offers originality and brings important contributions exploring relevant themes which were not investigated in-depth in the S&OP literature.

This thesis provides academics and practitioners information from real-life contexts on relevant issues to consider and to manage when implementing and executing S&OP.

1.4
Research question and objectives of the thesis

There is a research question that naturally emerges from the discussions developed so far in this introductory chapter:

RQ: How can the S&OP process performed in multinational corporations be characterized?

Therefore, the objectives of this thesis are:

I. To improve the S&OP process characterization by performing empirical studies within multinational corporations of different industries and also to contribute to the debate around S&OP and IBP being different processes or not;
II. To investigate how the Global Roll-up and Global Executive Meeting steps are executed in multinational corporations, going beyond the standard and traditional S&OP five-step cycle, offering different lessons learned of interest for both academics and practitioners;
III. To analyze the role of finance along the S&OP and IBP processes in multinational corporations.

The thesis is built on a group of papers published, which were developed under the umbrella of the research collaboration between Pontifícia Universidade Católica do Rio de Janeiro (PUC-Rio / Brazil) and the Münster University (Germany) in the Projeto Brasil Alemanha (PROBRAL). Table 1 presents the papers published as first author, which base this thesis. Other articles, published

as co-author, are cited in this research work and included in the references of this thesis.

Table 1: The papers that base this thesis.

Number	Paper	Role in the thesis
1	Sales and operations planning applied in a consumer product company in Mexico European Operations Management Association Summit (EUROMA) - Seeling et al. (2016)	S&OP characterization
2	Sales and operations planning maturity models: literature review and application in a consumer goods company in Brazil European Operations Management Association Summit (EUROMA) - Seeling et al. (2018a)	S&OP characterization
3	Sales and operations planning application: a case study in Brazil Producton and Operations Management Society Conference (POMS) - Seeling et al. (2018b)	S&OP characterization
4	A sales and operations planning application in the Brazilian sbsidiaryof a multinational chemical company Brazilian Journal of Operations and Production Management (BJO&PM) - Seeling et al. (2019)	S&OP characterization
5	Global sales and operations planning: A multinational manufacturing company perspective Journal PLOS-ONE - Seeling et al. (2021b)	S&OP characterization and Global S&OP
6	The role of finance in the Sales and Operations Planning process: a multiple case study Business Process Management Journal (BPMJ) - Seeling et al. (2022)	S&OP characterization and role of finance

The thesis is not merely a collection of papers as it expands the research investigating five subsidiaries of four multinational corporations. Only Seeling et al. (2022) discuss the five organizations but focused on the role of finance in S&OP. The other articles present the cases of one or two companies. Additionally, the connection existent between the 6 papers is clearly established through a research question that is answered along the thesis development.

1.5
The structure of the thesis

The remainder of the thesis is as follows. Chapter 2 offers a theoretical background on the S&OP process, its cycle steps and the role of finance. Chapter 3 describes the research method applied. Chapter 4 presents the analysis of the S&OP cycle performed in the studied organizations to characterize the process. Chapter 5 presents the cross-case analysis and the main discussions about the Global Roll-up and Global Executive Meeting steps. Chapter 6 present the cross-case analysis and the main findings regarding the role of finance in the S&OP and IBP processes. Conclusions and suggestions for future researches close the thesis in chapter 7.

2
Theoretical background

Chapter 2 presents important concepts regarding S&OP, including definitions and S&OP characterization; Wallace and Stahl's (2006) and Thomé et al.'s (2012a) frameworks' descriptions; the Global Roll-up and Global Executive Meeting steps; and the role of finance in the S&OP and IBP processes.

2.1
S&OP definitions and process characterization

S&OP is a business process (Wing and Perry, 2001; Goh and Eldridge, 2015; Noroozi and Wikner, 2017) performed periodically and usually once a month (Lapide, 2005a; Thomé et al., 2012a) that balances demand and supply (Lapide, 2005a; Vollmann et al., 2005; Wallace and Stahl, 2006; Feng et al., 2013; Ambrose and Rutherford, 2016) to enhance profit (Grimson and Pyke, 2007). As such, it considers the company's production, distribution, procurement and financial capabilities (Feng et al., 2008). It is situated at the tactical level and provides horizontal alignment bringing together different business functional areas' plans in one set of integrated consensus-based plans, as well as vertical alignment (Wallace and Stahl, 2006; Thomé et al., 2012a; Ambrose and Rutherford, 2016). Usually the demand forecast is handled at an aggregate level and covers a planning horizon compatible with the organization's strategic planning periodicity (Grimson and Pyke, 2007; Thomé et al., 2012a). This planning horizon frequently encompasses 18 months ahead but one year is also a period often elected by many companies because of their budgeting frequency (Wallace and Stahl, 2008).

S&OP success factors include, among others, empowered representatives from the business functional areas (e.g., sales, marketing, operations and finance) actively collaborating in the S&OP team, a champion to coordinate the activities, information technology (IT) support, adequate set of metrics, engagement of key partners (suppliers and customers), and sponsorship from senior executives

(Wallace and Stahl, 2006; Grimson and Pyke, 2007; Snow, 2007; Thomé et al., 2012a; Hulthén et al., 2016). Additionally, according to Goh and Eldridge (2019), "Strategic Alignment" and "Information Acquisition / Processing" are the two mechanisms that have the most positive impact to obtain S&OP superior results.

S&OP is viewed as an integrative device (Thomé et al., 2012a, 2014a). It is a management process leading to coordination and integration among business functional areas in order to balance demand and supply (Mintzberg, 1980; Tuomikangas and Kaipia, 2014).

Although it has been studied and described in many research works, according to Pedroso et al. (2016), the S&OP process in complex organizations still needs to be better characterized to be understood. In these companies, the S&OP implementation can be a challenge and these authors consider that there is still a gap in the identification of enablers and barriers to implement and to manage a more efficient process with positive results. Their results suggest that some success factors such as top management support, cross-functional integration, metrics and performance monitoring, information systems, deep understanding of the processes involved, and training the people are critical for a good performance. They also indicate that a formal structure dedicated to S&OP may be necessary to support the process implementation.

In this thesis, the S&OP or the IBP process implemented in each of the five subsidiaries of the four multinational corporations studied are characterized in detail using Wallace and Stahl's (2006) and Thomé et al.'s (2012) frameworks as guidelines.

2.2
S&OP frameworks

The academic and the grey literatures on S&OP offer different frameworks covering diverse aspects of S&OP such as process (e.g., Wallace and Stahl, 2006; Thomé et al., 2012a), maturity levels (e.g., Wing and Perry, 2001; Lapide, 2005a, 2005b; Cecere, 2006; Viswanathan, 2006; Grimson and Pyke, 2007; Feng et al., 2008; Tinker, 2010; Baumann, 2010; Wagner et al., 2014; Danese et al., 2017), coordination mechanisms (e.g., Tuomikangas and Kaipia, 2014; Goh and

Eldridge, 2019), supply chain integration (e.g., Noroozi and Wikner, 2017), context-specific design parameters (e.g., Ivert et al. 2015a; Kristensen and Jonsson, 2018), S&OP performance measurements (Hulthén et al., 2016), and empirical and theoretical perspectives in S&OP (e.g., Kreuter et al., 2021). The two selected frameworks to guide this research, Thomé et al.'s (2012a) and Wallace and Stahl's (2006) describe the S&OP totally, being applicable respectively to characterize the process through its building blocks and cycle-steps. Moreover, the Wallace and Stahl's (2006) S&OP model is a reference for the implementations performed in all the studied organizations.

2.2.1
The Integrative S&OP Framework

Thomé et al. (2012a) offer a well-known "Integrative S&OP Framework" (Kristensen and Jonsson, 2018) focusing on the S&OP process. This framework was based on Grimson and Pyke's (2007) S&OP Maturity Model. It describes S&OP as a whole and not as a partial process (Ivert et al., 2015b; Noroozi and Wikner, 2017), being generalizable and not restricted to specific contexts (Noroozi and Wikner, 2017). It incorporates the main elements and building blocks of S&OP and contemplates the dimensions of vertical and horizontal alignments in a systematic and holistic manner (Ivert et al., 2015a, 2015b). It is consistent with Kathuria et al. (2007), where vertical alignment bridges strategy to operations, while horizontal alignment refers to cross-functional integration. It also influenced the development of different frameworks, as the ones from Hulthén et al. (2016) to measure the effectiveness and efficiency of S&OP, from Tuomikangas and Kaipia (2014) for S&OP coordination, from Thomé et al. (2014b) and Hollmann et al. (2015) for collaborative planning, forecasting and replenishment, from Ivert et al. (2015b) for planning environment complexity, from Noroozi and Wikner (2017) for supply chain integration, and from Kristensen and Jonsson (2018) for context based S&OP.

The framework's building blocks are Business Plan, Context, Inputs, Structure and Processes, Outcomes, Results, and Operations. As it is situated at

the tactical level, it bridges long term business and corporate strategic plans to day to day operations.

The Business Plan of the framework is the company's highest level of strategic plan, encompassing enterprise's mission and vision. The Corporate Strategic Plan is a deployment of the Business Plan. S&OP links the strategic plans of the business with their execution (Blackstone, 2013).

Context refers to the enterprise's operations and market environment and encompasses: region, country, industry, manufacturing strategy, product-process matrix, product aggregation, hierarchical planning and planning horizon, among others.

Inputs include all information used in the S&OP process such as the business functional areas' plans, forecasts, capacities, and constraints.

Structure and Processes is a core building block composed of four design parameters: Meeting and Collaboration, Organization, Information Technology (IT) and Metrics. Meeting and Collaboration refers to the human effectiveness in the S&OP process (Grimson and Pyke, 2007; Ivert et al. 2015a) including participants, collaboration and trust. Organization comprises the structure necessary to perform the process including cross-functional team, empowerment, agenda and cycle steps. IT refers to software (Scavarda et al., 2006), interfaces, hardware, and communication systems used to support the process (Zago and Mesquita, 2015). Metrics refers to all key performance indicators (KPIs) used to monitor results and improvements in the firm performance and its supply chain (Braz et al., 2011; Fernandez et al., 2012; Gutierrez et al., 2015). They can have different perspectives, one for S&OP effectiveness measures and one for business performance measures (Hulthén et al., 2016).

The main S&OP process outcome is the reconciliation and integration of the business functional plans (e.g., sales, marketing, operations and finance) into one consolidated S&OP plan (Thomé et al., 2012a). The main result is profit optimization (Grimson and Pyke, 2007; Thomé et al., 2012a). Several objectives related to the different process' foci have an impact on the profit maximization such as improving forecast accuracy, inventory management, demand-supply balance, service level, among others.

Operations regards to the day to day execution encompassing company's resources and activities.

Figure 1 depicts Thomé et al.'s (2012a) S&OP process framework.

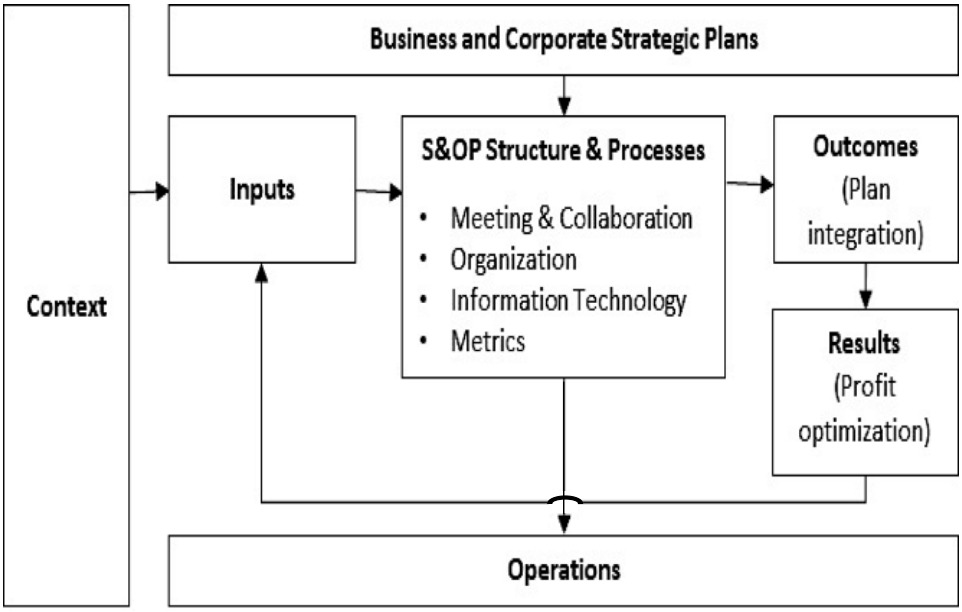

Figure 1: The S&OP framework.
Source: Adapted from Thomé et al. (2012a).

2.2.2
The 5-step framework and the Global Roll-up and Global Executive Meeting steps

S&OP is usually performed in five steps (Lapide, 2005a; Wallace and Stahl, 2006; Grimson and Pyke, 2007; Thomé et al., 2012; Wagner et al., 2014; Ivert et al., 2015a; Ambrose and Rutherford, 2016). In global corporations, there may be two additional steps (Wallace and Stahl, 2006). The S&OP steps, according to Wallace and Stahl (2006), are depicted in the sequence.

Data Gathering (step one) occurs in the beginning of the month. The Enterprise Resource Planning (ERP) system is fed with several types of company data (e.g., manufacturing, purchasing, sales, inventories, new products, costs, and prices). Information is generated for sales and marketing teams to support the development of the demand forecast and then reports are disseminated to appropriate people in the company as needed. According to Seeling et al. (2021a),

in a research made with fifteen big companies in Brazil from different segments, eight companies with a formal standard S&OP process in place named their step one as Portfolio Management and do not have a Data Gathering step. This finding shows that some current business practices are challenging the original Wallace and Stahl's (2006) model regarding the first step. Portfolio Management is led by the marketing functional area and during this step the portfolio of products is reviewed, performance by stock keeping unit (SKU) is evaluated, some products may be discontinued and new launches are defined. Moreover, even though there is information which is mandatory to update in the beginning of the month (e.g., inventory cost, production cost, among others) as in Data Gathering, the upload of information in the ERP is dynamic and happens all the time.

Demand Planning (step two) is when sales and marketing teams review the information received in step one, include the impact of new product launches, advertisement and promotions and other market initiatives to generate the new demand plan. This unconstrained forecast is usually built at an aggregate level of families of products, covering periods that match with the financial planning cycle.

Supply Planning (step three) is when the demand plan received from step two is simulated including capacity constraints to determine what is feasible to deliver, considering inventory on hands, production and sourcing.

Pre-meeting (step four) is when representatives from different business functional areas (e.g., sales, marketing, operations, and finance) discuss the gaps existent among demand needs and supply capacities and constraints and work together to find alternatives and to develop mitigation plans to solve the problems. The agreed plan proposal with a financial analysis and the unresolved issues and trade-offs that need senior managers' decisions are taken to the Executive Meeting (step five).

In step five, company's senior executives (e.g., directors, vice-presidents, and the managing director or president) take part: (i) to approve the S&OP plan proposal or define another course of action; (ii) to authorize changes in production rates or supply costs that surpass S&OP cross-functional team's autonomy; (iii) to analyze and compare the S&OP plan converted to financial figures with the budget based on the Business Plan and make decisions; (iv) to resolve pending

issues from Pre-meeting and any other relevant problems raised; and (v) to review KPIs, advancement of projects, product launches.

In the sixth step, called Global Roll-up, information regarding the S&OP of subsidiaries worldwide of a multinational corporation is gathered and consolidated.

In the seventh step, called Global Executive Meeting, multinational corporations' most senior executives such as the chief executive officer (CEO), chief operations officer (COO), chief financial officer (CFO), other chief officers, regional or divisional presidents and vice-presidents analyze the consolidated information, KPIs, financial results, global projects progresses, relevant issues and make decisions. According to VICS (2010), it is worth noting that in steps six and seven the S&OP planning horizon is extended and tends to merge with the multi-year strategic plan of global corporations. Another distinctive feature of steps six and seven is that, because they are anchored in global operations, they offer a natural bridge between company's planning and supply chain integration with initiatives such as vendor-managed inventories, efficient consumer responses, and CPFR (VICS, 2010, Thomé et al., 2014b; Hollmann et al., 2015;). In steps six and seven, the extension of the time horizon, the integration in the supply chain, and the participation of the C-Suite officers tend to confer to S&OP a strategic role in the company (Viswanathan, 2006, 2009; VICS, 2010; Baumann, 2010).

The first five steps have been analyzed and explored in different empirical studies offered in the S&OP literature (e.g., Grimson and Pyke, 2007; Wagner et al., 2014; Ambrose and Rutherford, 2016). Although steps six and seven have been presented in the literature (Wallace and Stahl, 2006; VICS, 2010), they have not been sufficiently analyzed by scholars in real life situations, opening avenues for future research on the topic. This thesis aims to build part of its research contribution addressing this research-practice gap, as the multinational corporations investigated in the multiple case-study present some kind of S&OP global consolidation.

Figure 2 depicts the process-steps, according to Wallace and Stahl (2006).

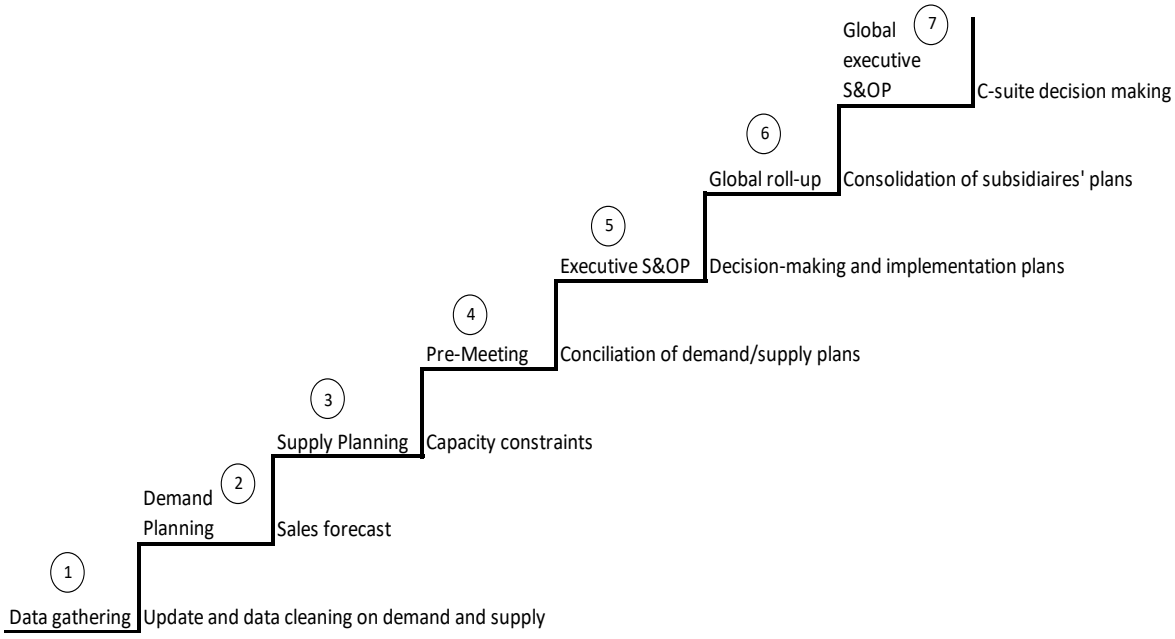

Figure 2: S&OP seven steps.
Source: Adapted from Wallace and Stahl (2006).

2.3
The state of the art

The typical standard S&OP implementation is described by Thomé et al.'s (2012a) framework, introduced in the previous section, developed based on a systematic literature review. According to Thomé et al. (2012a), S&OP encompasses regular cycle meetings, empowered teams from the business functions (e.g., sales, marketing, operations, and finance) working in collaboration, adequate structure and organization to execute the process properly, IT support, KPIs to measure enterprise's results and S&OP's effectiveness, among others. The cyclic process receives inputs (e.g., business functional areas' plans, forecast, operational constraints, inventory, budget, costs) and balances the enterprise's demand and supply. It generates as outputs a set of reconciled business functional areas' plans, aligned with the highest company's strategic plan, to maximize profit.

Many authors have developed their S&OP maturity models (MM) indicating the pathway to improve the process performance (Mendes, 2016; Seeling et al. 2018; Goh and Eldridge, 2019). These MM (e.g., Wing and Perry,

2001; Lapide, 2005b; Cecere, 2006; Grimson and Pyke, 2007; Snow, 2007; Feng et al., 2008; Viswanathan, 2009; Baumann, 2010; Wagner et al., 2014; Danese et al., 2017) present the implementation progress, in a sequence of evolutionary steps that are assessed according to a group of chosen dimensions, evolving from an inexistent or a very basic S&OP process to the state of the art (Lapide, 2005b). In some cases, the highest maturity step is aspirational and not yet achieved with the current technology (Lapide 2005b), with a high level of integration across the supply chain enabled by IT (e.g., Wing and Perry, 2001; Lapide, 2005b; Feng, 2008). The participation of key suppliers and customers in the S&OP cycle and the active participation of finance, playing a key role in the process, are also cited by academics as indications of a mature process (e.g., Grimson and Pyke, 2007; Baumann, 2010; Wagner, 2014; Danese et al., 2017). In the highest maturity level, the meetings could be event driven (e.g., Lapide, 2005a; Grimson and Pyke, 2007; Cecere, 2009; Wagner et al., 2014) due to the internal and external integration, among the enterprise's business functions and with suppliers and customers.

Goh and Eldridge (2019) bring a different perspective about S&OP. They say it is a process to facilitate coordination across the business functions but most of the companies that have adopted S&OP as their planning process have not gotten all the potential benefits. They investigate the effect of S&OP on supply chain performance using the coordination and contingency theories approaches, applying a structural equation model with six S&OP coordination mechanisms hypothesized to contribute to supply chain performance. The model was tested using a global survey of 568 practitioners. As previously informed, the obtained results show that "strategic alignment" and "information acquisition" are the mechanisms that most impact superior S&OP results. Moreover, they also conclude that a highly formalized S&OP process may difficult the supply chain performance and claim that the negative impact grows as the company size and the experience in S&OP increase. Goh and Eldridge (2019) finally indicate that "organizational bricolage" may be a coordinating mechanism of effective S&OP programs. In their perspective, S&OP teams should have more autonomy to respond with flexibility and fast to internal urgencies or changes in the business environment.

2.4
The role of finance in the S&OP and in the IBP processes

The S&OP acronym highlights "S" of sales (including marketing) and "O" of operations (including production, supply, logistics, among others) and does not explicitly mention finance. However, finance plays a key role in the S&OP process (Hahn et al., 2000; Viswanathan, 2009; Oliva and Watson, 2011; Thomé et al., 2012a; Wagner et al., 2014; Noroozi and Wikner, 2017; Oliver Wight, 2018). Regardless of the level of maturity of the S&OP process, firms can integrate budgeting and financial planning in their S&OP cycle (Baumann, 2010; Thomé et al., 2012a; Noroozi and Wikner, 2017) to properly evaluate assets, investments, revenues, costs and profit for different scenarios and improve the decision-making process (Noroozi and Wikner, 2017). By participating in the S&OP process, finance can also support in reconciling business functional areas' plans to deliver the firm's financial goals (e.g., Kallrath, 2002; Grimson and Pyke, 2007; Singhal and Singhal 2007; Thomé et al., 2012a; Wagner et al., 2014).

According to Oliver Wight (2018), IBP can be described as a mature or advanced implementation of S&OP, evolving from its original focus on production to balance supply and demand to a completely integrated and collaborative management and supply chain process. Bauman (2010) named IBP and Inter-enterprise IBP the stages three and four respectively of his four-stage Synchronized S&OP Maturity Model. In the stage three the S&OP process is financially driven and in level four it is financially driven and encompasses more than one organization, typically a company and its key suppliers. In this maturity model, there is no finance integration in the initial maturity stages.

The practitioner's literature (e.g., Viswanathan, 2006; Oliver Wight, 2018; Van der Drift, 2018a) renamed S&OP as IBP to differentiate from the traditional process, by placing finance at the center, supply becoming less prominent, and reinforcing the focus on the results and business strategy achievements. For the tenants of IBP, finance plays a central role in the S&OP process, which leads to gains regarding the traditional process in four main areas. First, the objective is profit-based, extending beyond the supply-demand balance. Second, rules and exceptions replace rigid prescriptions of the traditional S&OP process. Third, ad-

hoc meetings handle exceptions such as supply disruptions and sales promotions, in addition to the routine meetings. Fourth, the focus of the process is outwards in the supply chain and forward-looking in the time horizon (Viswanathan, 2006). By extending the focus and the time horizon, IBP led by finance contributes to join the tactical and the strategic dimensions of planning (Viswanathan, 2006; VICS, 2010). It is in line with Goh and Eldridge's (2019) study, which points out that some flexibility in conducting the process and more autonomy to the participants to make decisions are key success factors to respond to ever-changing business environments.

Although the participation of finance in the S&OP process is important, there is not a consensus in the literature regarding its right place and role within the S&OP process. Some authors suggest the integration of financial management in all steps of the S&OP cycle to improve company's performance (e.g., Shobrys and White, 2002; Badell et al., 2007). However, empirical research shows that finance participation is frequently absent in the Demand Planning and Supply Planning steps (e.g., Thomé et al., 2012a; Ivert et al., 2015a, Seeling et al., 2019). Moreover, its participation is necessary for the Pre-meeting step, together with sales, marketing and operations, when the consolidated S&OP plan proposal and action plans are put together (Wallace and Stahl, 2006; Ivert et al., 2015a) to be submitted later to senior managers' approval, during the Executive Meeting (Wallace and Stahl, 2006). The participation of finance in this step is important because it can circumvent rework caused by the lack of proper preparation of financial decisions to be carried forward to the Executive Meeting stage. But, according to Seeling et al. (2021a), sometimes finance executives do not understand clearly their role and the expectations about their participation in the process and additionally the research performed in fifteen big companies in Brazil showed that many times they do not have adequate IT tools to simulate scenarios, limiting their contribution. Finance right place and value can vary, being relevant in all maturity stages, but gradually integrated according to companies' advances in the S&OP maturity levels (Wagner et al., 2014). Some authors would advocate some involvement in basic stages and active participation in more mature stages (Tinker, 2010). Finance should play a leadership role in the collaborative, balanced cross-functional team that takes ownership of the IBP process

(Baumann, 2010; VICS, 2010), which can be placed in the highest S&OP maturity level (Viswanathan, 2009).

While the participation of finance is necessary for the S&OP cycle, it also receives valuable inputs from the S&OP process in return as well. S&OP interacts with financial planning in four different ways: (i) providing monthly updates and identifying sales or supply variances that affect the financial plans and targets; (ii) supporting annual company plans and budget developments; (iii) being a source of historical business information and future trends to orient capital investment decisions; and (iv) helping the cash flow management process by balancing demand and supply and by optimizing inventory (Dougherty and Gray, 2013).

Finance receives information from S&OP and can contribute to improving this process, but there is still a significant opportunity to increase its engagement in the S&OP cycle and get its active participation (Viswanathan, 2009). An example is seen in the case studies presented by Ivert et al. (2015a) on the food industry in Scandinavian countries, which shows that financial integration is not practiced in any of the studied companies. According to Snow (2007), having finance embracing the S&OP plan, as the other company's business functional areas do, would improve the enterprises' performance and it can be considered a best practice.

Even though the involvement of finance in S&OP has been considered an important subject by scholars and practitioners, reinforced in recent literature reviews (e.g., Thomé et al., 2012a; Noroozi and Wikner, 2017), the literature lacks of empirical studies that embrace a better understanding of its role in real life situations.

3
Research method

Chapter 3 presents the research method adopted in the thesis.

The research protocol follows these sequential steps: definition of research theme, definition of the unit of analysis, case selection, data collection, reliability and validity, and analysis, consistent with Gil (2002).

3.1
Research theme

The S&OP process has been implemented in a large number of organizations worldwide and has been a subject of great interest from academics and practitioners thus becoming a relevant theme to be investigated. Even though all the attention given to the process in the past years and the observed literature body growth, there are important gaps regarding the characterization of the S&OP process, its global steps and the role of finance in the cycle steps, leaving opportunities to contribute to the enhancement of the knowledge about the subject. As a consequence of the literature gaps identified, a research question naturally emerged:

RQ: How can the S&OP process performed in multinational corporations be characterized?

The thesis investigates the S&OP process characterization, its global steps and the role of finance in the cycle.

3.2
Unit of analysis

The unit of analysis are the S&OP and the IBP processes. The Global Roll-up and the Global Executive Meeting steps and the role of finance in the S&OP process are "embedded units of analysis" (Yin, 2009, p. 31) described for the studied companies.

3.3
Case selection

The study analyzes real-life context situations using multiple sources of evidence, which makes it particularly suitable to the multiple case study method (Yin, 2009; Gil, 2002). It is a qualitative case study, in the sense defined by Ketokivi and Choi (2014, page 233), "examining concepts in terms of their meaning and interpretation in specific contexts".

The studied organizations are:

a) The Brazilian and the Mexican subsidiaries of a multinational corporation that manufactures and commercializes consumer goods (e.g., plastic products for home, office products and hand tools, among other products) for the mass market hereinafter referred to as the consumer goods company;
b) The Brazilian subsidiary of a multinational chemical corporation that manufactures and commercializes pesticides and cleaning products for the mass market hereinafter referred to as the chemical company;
c) The Brazilian subsidiary of a multinational pharmaceutical company hereinafter referred to as the pharmaceutical company;
d) The Brazilian subsidiary of a multinational corporation that manufactures and commercializes hygiene and personal care products, laundry and cleaning home care products hereinafter referred to as the personal and home care products company.

Four main criteria guided the choice of the 5 subsidiaries of the 4 multinational corporations for the multiple case research. First, the S&OP processes in all the selected subsidiaries are representative of the global S&OP implementation company-wide, thus conferring conceptual representativeness to the sample (Yin, 2009). Second, all subsidiaries have an established S&OP cycle similar to the traditional Wallace and Stahl's (2006) five-step model running and some type of integration of their processes with their headquarters. This facilitated the search for regularities and contrasts among similar processes in different contexts (Pawson and Tilley, 1997). Third, the subsidiaries are the major operations in Latin America, respectively in their multinational corporations, and

complex organizations, considering number of sites, number of employees, number of suppliers, number of customers, number of distribution channels, number of stock keeping units (SKUs) and revenue amount. Fourth, Mexico and Brazil are the two biggest countries regarding territory, population, gross domestic product (GDP), and market size in the region, conferring additional relevance to the study of S&OP in global operations in emerging markets.

3.4
Data collection

Extensive field observations to collect information and to base the results consisted of interviews and direct participation. A semi-structured questionnaire was designed for the interviews (Yin, 2009), adapted from Manuj and Sahin (2011), which is presented in Appendix 1. Interviews were face to face following a protocol and questionnaire (approximately from one hour to one hour and a half each). The questions were a guide to ensure that all topics of interest were covered. Although some questions had a yes/no format, interviewees were prompted to explain their answers further. Usually, one interview per person was conducted face to face but sometimes they were done in small groups. Additional questions were made when necessary. Open-ended interviews were scheduled to complement and clarify the information obtained when needed.

Table 2 presents the 4 multinational corporations and their 5 subsidiaries and the professionals that were interviewed in each one. The interviews with the Global S&OP Project leader from the consumer goods company took place at the subsidiaries, during his periodic visits, and by e-mail and through phone calls.

The direct observation was also an important instrument to collect data as there was access to field operations and some meetings. Observations covered at least two years in the consumer goods company (both subsidiaries), one year in the pharmaceutical company, and six months in the chemical company and in the personal and home care products company.

The observational guideline adopted for data collection and analysis through direct observation is presented in Appendix 2.

Table 2: Organizations and professionals interviewed.

Company	Subsidiary or Headquarters	Interviewees
Consumer goods company	Brazilian subsidiary	supply chain and S&OP manager (1 position with double hat), supply planner, demand planning manager (from sales force), 2 sales directors, supply chain director, production planning manager (from one of the plants), financial planning manager, and the subsidiary's general manager
	Mexican subsidiary	2 S&OP managers (each manager responsible for a group of businesses), sales director (responsible for the biggest business in the country), supply manager, supply chain director, financial planning manager, finance director, and the subsidiary's general manager .
	Corporate Headquarters	Global S&OP Project leader
Chemical company	Brazilian subsidiary	demand planning manager (which is also the S&OP manager), supply chain director, marketing manager, finance planning manager, and the subsidiary's general manager
Pharmaceutical company	Brazilian subsidiary	demand planning manager (which is also the S&OP manager), marketing manager and finance planning manager
	Regional Headquarters	Latin-American supply chain director
Personal and home care products company	Brazilian subsidiary	3 demand planners from different product categories, demand planning manager, logistics director, marketing manager (responsible for one product category), sales manager (from one product category), data analysis manager (responsible for sales and market data analysis), finance manager (from one category)

Source: Adapted from Seeling et al. (2022).

3.5
Reliability and validity

The research protocol, the selection of the cases and the unit of analysis, along with validity and reliability checks contribute to confer transferability, truth-value, and traceability to the case study (Pedrosa et al., 2012; Gammelgaard, 2017), as discussed herein.

Research reliability was strengthened with the use of a fieldwork protocol for direct observation and interviews, consistent with Yin's (2009) guidelines. Documents were verified and analyzed as evidence of the practices performed in the subsidiaries.

Wallace and Stahl's (2006) model was selected because it depicts the S&OP process steps and was adopted as a reference by all the studied companies, which implemented and perform a cycle based on this framework. The Thomé et al.'s (2012a) framework was chosen because it represents the total S&OP process with its main building blocks. The framework is generalizable (Ivert et al, 2015a) and not restricted to specific contexts (Noroozi and Wikner, 2017). It captures the essential elements of S&OP, describing the process as a whole and not as a partial process. Many other frameworks were analyzed, as the ones listed in chapter 2. But they are focused on parts of the process or on a specific perspective about S&OP (e.g., maturity levels, supply chain integration, coordination mechanisms, context-specific design parameters, S&OP performance measurements, and empirical and theoretical perspectives in S&OP). Wallace and Stahl's (2006) and Thomé et al.'s frameworks describe the S&OP process totally thus being the most adequate to guide the research and assist in the characterization of the cycle in this study.

The use of the two frameworks in this research reinforces the replication of results in different settings and thus enhances the external validity and generalization (Valentine, 2009) of multiple S&OP case studies in different industries and geographical locations. Additionally, this consistent use of proven frameworks adds to generalizable results in evidence-based management research (Rousseau, 2012).

Validity checks and triangulations were performed by comparing field observation notes, answers from interviews with different professionals, internal documents and public data from the company.

3.6 Analysis

The analysis of the results of this multiple case study was performed using frameworks known in the extant literature. Regularities and contrasts were observed among the S&OP processes run in the studied five subsidiaries of the four multinational companies, which are depicted in chapters 4, 5 and 6 of this thesis and the main results and findings are brought to chapter 7 of conclusion.

The S&OP framework developed by Thomé et al. (2012a) systematically guided the observations to describe the S&OP process implemented in the subsidiaries, in terms of Context, Inputs, Structure and Processes, and Outcomes and Results.

The S&OP framework created by Wallace and Stahl (2006) is the reference to describe the process steps adopted by the multinational companies in their subsidiaries. There are some differences in the cycle from organization to organization that are pointed out during the S&OP process characterization of each one.

The first five steps of this framework are commonly accepted and used in the literature (e.g., Thomé et al., 2012a; Wagner et al., 2014; Ivert et al., 2015a; Ambrose and Rutherford, 2016). However, the last two steps offer a broader approach that fits big local companies with many subsidiaries and global operations such as the multinational companies investigated in this thesis. The analysis demonstrates many discrepancies among the studied organizations regarding the global steps.

Additionally, the role of finance is analyzed in the five subsidiaries of the four multinational corporations also showing different approaches and practices from organization to organization.

The analysis of the commonalities and discrepancies brings useful insights that enrich the study thus adding value to enhance the knowledge about the S&OP phenomenon. Two S&OP frameworks were built based on the research performed in the studied companies, which are explained in detail in the papers Seeling et al. (2021b) and Seeling et al. (2022). They reflect respectively the S&OP global steps and the role of finance in the process. The frameworks are part of the contributions of this thesis and close chapters 5 and 6, aiding to summarize the research findings.

4
Within case analysis of S&OP in the companies

Chapter 4 presents the within case analysis, using Thomé at al.'s (2012a) and Wallace and Stahl's (2006) frameworks as guidelines to characterize the S&OP process performed in each organization. The six papers listed in Table 1 (Seeling et al., 2016; Seeling et al., 2018a; Seeling et al 2018b; Seeling et al. 2019; Seeling et al., 2021b; and Seeling et al., 2022) are used to support the S&OP process characterization but Seeling et al. (2022) brings the biggest contribution, including a resume table of the companies. The questionnaire used in the interviews is particularly important in this effort to characterize the S&OP process because it is structured with specific questions for top executives and for managers and staff, organized in a way to cover all cycle steps.

More information about the four multinational companies and their five subsidiaries and the S&OP processes they run can be obtained directly from the papers.

The organization of this chapter follows the design parameters of Thomé et al.'s (2012a) framework for each one of the studied companies: Business and Corporate Strategic Plans, Context, Inputs, Structure and Processes (embracing meetings, organization, IT, and metrics), and Outcomes and Results together. It addresses directly the research question and the objective I, offering more empirical studies in different contexts, aiding to improve the characterization of the S&OP process. Additionally, S&OP and IBP similarities and discrepancies are discussed to evaluate if they are different processes or the same one.

4.1
The consumer goods company and its Brazilian and Mexican subsidiaries

The studied company is a multinational corporation headquartered in the U.S. and present in more than 50 countries, which manufactures and commercializes globally a wide variety of goods of recognized brands. The

company employs around 20,000 people worldwide and brings in revenues of approximately US$6 billion annually, maintaining relationships with clients from several market channels: distributors, wholesalers, industrial clients, mass merchandisers, smaller retailers, among others.

The consumer goods company decided to adopt S&OP globally as a way to organize, integrate and monitor its efforts thus contracting a consultancy firm to aid the implementation. The process was not new in the company as some subsidiaries around the world already had the S&OP cycle steps and metrics implemented, but many of them still in early implementation stages. Other subsidiaries did not have at all a S&OP process. Therefore, the corporation decided to create a project and a global team to standardize and to deploy the S&OP process to all operations worldwide, to train the people and to audit the implementations periodically.

4.1.1
Business and corporate strategic plans

The consumer goods company deploys its corporate plan to all subsidiaries worldwide with guidelines and objectives and then local plans and budgets are developed accordingly and agreed after a few negotiation rounds between each subsidiary and the global headquarters. All subsidiaries' plans are consolidated at the corporate level, building the agreed-upon corporate business plan.

4.1.2
Context

The Mexican subsidiary commercializes around 4,000 SKUs, delivering to approximately 2,000 clients, being responsible for one-third of Latin American annual revenue. The main product line commercialized in the country is responsible for approximately 50% of the sales. The sourcing is complex as almost all the portfolio is imported from different countries (e.g., U.S., China, Taiwan, Brazil, Colombia, and France), coming from several plants and distribution centers (DCs) owned by the consumer goods company or from

external suppliers. There is one DC but there is no manufacturing plant managed by the Mexican subsidiary. The strategy is buy-to-stock, based on sales forecast. The organization uses a postponement strategy to increase flexibility and reduce inventory, packing 25% of the portfolio at the DC.

The Brazilian subsidiary commercializes around 6,500 SKUs, delivering to approximately 8,000 clients, being responsible for close to 40% of the Latin American annual revenue. The main product line sold in the country is responsible for about 85% of the sales. Around 65% of the portfolio is locally manufactured in two company's plants. The remaining is imported from several countries (e.g., U.S., China, Taiwan, Indonesia, India, and Argentina). The subsidiary has two DCs attending local customers and exports. The manufacturing strategies are make-to-stock and buy-to-stock, based on sales forecast.

4.1.3
Inputs

Unconstrained demand forecast, supply plan with constraints, inventory position, new product launches, trade promotions, costs, price changes and budget figures are the main S&OP process inputs and are updated in the ERP system.

In both subsidiaries, sales and marketing personnel prepare the forecast at the aggregate level. In Mexico, two S&OP managers open the forecast by SKU based on historical data, reconfirm the detailed plan with empowered representatives from sales and marketing teams and send validated information to the supply team. In Brazil, the demand planning manager and his analysts, within the sales organization, open the forecast by SKUs and send it to the supply team. Marketing provides new product and promotion information.

The Mexican supply plan is a sourcing plan. The Brazilian supply team generates a sourcing plan and production master plans for the two local plants. In the Brazilian plants, production planning teams perform capacity simulations, make their floor scheduling and inform their constrained plan and gaps to the supply team. Considering the importance of imported products for both subsidiaries, foreign trade has a key role, communicating with suppliers and freight forwarders, moving loads efficiently, and providing accurate product

arrival and cost information to supply, sales, marketing, and finance areas.

In both, Brazil and Mexico, finance is responsible for building the local budget based on the information gathered from all business functional areas and observing guidelines and targets provided by company's headquarters in the USA. This information is available for the people involved and is key to the S&OP process. Prices are defined in the budget but may be reviewed if needed by sales, marketing, and finance together, based on the actual product margins and depending on local market conditions.

Within the Global Roll-up step, aggregated data obtained from the subsidiaries' S&OP cycle is sent to the corporate headquarters, as discussed in chapter 5.

4.1.4
Structure and processes

In both subsidiaries, there is an agreed-upon calendar for the S&OP cycle meetings, and the five-step framework offered by Wallace and Stahl (2006) is executed.

As mentioned before, information is provided to the corporate headquarters to support the sixth (Global Roll-up) and seventh (Global Executive Meeting) steps. Employees understand their responsibilities, and there is no resistance against the S&OP process, although different commitment levels are observed. S&OP is a corporate priority, and the managing director sponsors the process in each country. However, finance representatives do not often attend the meetings in both subsidiaries, except by the Executive Meetings. Finance personnel are kept informed of the meeting results and support when requested though.

In the Mexican organization, five sales directors, the trade-marketing director, the marketing director, the finance director, the human resources director, the supply chain director, and the general manager compose the local senior management team that is also the group attending the Executive Meeting. In Brazil, there are four sales directors, two marketing directors, the finance director, the human resources director, the supply chain director, two

manufacturing directors and the general manager composing the local senior management team and attending the Executive Meeting.

The S&OP manual developed by the Global S&OP Project team is the reference guide that shows in detail how the process must be executed and is used to train people and to audit the subsidiaries around the world. The empowered representatives from all business functional areas that need to attend the meetings and participate in the process are defined. Two S&OP managers, each one dedicated to specific product lines, keep the process pace in Mexico. In Brazil, the supply manager, supported by his team, plays this same role. In both subsidiaries, the supply chain director has the overall responsibility for managing the S&OP cycle execution. The S&OP process has defined: meeting calendar, topics to be covered in the meetings, participants' list, information to be generated (e.g., forecast, capacity plan, inventory, and metrics) by assigned people, meeting minutes, standard reports and presentations, showing plans, gaps, potential result upsides and downsides, mitigation plans, and metrics.

Information from each subsidiary is sent to the corporate headquarters where it is consolidated and reviewed by the consumer goods company's most senior executives, performing a type of Global Roll-up and a Global Executive Meeting, led by the Global S&OP Project leader. These steps will be discussed in chapter 5.

Standard reports can be taken from the ERPs to verify inventory positions, service levels, costs, prices, open sales orders, open purchase orders, among other important data. There is a standard set of metrics that all subsidiaries worldwide have to keep track and report: perfect orders %, line fill %, forecast accuracy %, distribution and transportation costs, inventory value (gross, raw material, work in process, excess and obsolete), inventory turns, inventory days on hands, total SKU count, SKU ABC curve and the company's S&OP assessment score.

These metrics are presented in a scorecard during the meetings and are shared with the corporate headquarters periodically, during Global Roll-up. In addition to the listed KPIs, which are common to both subsidiaries, the Brazilian operation also reviews manufacturing indicators, as there are local plants. The plant schedule attainment is an important production indicator monitored. These metrics are also reviewed in historical series. Not all metrics are obtained

automatically from the ERPs and some need to be calculated manually in spreadsheets.

4.1.5
Outcomes and results

The five-step S&OP processes performed in Brazil and Mexico generate integrated demand and supply plans, which are, as much as possible, aligned with the expected financial results on the budget. Action plans to mitigate gaps and downsides are other process outcomes. Performance improvements are still being evaluated as the new S&OP standard process has been recently implemented.

The Brazilian subsidiary has shown an improvement in forecast accuracy and service level, as well as inventory reductions and is on target. The forecast accuracy in Brazil has achieved 76%. The Mexican subsidiary still struggles with a forecast accuracy close to 60% influencing negatively on inventory and service level. Although still lacking consistent improvements, both subsidiaries are considered examples to other units in Latin America that do not have yet implemented S&OP or are in early implementation stages.

It is important to emphasize that the two subsidiaries have been increasing their complexity, launching hundreds of new SKUs every year and increasing the customer base and geographic distribution coverage to grow their businesses. The Brazilian subsidiary has launched more than 500 SKUs and expanded its customer base by around 400 clients every year. The Mexican subsidiary has also been increasing its portfolio year over year and overcomes two merger processes in a short period. During these mergers, turnover was high, the two Mexican plants were closed, and the entire portfolio is now imported. All these changes make it difficult to isolate and measure the impact of S&OP in the organizations solely. However, extensive observations indicate that S&OP has been key to manage the complexity and dynamic changes towards the subsidiaries' planned objectives.

Although it is not possible to separate the results attributable solely to S&OP, it was possible to obtain from documents publicized by the company some of the tangible results during the S&OP implementation phase for the Latin American region as a whole, as summarized in Table 3. Overall, the S&OP

process resulted in substantive gains to the company.

Table 3: S&OP results in Latin America.

Metrics	Tangibles
Total Inventory	Minus 20%
Excess and obsolete inventory	Minus 22%
Inventory turns	Plus 26%
Days of inventory on-hands	Minus 20%
Perfect order fulfilment	Plus 2%
SKU Count	Minus 18%

Source: Documents publicized by the company.

S&OP performance and other general business results are shared and reviewed by corporation's designated people monthly, ensuring the vertical alignment as well. The S&OP process performed in the subsidiaries seeks to deliver budget figures, and any deviation is reported and renegotiated with the corporation. The S&OP KPI dashboard is sent to the corporate headquarters during Global Roll-up and is presented during the Global Executive Meeting, respectively S&OP steps six and seven, which are discussed in chapter 5.

4.2
The chemical company

The chemical company is headquartered in the United States and present in more than 110 countries. It manufactures and commercializes a variety of pesticides and cleaning products of recognized brands with revenues of approximately US$ 11 Billion worldwide. The Brazilian subsidiary is a multi-site complex organization that manufactures the majority of the goods locally and complements its portfolio with outsourced and imported products. Based on revenue, number of employees and geographic presence criteria, the Brazilian subsidiary is considered a big company, maintaining relationships with clients from several market channels: distributors, wholesalers, mass

merchandisers and other retailers. The corporation has implemented a long running S&OP in its operations worldwide, and the Brazilian subsidiary's process is considered a best practice.

4.2.1
Business and corporate strategic plans

The chemical company has developed an international operations strategy, doing business worldwide through its subsidiaries. The international operations strategy includes building local manufacturing facilities in different countries, that are part of a multisite production network configuration, supported by global suppliers (Grillo et al., 2018).

The multinational chemical corporation develops an annual budget and strategic plans that cover a longer term horizon. The budget and the strategic plans are built as a result of a few rounds of negotiation between the corporate headquarters and each individual subsidiary. Targets are provided by corporate headquarters to all subsidiaries that develop their own local strategic plans and budgets accordingly. The subsidiary's proposal is then submitted to the chemical company headquarters for approval or more adjustments are requested.

The chemical company adopted S&OP globally to standardize its planning process and ensure everybody's alignment. The S&OP information from all subsidiaries worldwide is consolidated using a global software tool, developed in-house, that is accessed also by executives in high hierarchical levels, including the CEO. S&OP is considered an important planning process initiative to bridge the corporate strategic plan to operations.

4.2.2
Context

The Brazilian subsidiary commercializes around 300 SKUs in different product categories of consumer products, delivering to approximately 350 clients, mainly distributors and retailers. It is responsible for bringing in revenues of around US$350 million. The sourcing is complex: the majority of the items (75%)

is produced in the subsidiary's plant in the north region of the country, around 20% of the products are outsourced and other 5% are imported from different countries (e.g., USA, Canada, Argentina and Mexico). Additionally to the manufacturing plant, the subsidiary has two distribution centers (DC) strategically located to service the entire country. The planning horizon is 18 months and the strategy is make-to-stock and buy-to-stock, based on sales forecast.

4.2.3
Inputs

The main inputs for the S&OP process are the marketing plan, including the new product launches, the trade promotions, and the portfolio of products; the demand plan, based on the mathematical demand forecast and inputs from professionals; the constrained supply plan, built on production capabilities simulations in different operations scenarios and information from suppliers; the inventory position, including raw materials, packaging materials, work in progress, finished goods and inventory in transit; the open customer orders; the open purchasing orders with expected arrival date; the costs; the prices; and the budget figures. This information is kept updated in the ERP system. The demand plan is built based on market information from different sources to achieve the organization's objectives and deliver budget. The Brazilian subsidiary keeps track of 60% of its customers' sellout and monitors the inventory of key customers. The demand and the supply plans by SKUs are converted to financial figures to be evaluated in local currency and US dollars. The in-house S&OP system is updated with all information generated in each step of the cycle by the subsidiaries worldwide, including meeting minutes, pending issues, presentations and plans, among others, standardizing the process globally.

4.2.4
Structure and processes

In the Brazilian subsidiary, there is a known monthly calendar of S&OP meetings for the year. Sometimes, as observed, schedule adjustments may occur, since they do not affect the cycle's proper execution.

There are defined participants representing all the business functions involved in the process (marketing, trade marketing, sales, supply chain, demand planning and finance) working collaboratively with clear roles and responsibilities. Other business functions may interact with the process, providing and receiving information, but do not attend the regular meetings, only by exception (e.g., production, research & development, and logistics).

The demand planning manager has a double hat, also responding as S&OP manager. The S&OP manager organizes the meeting calendar, attends all the meetings, ensures that the S&OP system is properly updated by whoever is the person responsible in each step, keeping track of indicators and targets, and making part of the presentations.

The Brazilian subsidiary's directors and general manager attend meetings and sponsor the process. S&OP is well stablished in this organization, accepted by everybody, and considered the most important planning process by the executives. Managers and directors have S&OP indicators and their correspondent targets associated directly to their annual appraisals thus impacting their individual performance bonus and their career progress.

The chemical company's 5-step S&OP cycle is slightly different from Wallace and Stahl's (2006) model and is described next. Even though Data Gathering's activities are performed every month, the ERP system update is not considered part of the S&OP cycle in this organization. Moreover the first step in the S&OP cycle is the Marketing Planning and happens in the first week of the month. During Marketing Planning, the marketing plans and the portfolio of products are reviewed. Market trends and competition are assessed based on the consultancy firm Nielsen's reports and other sources of information. These reports are key for the decision-making process and are available for all product categories only once every quarter due to the periodicity of the different category

reports. Because of that, the Brazilian subsidiary did not have this meeting on a monthly basis for a while. This is a non-compliance, considering the chemical company's standard S&OP process, and it has been recently corrected. Marketing owns the first step and trade marketing and demand planning (S&OP manager) attend the meeting too. There is a second regular meeting with the same attendees in this first step, that has been always performed on a monthly basis, to translate all the marketing analysis and initiatives into demand figures.

Demand Analysis is step two, performed in the second week, when the unconstrained demand plan is built. It is equivalent to Wallace and Stahl's Demand Planning step. The demand of almost 85% of the portfolio items are determined solely by mathematical demand forecast calculation and the other 15%, involving especial trade promotions, changing market trends and new product launches, are treated by exception. Sales owns the process in this step and marketing, trade marketing and demand planning (S&OP manager) attend the meetings. The new product launches' demand is planned with 18 months of anticipation and included in the S&OP plan but there are scheduled reviews each quarter in the 9 months prior to the launch date to ensure demand and supply alignment.

The South-American regional planning team has skilled people trained in demand planning and uses an IT tool called Advanced Planning and Optimizer (APO) from the ERP SAP to generate the mathematical demand forecast, based on historical data, at an aggregate level and also opened by SKUs. The mathematical demand forecast by SKU is reviewed in the sequence by the Brazilian subsidiary's demand planner.

Supply Analysis is the third step of the process, equivalent to Supply Planning, when the Brazilian supply team analyzes the unconstrained demand plan and verifies the subsidiary's capacity constraints regarding production and sourcing. The supply team generates the feasible supply plan and points out the identified gaps in the third week of the month. The supply chain area owns this process step and the demand planning manager (S&OP manager) attends this step meeting too.

Finance is responsible for building the local budget, based on the inputs gathered from all areas and based on the targets provided by company's

headquarters in the USA. It also keeps track of it along the fiscal year. Prices are defined in the budget but may be reviewed, if needed, by sales, marketing, trade marketing and finance, based on the actual product margins and on the market business environment. Finance is the owner of the fourth step of the S&OP cycle, Pre-meeting, which is performed in the fourth week of the month. Finance simulates the different scenarios and gap mitigation plans developed in the previous steps from a financial stand point. Finance makes recommendations and finalizes the S&OP plan, comparing it with budget and also determining the profit-and-loss (P&L) expected results. The attendees in the Pre-meeting step are the finance manager and the demand planning manager (S&OP manager). All information is taken to the Executive Meeting.

The Executive Meeting is the fifth step of the cycle that happens in the fourth week of the month. The demand planning manager (S&OP manager) uses the S&OP system tool to present to the General Manager and all directors the S&OP plan proposal for approval. They also review the key performance indicators and P&L projections and make decisions. Pending issues that remained are resolved at this moment but they are not many as there is a director responsible for each previous step, with autonomy to decide in his area.

The S&OP system is the tool to document all the information by subsidiary and thus it gathers and consolidates the results around the world. In this sense, the chemical company has a kind of sixth cycle step, similar to a Global Roll-up. The seventh step, Global Executive Meeting, is not implemented even though the information is made available to be analyzed by different levels of executives in the hierarchy, it is analyzed consolidated by region every month and it was said in interviews that the CEO occasionally audits it. The global steps are discussed in detail in chapter 5 for all the studied companies.

Many dedicated software programs and customized spreadsheets are utilized to perform the S&OP process. SAP is the company's ERP used in many activities, especially during supply planning. Nielsen's data bank is consulted for market information and is especially important during Marketing Planning. During Demand Analysis (Demand Planning step), a spreadsheet is used by the sales team to consult customers' inventory and sellout to consumers (60% of the boxes sold). All demand premises adopted are registered in another spreadsheet

that is attached to the demand figures to create the demand plan. These two spreadsheets are formal documents always used to perform the S&OP cyclic activities. APO is used to determine the mathematical demand forecast. Business Planning and Control (BPC) is a package of the SAP ERP used by finance to make simulations and P&L projections for different scenarios and for the S&OP plan. It is key for the Pre-meeting step. The S&OP system tool documents and displays all information about the process. The plant has IT tools dedicated to support production planning and scheduling at the shop floor level. Many professionals from different business functions use spreadsheets for several purposes, usually to handle information in formats that the ERP standard reports do not provide.

Table 4 presents a summary of the 5-Step S&OP cycle performed by the Brazilian subsidiary.

Table 4 - 5-step S&OP cycle performed by the Brazilian subsidiary.

Step	Participants	Activities
1. Marketing Planning	Marketing (owner), Trade Marketing and Demand Planning (S&OP manager)	Review the marketing plan, portfolio and monitor the competition. Execute the Pre-Demand Planning meeting to translate marketing insights in demand figures.
2. Demand Analysis (Demand Planning)	Sales (owner), Marketing, Trade Marketing, and Demand Planning (S&OP manager)	Generate the unconstrained demand plan.
3 Supply Analysis (Supply Planning)	Supply Chain (owner) and, Demand Planning (S&OP manager)	Build the supply plan, map the gaps to deliver the demand plan and possible mitigation actions.
4. Pre-meeting	Finance (owner) and Demand Planning (S&OP manager)	Generate the S&OP plan proposal with financial analysis, simulating different scenarios and mitigation plans to provide recommendations to senior executives.
5. Executive Meeting	General Manager, Directors and S&OP manager	Review the S&OP plan proposal, P&L projections and KPIs; Approve chosen final plan.

Source: Adapted from Seeling et al. (2019)

There are many metrics used in the S&OP process. In Marketing Planning, the main metrics utilized by SKU and aggregate are market share, distribution (e.g., units, value, and geography), inventory turns, revenues, sales growth, margins, profit and SKU count. In Demand Analysis, the metrics used are the sales forecast indicators Mean Absolut Percent Error (MAPE) by SKU and the percentage error in number of boxes sold. The frozen forecast period is three months. Other KPIs include Fill Rate (units delivered to customers versus units requested) and main customers' sellout (boxes sold to consumers) and days on hands (inventory coverage measured in days of average demand). In Supply Analysis, the most used performance indicators are shortages and excesses (respectively SKUs below the projected inventory level and above it). Shortages are analyzed based on historical data to determine the causes. The operational costs, extra expenditures, and inventory value are also reviewed, among others. In Pre-meeting, the P&L is analyzed focusing on revenue and profit. In the Executive Meeting, all previously described metrics are reviewed and the executives evaluate the S&OP process to improve it. The performance indicators are registered for historical evaluation in the S&OP system.

4.2.5
Outcomes and results

The S&OP process adopted in the Brazilian subsidiary generates a marketing plan, an unconstrained demand plan, a supply plan with existing capacity constraints, and an approved S&OP plan with financial analysis with an 18-month time window. In the Brazilian subsidiary, there is just one consolidated and agreed-upon plan that internally aligns demand and supply and expected financial results tied to the corporate plan. The S&OP plan includes all new product launches.

4.3
The pharmaceutical company

The pharmaceutical company was founded in Germany and has been in the market for over 350 years. It characterizes itself as a pharmaceutical and chemical company leader in technology and science. The company has more than 57 thousand employees and operates in 66 countries, bringing in approximately 16 billion Euros. In Brazil, it has been present for almost one hundred years and has around 1200 employees, invoicing US$ 380 million per year. Latin America represents 6% of the revenues, Brazil being the biggest market in the region. The company operates globally in the segments of health care (medicines and devices used in the treatment of patients) and research and production of biotechnology products and chemical products.

4.3.1
Business and corporate strategic plans

The pharmaceutical company builds its corporate plan negotiating targets with and providing guidelines to the subsidiaries worldwide. As the pharmaceutical company produces medicines for serious diseases (e.g., cancer, heart diseases, endocrinology medicines, fertility products, and hormones), the forecast depends on the number of patients in each country, which is monitored by marketing. Local plans and budgets are developed and agreed between each subsidiary and the global headquarters. All subsidiaries' plans are consolidated at the corporate level, building the corporate business plan. There are four opportunities along the year for each subsidiary to revise the budget figures with the headquarters providing a better forecast, based on the IBP process analysis and outcomes. They relaunched their S&OP years ago, conferring more importance to finance and focusing on results, being the implementation supported by a consultancy firm. Additionally, the strategic plan is reviewed annually with long term view.

4.3.2
Context

The Brazilian subsidiary commercializes around 250 SKUs. It has one industrial plant that produces for the local market and exports to seven countries. The majority of the products are locally manufactured but there are also imported SKUs. In Brazil, there are a plant warehouse and a distribution center. The subsidiary has 200 customers, mainly drugstores, medical clinics, hospitals, and specialized distributors. The planning horizon is 18 months and the strategy is make-to-stock and buy-to-stock, based on sales forecast.

4.3.3
Inputs

The main inputs for the IBP process are the marketing plan, including the new product launches and the portfolio of products; the demand plan, prepared by marketing based on a deep knowledge of the market and the number of patients in Brazil, which is obtained by a team of technical marketing representatives that visit the medical doctors and by information provided by drugstores, medical clinics and hospitals; the constrained supply plan, built on production capabilities simulations in different operations scenarios and information from suppliers; the inventory position, including raw materials, packaging materials, work in progress, finished goods and inventory in transit; the open customer orders; the open purchasing orders with expected arrival date; the costs; the prices; and the budget figures. This information is kept updated in the ERP system. The demand plan and the supply plans are built in SKUs. Finance converts it to Brazilian Reais and Euros.

4.3.4
Structure and processes

In the Brazilian subsidiary, there are defined participants representing the different business functional areas (Marketing, Sales, Supply Chain and Finance)

working in collaboration. Other business functional areas may interact with the process, providing and receiving information, but do not attend the regular meetings, only by exception (e.g., Production, Quality, and Logistics). There is a calendar of cycle meetings for the year.

The pharmaceutical company calls its new process deployed worldwide as IBP to differentiate from their previous S&OP, which did not achieve the expected results. The company's IBP process is focused on delivering financial results and confers to finance an important role.

The demand planning manager reports to the supply chain director and has a double hat, also responding as S&OP manager. The S&OP manager organizes the meeting calendar, attends all the meetings, keeping the process pace.

The Brazilian subsidiary's directors and general manager attend meetings and sponsor the process.

The IBP cycle performed by the pharmaceutical company has 4 steps, being slightly different from Wallace and Stahl's (2006) model. Data Gathering's activities are performed in the beginning and during the month but are not considered part of the IBP cycle in this organization.

Moreover the first step in the cycle is Demand Meeting and happens in the first week of the month. During Demand Meeting, the unconstrained demand plan is built by marketing. Sales also participates but marketing owns this step as it is responsible for monitoring the market and the patients.

Supply Meeting is the second step of the process, when the demand planning manager analyzes the unconstrained demand plan and verifies the subsidiary's capacity constraints regarding production and sourcing, supported by manufacturing, international commerce and logistics areas. Supply chain business functional area owns this process step.

During Demand Meeting and Supply Meeting the plans are built in units by SKU and not in financial figures. Finance participates in these steps by exception. The company believes that it avoids the pressure of the budget over the planning process in the early steps.

Finance is the owner of the third step of the IBP cycle, Pre-meeting, which is performed in the fourth week of the month. Finance simulates the different scenarios and gap mitigation plans developed in the previous steps from a

financial stand point. Finance makes recommendations and finalizes the IBP plan, comparing it with budget and also determining the profit-and-loss (P&L) expected results. The attendees in the Pre-meeting step are the finance manager and the demand planning manager (S&OP manager). All information is taken to the Executive Meeting.

The Executive Meeting is the fourth step of the cycle and it also happens in the fourth week of the month. The demand planning manager (S&OP manager) presents to the general manager and all directors the S&OP plan proposal for approval. They also review the key performance indicators and P&L projections and make decisions.

Financial projections built during the IBP process are shared on a monthly basis with the pharmaceutical company headquarters from all subsidiaries worldwide. There are four opportunities to review and update the forecast along the year. That is somehow similar to a sixth step, Global Roll-up, as S&OP information, mainly financial figures, is gathered from all subsidiaries worldwide and sent to the headquarters. A seventh step, Global Executive Meeting, is not implemented but information is made available to be used by different levels of executives in the hierarchy and it is analyzed consolidated by region.

4.3.5
Outcomes and results

The IBP process implemented generates an unconstrained demand plan, a supply plan with existing capacity constraints, and an approved IBP plan with financial analysis. In the Brazilian subsidiary, there is just one consolidated and agreed-upon plan that internally aligns demand and supply and expected financial results tied to the corporate plan.

4.4
The personal and home care products company

The personal and home care products company was founded in the United states of America more than 180 years ago. It commercializes an extensive

portfolio of consumer goods of recognized brands. It is present in 180 countries and has around 130 thousand employees worldwide, bringing in approximately US$ 71 billion. In Brazil, it has been present for more than 30 years and has around 4500 employees, with revenues of US$ 508 million per year.

4.4.1
Business and corporate strategic plans

The personal and home care products company builds its corporate plan negotiating targets with and providing guidelines to the subsidiaries worldwide focusing on revenue and profit growth year over year. The local strategic plan and the budget of the Brazilian subsidiary are developed in agreement with the company's corporate headquarters. All subsidiaries' plans are consolidated at the corporate level, composing the corporate business plan. The strategic plan is reviewed every year with long term view.

4.4.2
Context

The Brazilian subsidiary operates in eight product categories focusing on personal hygiene and household cleaning, commercializing a portfolio of around 500 SKUs. The company has make-to-stock production. Among its approximately 15 thousand customers, there are distributors, wholesalers, and retailers. In Brazil, there are three production plants where most of the products sold in the country are manufactured. However, some products need to be imported from other countries and many SKUs manufactured locally are exported to other parts of the world.

4.4.3
Inputs

The main inputs for the S&OP process is the demand plan, including the new product launches and the reviewed portfolio of products. The supply capacity

is evaluated globally once a year, based on the demand and on the committed budget, consolidating all subsidiaries' figures worldwide. The capacity allocated to each subsidiary allows a certain level of flexibility. In case of sales surpassing much the top limit, the extra capacity must be officially requested to the global supply area at the headquarters to be evaluated. Supply capacity reserved for each subsidiary is documented in a kind of internal annual contract. Additionally, other inputs include, among others, inventory position (raw materials, packaging materials, work in progress, finished goods and inventory in transit), the customer open orders, purchasing open orders and expected delivery dates, costs, prices, and the budget figures. The company has put efforts to implement one ERP system worldwide in order to standardize also the main processes. The demand plan is built in SKUs and financial figures since the beginning of the S&OP cycle, which always seeks to deliver budget.

4.4.4
Structure and Processes

In the Brazilian subsidiary, the participants of the S&OP team represent the different business functional areas (e.g., marketing, sales, supply chain and finance, among others) and work in collaboration. A calendar of cycle meetings is followed every month.

The Brazilian subsidiary's directors and country president attend the meetings and sponsor the process.

The S&OP cycle is slightly different from Wallace and Stahl's (2006) model. Data Gathering, likewise other companies previously presented, is not considered a cycle-step in this organization. Moreover, its steps are called differently: (1) Data Analysis, in which regional analysts calculate the demand forecast; (2) Pre-team Meeting, which is an optional meeting frequently handled to prepare the Team Meeting; (3) Team Meeting, which is pretty much a demand meeting with active participation of several S&OP stakeholders, including finance; (4) Pre-meeting; (5) Executive Meeting; and (6) S&OP Plan Upload.

The company has a culture of managing sales from a financial standpoint to deliver or surpass the budget figures. Finance is active in practically all the steps of the S&OP process. It is always present in the Teams Meetings (Demand Meetings) held by product category, as part of the designated team. The representative from finance proactively exorts the team to prioritize the sales of products with the best margins and challenges the numbers to deliver or surpass the budget goals. Discussions around the role of finance in the organizations are held in detail in chapter 6.

There is no formal supply meeting because, as it was previously explained, the capacity is assured within previously established limits.

Marketing, sales, and finance take part in the Pre-meeting to generate the S&OP plan proposal. Finance officially owns Pre-meeting, being represented by the director or senior manager. This is the last opportunity for marketing and sales directors from all product categories to review and adjust the S&OP plan proposal presented in units and value to match budget figures.

In the Executive Meeting, all directors are always present to examine and approve the S&OP plan. All product categories below the target have their numbers questioned by the finance director and challenged by the president. Plans that do not achieve the committed financial results are often rejected.

4.4.5
Outcomes and results

The S&OP generates an approved S&OP plan with financial analysis and tied to the corporate plan.

4.5
Discussion of results and key findings

S&OP is considered a key planning process to manage the business by all four companies studied, supported and sponsored by their top executives (e.g., local directors and general manager or country president and C-suite and the CEO). This point was made clear by the interviewees and was confirmed in field

observations. As a consequence, resources (e.g., people, infra-structure, time, and systems) are made available to perform S&OP properly, in line with best practices presented by many authors (e.g., Wallace and Stahl, 2006; Snow, 2007; Grimson and Pyke, 2007; Thomé et al., 2012a). Wallace and Stahl (2006) points out the importance of the senior executives' sponsorship for a successful S&OP. Additionally, Baumann (2010) reinforces this same idea by including it as a key characteristic of highly mature implementations.

The message that S&OP is important is reinforced in different ways in the day to day in the studied organizations. In the consumer goods company and in the chemical company, the subsidiaries are periodically audited by the headquarters to check its compliance with their corporate standard S&OP process. In the chemical company, there are on line courses to spread the S&OP knowledge among the employees and they have to attend them accordingly to their roles, responsibilities and needs. Moreover, the executives from all four companies have targets in their annual appraisals linked to KPIs, including S&OP indicators (e.g., forecast accuracy, service level, costs, revenue, and profit, among others) and consequently their variable salary and their career progress also depend on these results. That is consistent with mature S&OP implementations as indicated by Grimson and Pyke (2007), Cecere (2009), and Bauman (2010). Snow (2007) considers that incentives to employees and executives may be applied to help improve the process performance. S&OP indicators are also included in the agreement with the trade union to define performance criteria for profit sharing in the consumer goods company and in the chemical company.

In general, a S&OP system is a tool to ensure the proper process flow and to document the cycle execution but it also standardizes the process. In the chemical company and in the personal and home care products company , it allows comparisons of results among the subsidiaries and can be accessed by executives in tactical positions and even in high hierarchical levels. This kind of software helps to ensure the correct pace of the process step by step, with the involvement of the designated people to contribute or to approve and has tools to perform mathematical demand forecast. The subsidiaries in the consumer goods company and in the pharmaceutical company use spreadsheets and share points to keep its S&OP files and registers. The chemical company developed a customized

in-house system to document and keep track of its S&OP process worldwide. The personal and home care products company uploads the subsidiaries' S&OP plans in a global system. All of the studied companies use dedicated systems to perform mathematical demand forecast to support the Demand Planning step.

The four companies and their five subsidiaries are complex organizations, which can be illustrated by their number of employees, multi- facility structure, large portfolio of SKUs, customer base, many suppliers, revenues, costs, geographic distribution, industry type, frequency of product launches, among others. The need of a robust planning process like S&OP becomes more important as organization's complexity increases (Wallace and Stahl, 2006). S&OP produces a positive impact on supply chain performance (Nemati, 2017) and on manufacturing companies' operational performance, which is potentialized when the complexity increases (Thomé et al., 2014a). The process may improve the firm results (Thomé et al.'s, 2014b) and the S&OP plan adoption by the entire company is a key success factor to achieve it (Snow, 2007).

Goh and Eldridge (2019) bring a different perspective and indicate that a very formalized S&OP might sometimes inhibit the firm performance and recommend some flexibility to respond to unplanned issues. All five studied subsidiaries perform a standardized S&OP process running for years but other business as usual activities are also performed in parallel within the business functions, allowing the organizations to respond to unexpected issues in the short term. Any changes in the plans are reflected in the S&OP in the earliest opportunity. Examples of short term issues mentioned during the interviews are difficulties to achieve revenue targets and promotions that are not bringing the expected results, delays in operations or customer credit restrictions blocking sales. In these situations, not necessarily the correction comes only in the next cycle and usually action plans are immediately put in place to mitigate the problems, frequently generating extra costs or impacting the inventory. Emergency use of the inventory now may cause rush orders to supply the demand of the coming cycles. Exceptions happen and a good recent example is the impact of the COVID-19 pandemic on the supply chains. The pharmaceutical company, for instance, had to rent three airplanes to distribute medicine around the country as the regular flights were dramatically diminished. Lack of raw material and

reduction in the ocean freight offer with cost increase were also problems faced during the COVID-19 pandemic. Another example, during a stronger dengue epidemic a few years ago, the chemical company was not prepared enough to attend the unexpected demand of products to repel and to kill mosquitoes and had extra costs in sourcing, manufacturing, and logistics.

So it is important to reinforce that, although the S&OP cycles in these companies start with unconstrained demand plans and they have organized cycles, they always do their best to deliver or surpass the budget figures committed with their headquarters.

According to the Aberdeen Group, the industry average is 92,5% for customer service levels and 73% for forecast accuracy by product family (Viswanathan, 2009). Considered a sensitive theme, even though the names of the studied companies are not disclosed, the majority of the KPIs were partially shown and were not authorized to be published and rarely it was possible to see long historical series that could attest to improved results over time. Typically the KPIs in the studied companies include service levels and forecast accuracy with similar results or slightly above the industry average. Additionally, new product developments (NPD) are usually executed timely.

Cecere (2009) discusses the benefits of a demand-driven S&OP implementation, listing possibilities of revenue increases between 2% and 5%, inventory reductions between 7% and 15% and improvements in NPD of up to 20%, if properly implemented and under specific conditions. Goh and Eldridge (2015) present two cases of success in China. One company obtained 52% of improvement in forecast accuracy and a 30% reduction in the inventory. A second company reduced the order lead time of new product launches by 67%. According to Goh and Eldridge (2015), both companies did not have solid processes in the beginning and obtained these high results right after the S&OP implementation. Field observations and analysis of documents and metrics indicate that S&OP has been a key planning and supply chain process to manage the complexity and dynamic changes, keeping all business functions aligned towards the objectives in the studied companies and its subsidiaries.

The S&OP cycles in the studied organizations are all based on Wallace and Sthal's (2006) five-step framework but the companies have introduced a few significant changes.

The consumer goods company performs a "classic" five-step cycle. It is the only one that still considers Data Gathering the first step of the process. The other companies assume that information is uploaded dynamically along the month and disregard this step.

The chemical company and the personal and home care products company have, as their first step, a meeting to review portfolio and prepare their Demand Planning meetings. Indications point to portfolio analysis becoming a trend in the preparation of the S&OP cycle (Seeling et al., 2021a). All companies have a similar Demand Planning step. It is interesting to note that, in the pharmaceutical company, marketing owns this step and provides the demand forecast while in the other companies the sales team does it. This is an example of differences caused by the specific context.

The personal and home care products company does not have a Supply Planning step, differently from the others. Supply to attend the demand plan is assured by the global supply team within negotiated limits in this company.

The Pre-meeting step is owned by finance with a key role in three out of the four companies, with the exception of the consumer goods company. In this company, the Pre-meeting is not always held when the supply and demand plans match or are very close and finance supports the other functional areas as needed and attends the Executive Meeting.

All companies perform an Executive Meeting to approve the S&OP plan.

The pharmaceutical company named its process IBP instead of S&OP to reinforce the importance of all functional areas collaborating integrated, to evidence the role of finance in the process and the focus on financial results. The IBP concept put focus on finance and financial results, which adds value to the process, as reinforced by Van der Drift (2018a, 2018b).

The S&OP processes performed by the other three companies have the same characteristics: integration, collaboration and focus on financial results. In the consumer goods company, finance is less protagonist in the S&OP process but it is for sure in the chemical company and in the personal and home care products

company. The research, even though considering its limitations in terms of the size of the sampling, indicates that IBP can be considered a mature stage of S&OP implementation, in accordance with Baumann (2010). That is the conclusion comparing the studied companies and responding to part of the objective I of this thesis.

The S&OP processes are very standardized in the five subsidiaries studied, with clear procedures and responsibilities assigned. In general, the steps are executed according to known calendar and documented. The processes are similar to Wallace and Stahl's (2006) model and can be perfectly described by Thomé et al.'s (2012a) framework. The implementations are consistent with intermediate to high maturity levels as described by Grimson and Pyke (2007), Lapide (2005b) and Danese et al. (2017).

Some of the key findings regarding the S&OP characterization are:

a) All studied companies consider S&OP a key process to bridge strategy to operations and to plan the business, integrating the different business functional areas. This vision is deployed to all subsidiaries.
b) All studied companies perform a S&OP cycle inspired and similar to Wallace and Stahl's (2006) model, which could be perfectly described by Thomé et al.'s (2012) framework.
c) All of companies incorporated changes in the classic five-step model to adapt to their context and their culture.
d) There is a trend, also confirmed in Seeling et al. (2021a) not to consider Data Gathering a process step anymore and to include a portfolio assessment step before Demand Planning.
e) The characterization of the IBP process does not differ from a mature S&OP implementation, which incorporates finance planning, focuses on profit maximization (while balancing demand and supply), and put finance in a key role, as important as marketing, sales and operations.
f) Some of the main characteristics of the S&OP / IBP process observed in the studied companies are: top executives sponsor the process; there is a designated empowered team with roles and responsibilities working collaboratively; there is a S&OP manager; cycle meetings occur according to a defined calendar; the process starts with unconstrained

demand but in the end usually seeks to deliver or surpass the committed budget aligned with corporate plan; several IT tools are used to support the activities (ERP, dedicated S&OP software, demand forecast system, spreadsheets etc.); there are standard documents produced along the cycle; there is a defined dashboard of KPIs monitored; it reconciles the business functional areas' plans to build one plan for the organization that seeks to maximize profit; some global corporations consolidate the information from their subsidiaries to use it.

Table 5 presents a resume of the characterization of the S&OP performed in the four companies studied.

Table 5: Characterization of the S&OP of the four companies studied.

	Consumer goods company		Chemical company	Pharmaceutical company	Personal and home care products company
Context	Headquarters in USA, subsidiary in Mexico, consumer goods (plastic products, office products and hand tools) for mass market, 4000 SKUs, 2000 customers, no industrial plants, 1 DC, buy-to-stock, 18-month planning horizon	Headquarters in USA, subsidiary in Brasil, consumer goods (plastic products, office products and hand tools) for mass market, 6500 SKUs, 8000 customers, 2 industrial plants, 2 DCs, make-to-stock and buy-to-stock, 18-month planning horizon	Headquarters in USA, subsidiary in Brazil, chemical products (pesticides, waxes, cleaning products for home usage) for mass market, 300 SKUs, 350 customers, 1 industrial plant, make-to-stock and buy-to-stock, 18-month planning horizon	Headquarters in Germany, subsidiary in Brazil, pharmaceutical products (medicines and other health products) for hospitals, special distributors and pharmacy chains, 250 SKUs, 190 customers, 1 industrial plant, 2 DCs, make-to-stock and buy-to-stock, 18-month planning horizon	Headquarters in USA, subsidiary in Brazil, hygiene and personal care products, laundry and cleaning home care products of recognized brands for mass market, 500 SKUs, hundreds of customers, 3 industrial plants, a net of DCs in Brasil, make-to-stock and buy-to-stock, 18-month planning horizon
Business Plan & Strategic Plan	Corporate strategic plans, global budget and targets are deployed to the subsidiaries. Local budget, strategy and plans developed in agreement with corporate headquarters	Corporate strategic plans, global budget and targets are deployed to the subsidiaries. Local budget, strategy and plans developed in agreement with corporate headquarters	Corporate strategic plans and global budget and targets deployed to the subsidiaries. Local budget, strategy and plans developed in agreement with corporate headquarters	Corporate strategic plans and global budget and targets deployed to the subsidiaries. Local budget, strategy and plans developed in agreement with corporate headquarters	Corporate strategic plans and global budget and targets deployed to the subsidiaries. Local budget, strategy and plans developed in agreement with corporate headquarters
Inputs	Costs, prices, new products, promotions, business functional areas' plans (demand plan, supply plan and financial projections), budget, sourcing constraints, inventory etc.	Costs, prices, new products, promotions, business functional areas'plans (demand plan, supply plan and financial projections), budget, production capacity and sourcing constraints, inventory etc.	Costs, prices, new products, promotions, business functional areas' plans (marketing plan, demand plan, supply plan and financial projections), market information / Nielsen reports, budget, production capacity and sourcing constraints, inventory etc.	Costs, prices, new products, promotions, business functional areas' plans (demand plan, supply plan and financial projections only in Pre-meeting), special market information from health industry , clinical researches, governmental data, budget, production capacity and sourcing constraints, inventory etc.	Costs, prices, new products, promotions, business functional areas' plans (demand plan, supply plan and financial projections), market information / Nielsen reports, budget, production capacity and sourcing constraints, inventory etc.
Structure & Organization	S&OP, 5-step cycle (Data Gathering, Demand Planning, Supply Planning, Pre-meeting, Executive Meeting), Global Roll-up, kind of Global Executive Meeting, S&OP manual, supply planning manager is the S&OP manager, S&OP team assigned, calendar, meeting minutes, good collaboration, low engagement from finance, support from top executives, deck of KPIs reported to corporate headquarters	S&OP, 5-step cycle (Data Gathering, Demand Planning, Supply Planning, Pre-meeting, Executive Meeting), Global Roll-up, kind of Global Executive Meeting, S&OP manual, supply planning manager is the S&OP manager, S&OP team assigned, calendar, meeting minutes, good collaboration, low engagement from finance, support from top executives, deck of KPIs reported to corporate headquarters	S&OP, 5-step cycle (Marketing Planning, Demand Planning, Supply Planning, Pre-meeting, Executive Meeting), Global Roll-up, no Global Executive Meeting, S&OP home-made system, supply planning manager is the S&OP manager, S&OP team assigned, calendar, meeting minutes, good collaboration, high engagement from finance, support from top executives, metrics	IBP, 4-step cycle (Demand Planning, Supply Planning, Pre-meeting, Executive Meeting), Global Roll-up, supply planning manager is the S&OP manager, S&OP team assigned, calendar, meeting minutes, good collaboration, high engagement from finance, support from top executives, metrics	S&OP, 5-step cycle (Data Analysis, Demand Meeting by category = Business Review Meeting, Pre-meeting, Executive Meeting = Sufficiency Meeting, Data Upload), there is no Supply Meeting, there is a supply agreement, Global Roll-up, no Global Executive Meeting, supply planning manager is the S&OP manager, S&OP team assigned, calendar, meeting minutes, good collaboration, high engagement from finance in all cycle steps, support from top executives, metrics
Outcomes & Rsults	S&OP plan (business functional areas' plans reconciled and agreed)	S&OP plan (business functional areas 'plans reconciled and agreed)	S&OP plan (business functional areas' plans reconciled and agreed)	IBP plan (business functional areas' plans reconciled and agreed)	S&OP plan (business functional areas' plans reconciled and agreed)

5
Global Roll-up and Global Executive Meeting steps

Chapter 5 presents the global S&OP process, highlights and discusses the results about benchmarking, global gains, local gains, and synergies with ERP implementation. More information about the global S&OP process in multinational companies can be found in Seeling et al. (2021b), including a detailed description of the framework of the S&OP process in 7 steps, built based on the field observations performed along the research. The questionnaire used in the interviews is particularly important in this effort to characterize the S&OP global steps in this chapter with specific questions regarding the Global roll-up and the Global Executive Meeting. This chapter addresses objective II of this thesis.

5.1
The global process

The Global S&OP process encompasses the Global Roll-up (Step 6) and the Global Executive Meeting (Step 7), according to Wallace and Stahl (2006). The Global Roll-up occurs when multinational corporations with presence in many countries spread along the globe need to consolidate the information regarding their S&OPs gathered from their subsidiaries. This information may be organized and put in front of the multinational corporations' top executives periodically in a meeting, allowing comparisons, insights, identification of business opportunities and consequently decisions can be made accordingly. This is the Global Executive Meeting performed only by some companies. These two global steps have not been investigated in-depth in the S&OP literature and this thesis brings one of its contributions addressing this research gap.

The companies studied in this research work consolidate and use the S&OP information from their subsidiaries differently.

In the consumer goods company, the global CEO and the C-suite support and monitor periodically the progress of the S&OP Global Project, created to

deploy the process to more than 50 subsidiaries worldwide. Every month, the global project leader presents the implementation status and shows the consolidated KPIs and results, based on the information gathered from each subsidiary worldwide. This is very similar to a Global Roll-up and a Global Executive Meeting steps, as described by Wallace and Stahl (2006). In these periodic meetings, the global executive team analyzes the whole corporation's and the subsidiaries' results regarding the S&OP process, making decisions, asking for additional information or requesting a corrective action plan, if issues are identified. This is a new process in the organization and still in a learning curve. It may continue the way it is being held or it may be changed when the S&OP global deployment comes to an end and the implementations mature. The CEO and the C-suite have a strategical role in the organization and do not want to micromanage the subsidiaries. The amount of information available to review is huge and the subsidiaries are in different maturity stages, some have run S&OP processes for years while others are implementing the first stages. It is difficult to compare results obtained from subsidiaries which are so different in terms of infrastructure, size, and complexity. The Brazilian and the Mexican subsidiaries individually are bigger businesses in structure, portfolio of products and revenue than all the other Latin American countries together. The business in the United States generates more than ten times the revenue obtained in total Latin America. The size of Brazil in millions of square kilometers is comparable to the United States but it has poorer logistics infrastructure, impacting on costs and service. The Brazilian subsidiary and the operation in the United States have a similar number of customers in total. But the order profile in Brazil is similar to United Kingdom's, mainly small and medium orders, less than a truck load. The customers' orders in the United States are mostly full truck loads. In some countries, the subsidiary has big industrial plants and distribution centers, carrying resources and inventory to supply the local market and to export (e.g., Brazil, China) while in others there are just an outsourced small distribution center and an office for the sales force (e.g., Puerto Rico, Chile). The executives in the Global Executive Meeting are learning and deciding how to deal with the consolidated information, considering all these differences among the subsidiaries. How these meetings are going to evolve is still an open subject.

In the chemical company and in the personal and home care products company, the S&OP information from each subsidiary is uploaded in their respective corporate systems, which can be consulted and used anytime. In the chemical company, all the information produced along the S&OP process is uploaded. In the personal and home care products company only the key information focused on the demand plan and financial figures is uploaded. In this company, "S&OP Upload" is how the last step of the process is named.

Similarly, the pharmaceutical company shares the results of its S&OP planning process with the corporate headquarters on a monthly basis, focusing on the financial figures. In the pharmaceutical company, there are four opportunities to review the year-end expected results with the corporate headquarters, based on the S&OP process planning and results. There is no Global Executive Meeting in these last three companies but all of them perform a kind of Latin American S&OP review, when results are compared, regional internal benchmarks are made and opportunities and issues treated.

5.2
Benchmarking

At the moment, in the consumer goods company, steps six and seven have been more important to monitor regularly the progress of the Global S&OP Project created to deploy the process to all subsidiaries worldwide. However, they create an unique opportunity to analyze the different subsidiaries and generate insights. It is possible to identify the best performances and the best practices regarding forecast accuracy, service level, and the S&OP assessment score. Groups have been created to discuss and share best practices as a consequence, suggested by the C-suite members. Even though corporate marketing works with the local subsidiaries' teams to explore opportunities related to portfolio management among regions and new launches, this information is now in front of the global executive team periodically. The same situation is applicable to spare capacity analysis performed by corporate supply around the globe, which starts to show up more often at headquarters' Global Executive Meetings. Because the

most senior executives are seeing these opportunities, sometimes changes speed up.

The chemical company also utilizes the S&OP data to perform internal benchmarking and share best practices, usually through the S&OP managers that are also the demand planning managers in the subsidiaries. By initiative of the company's headquarters, the demand planning managers / S&OP managers have meetings from time to time and the company also provides trainings to the employees regarding S&OP best practices adopted in the process.

The pharmaceutical company had a S&OP process running for years and has implemented its IBP process globally in replacement a few years ago. The implementation was supported by a consulting and software-house big firm and the process was standardized and integrated by systems. There are no Global Executive Meetings but there are regional S&OP meetings (e.g., Latin America) focused on financial results but also covering operations and supply chain subjects. In these meetings, business opportunities and internal benchmark can be explored (e.g., lack and excess of inventory among the subsidiaries in the region, outstanding performances that indicate a best practice to be shared and deployed).

The personal and home care products company is considered by the market as a reference in S&OP implementation globally. It has a strong culture of focus on financial results. Moreover internal and external benchmarking, usage of data science to guide business decisions and hiring consultancy firms to bring best practices are normal practices in the company. The company does not have a Global Executive Meeting and as a consequence benchmarking is performed using other ways and mechanisms in different hierarchical levels and in the business functional areas within the company.

5.3
Global Gains

In the consumer goods company, the global executive team is seeing benefits from the Global Roll-up during the Global Executive Meetings. Excess and obsolete products aging and occupying space demand fast solutions, plants with spare capacity may supply new markets or receive special orders. In the other

hand, plants with capacity constraints may receive investments earlier now. New product launches in new countries may be accelerated. Service level issues are going to be resolved quicker now that the CEO and the C-suite see them periodically. The global executive team has a holistic understanding of the business worldwide and power to sponsor changes. Topics as service levels, distribution costs, forecast accuracy, inventory levels and excess and obsolete inventory have become more important than ever in the Brazilian and Mexican subsidiaries because they are being reported to the consumer goods company headquarters. Vice-presidents, directors, and managers are often discussing these results. The number of new product launches has increased in Brazil and Mexico during the studied period and a small bow saw plant remaining in USA was transferred to Brazil as a consequence of a technology renovation and capacity expansion. These initiatives could not be solely attributed to the Executive Meetings but they coincide with the period and are aligned with the global strategy.

In the other three companies studied, as there is no Global Executive Meeting, the opportunities among regions and subsidiaries are mapped differently and not necessarily related to the S&OP process. All three companies perform regional S&OP meetings periodically owned by the supply and demand planning teams to review the achievement of committed results, which are also used to analyze and compare operational results, share best practices and see opportunities within the region. Financial results are also consolidated regionally by finance. But these meetings, although consolidate S&OP information, analyze it and use it, cannot be considered an Executive Meeting, as per Wallace and Sthal's (2006) concept.

5.4
Local gains and KPIs

The studied companies did not open their KPIs freely. In many opportunities it was possible to verify their indicators in internal documents and during some meetings and also talk about them in interviews but it was not possible to publish them. Some examples were presented in this thesis when

authorized or when it was public data. Overall the studied companies present results consistent with the average of the industry or above. All the investigated companies are leaders in their segments. In the studied subsidiaries, the historical data is contaminated by many outliers as, for instance, frequent new product launches and capacity expansions, as all of them have targets to increase sales year over year. Thus it is difficult to separate S&OP benefits from other business situations that impact their results. For instance, when a company is going to launch a new product line with many SKUs, the inventory coming from different sources is frequently built in advance and the corresponding sales will come weeks or even months later. That complicates the analysis of inventory levels versus sales. There is no doubt though that S&OP has been a key process to manage the complexity and move the companies towards their objectives. In all the companies studied, S&OP is the process to link the strategy and the objectives to execution and review the results and plan the business every month.

In the consumer goods company, the leader of the Global S&OP Project has celebrated the improvements obtained, pointed out good examples and initiatives, and communicated some preliminary good local results. So far, the company is still dealing with the difficulties to gather S&OP information in a comparable format from around 50 countries with many subsidiaries using different systems. The global S&OP implementation team developed a standard S&OP KPI dashboard to be adopted by the subsidiaries worldwide. Every unit has to report its results monthly using these performance indicators, calculated the same way, as explained in the S&OP manual. The KPIs cover different aspects such as costs, service levels, inventory data, forecast accuracy, and the S&OP assessment grade. As previous explained, the sizes of the subsidiaries vary from simple commercial small operations with a limited portfolio of products to complex organizations with huge revenues, more than a thousand employees and a portfolio of thousands of SKUs. Smaller organizations, scarce in resources, have difficulties to generate the information for the KPI deck as part of the information needs. They calculate KPI out of the system, in spreadsheets. Therefore, information is not entirely reliable with some data mistakes, miscalculations, and misinterpretations. Larger organizations face challenges to achieve high standards due to their complexity. Different criteria also make it difficult to compare the

performances as, for instance, subsidiaries with local plants that also export, carry extra inventory (raw materials, work in progress and finished goods) to supply other regions. They are responsible for inventory costs but the revenue is credited in the destiny unit as internal sales are made with transfer cost. Similar challenges have been faced for years to consolidate the financial results globally from different ERP systems, although these financial routines are mature now. The Brazilian subsidiary has improved service level, inventory is under control and forecast accuracy increased. The Mexican subsidiary has increased service level, the inventory is controlled against budget but forecast accuracy has not shown significative improvements yet. A better forecast accuracy might allow inventory reductions in the future.

Similarly, the chemical company has a well-defined process with standard formats and KPIs documented, which are uploaded in the company's customized S&OP system, including meeting minutes and standard spreadsheets, S&OP plan, among others. The company tracks the subsidiaries' forecast accuracy, inventory levels, service levels, costs, projected revenue and profit, among others. According to the demand planning manager and the supply chain director, S&OP is the most important process to run and keep the business on track.

In the Brazilian subsidiary of the pharmaceutical company, the interviewees were unanimous about the improvements obtained after the replacement of an unsatisfactory S&OP implementation for an IBP process that has helped integrate the areas and focus on results, operational and mainly financials. Finance was integrated in the process with an important role during Pre-meeting to lead the construction of the best feasible plan at the moment to maximize results and seek delivering budget figures. Costs, margins, revenues, profit, inventory levels, forecast accuracy and service levels are some of the typical KPIs monitored, among others.

In the Brazilian subsidiary of the personal and home care products company, there is a strong focus on delivering or surpassing the committed targets with the headquarters, especially revenues and profit that always reflect growth year over year. As previously explained, the supply for the year is assured by a contract with global supply area, based on the planned demand. Finance representatives are part of the S&OP team and are present since the initial steps of

the process, handled by category. Results, KPIs and market and business information are analyzed and reviewed in every S&OP process step to support the decision making process, such as: forecast accuracy, portfolio of products, market share, new launches, margins by product, revenues, profit, inventory levels, supply issues, and service levels, among others.

5.5
Synergies with ERP implementation

The global S&OP process may benefit from synergies with other management initiatives (Ackerman, 2011; VICS, 2010). Additionally, as the decision-making moves up to the C-Suite, the whole process becomes more focused on strategic issues (VICS, 2010).

In the consumer goods company, evidence from the case study seems to confirm the synergy effect between S&OP and ERP implementation and the gradual evolution from tactic to strategic planning due to the Global Roll-up and Global Executive Meetings steps. The company has put a lot of effort on a project to deploy an ERP implementation globally. It has been executed by regions and taken some years already, starting with USA, followed by Europe and then Asia/Pacific and finally Latin America. By having one ERP, the company will have advanced a large step towards the complete integration of its units, standardizing processes around the world and automatizing reports and KPIs' calculations, including the S&OP information.

Despite their sizes and number of subsidiaries, the chemical company and the personal and home care products company already have standardized their ERPs globally and both have their own system to upload S&OP data. These companies buy and sell divisions or acquire other companies from time to time, according to their business growth strategies. They also have to update the ERP's version eventually. These initiatives make it a continuous effort.

The pharmaceutical company changed its ERP system and implemented IBP simultaneously, supported by an important consultancy firm and software-house. The ERP already offers features to facilitate the IBP process execution. The company considers it a successful change.

Some of the key findings regarding the Global S&OP steps are:

a) Not all the studied companies perform the Global S&OP steps (6 and 7) as described by Wallace and Sthal (2006), which coincides with the authors that stated that some corporations with subsidiaries spread worldwide might need them.
b) All the studied companies consolidate their S&OP information globally using different ways. The consumer goods company has a kind of Executive Meeting and the other three companies have a regional meeting to review the S&OP results and plans.
c) The Executive Meeting held with the attendance of most senior executives of the companies, including the CEO and C-suite, presents challenges to deal with too much detailed information, which is gathered from subsidiaries with different contexts, structure and maturity; there are difficulties to standardize and consolidate the information; and the top executives do not want to micromanage the subsidiaries.
d) In the consumer goods company, which performs a kind of steps 6 and 7, the top executives in the Global Executive Meeting are monitoring the progress of the S&OP implementation deployment but they are now able to see business opportunities among the regions and accelerate changes. Additionally, the executives managing the subsidiaries increased their focus on S&OP KPIs and overall results that were now being presented to the global top executives.
e) Associated with the active participation of the CEO and the C-Suite in the meetings, the focus of the Global S&OP tends to become more strategic.
f) Although preliminary positive results have been obtained by the consumer goods company, it is not yet clear how the company will get full benefits from the approach and how it will manage its current challenges. There is still a long way to go to synchronize the S&OP efforts from each subsidiary towards a global S&OP planning.
g) As a result of the steps 6 and 7, global gains were identified as well as local gains and synergies with ERP implementations.

Figure 3 offers Seeling et al.'s (2021b) Global S&OP framework built based on research and field observations at studied companies, which presents some of the key findings of the study.

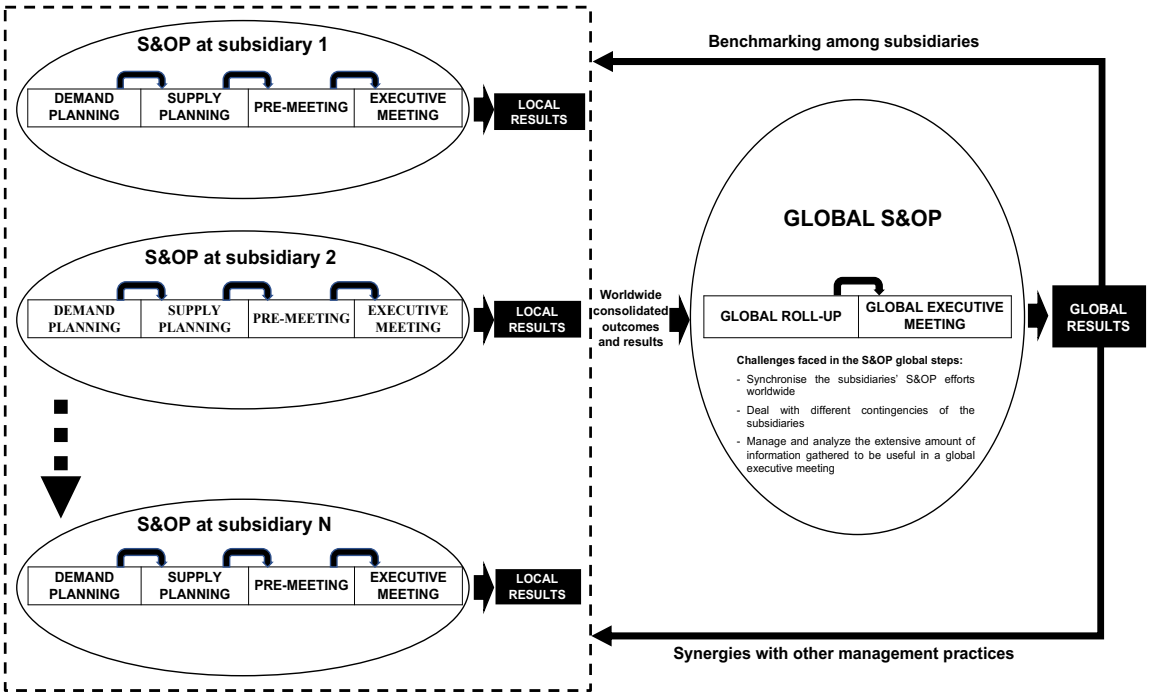

Figure 3: The Global S&OP at studied company.
Source: Adapted from Seeling et al. (2021b).

6
The role of finance in the studied organizations

Chapter 6 presents the role of finance in the S&OP / IBP process performed in the studied companies. The role of finance in S&OP, although commented in different research works as previously presented, is still an under-researched theme and a literature gap to be fulfilled. This thesis offers a contribution to the S&OP knowledge by investigating in-depth the role of finance in multinational corporations. More information about the subject can be found in Seeling et al. (2022), including a detailed description of the framework of the role of finance in the S&OP process, built based on the field observations of the research. The questionnaire used in the interviews is very important in this effort to characterize the role of finance in the S&OP process. It has specific questions for top executives and for managers and staff focused on what happens in each process step allowing to analyze how finance participates in the cycle. This chapter addresses the objective III of this thesis.

The discussion about the results regarding the role of finance in the S&OP / IBP process is threefold. First, there is a two-way communication road going from finance to the S&OP / IBP process, and vice-versa. Second, the role of finance in the subsidiaries is scrutinized using the classic five-step Wallace and Stahl's (2006) framework. Finally, actual finance participation is confronted with the expected role of finance according to the literature on the theme.

6.1
The two-way communication role of finance

In the consumer goods company, the S&OP process provides valuable information to finance in the Brazilian and in the Mexican subsidiaries. The S&OP process generates and shares monthly updates regarding potential revenue upsides and downsides with root-cause analysis, production and supply constraints and mitigation plans, excess and obsolete inventory information, new products, promotions, and the company's KPI deck, being also a source of

information for capital expenditure needs. During Data Gathering, the first step of the cycle, performed in the beginning of the month, the ERP is fed with fundamental information to run the business and for financial analysis and control. But information is dynamically updated along the entire period. Examples are sales forecast, supply orders, production orders, product expected arrival dates, inventory on hands and in transit, invoicing, headcount, orders delivered to customers, capital expenditures, among others. S&OP has contributed to improve return on assets and cash flow in both subsidiaries, by carrying out its mission of balancing demand and supply, rightsizing the inventory.

On the other hand, it is noticed that the participation of finance is still weak along the S&OP cycle in both subsidiaries. The standard process in the consumer goods company, which is described in the S&OP manual, suggests the participation of finance representatives in all cycle steps contributing with their expertise to improve the decision-making process and to look at the plans from a financial stand point but only the Executive Meeting is mandatory. Finance members are frequently absent or do not play a very active role, adding low value during Demand Planning, Supply Planning and even in the Pre-meeting. They are collaborative when they are involved to give their guidance or authorization and when they are requested to assess plans from a financial stand point though. Finance directors attend the Executive Meetings in Brazil and in Mexico and play an active role in the S&OP plan assessment and approval. However, this is already the last step of the process and changes at this point cause rework and delays.

Overall, there is a more participation of finance in the S&OP process in Brazil, during the regular meetings, particularly in the Demand Planning step. In Brazil there are also ad-hoc meetings, taking place outside of the regular S&OP cycle, usually ten days before month-end, when there are exceptions to manage (e.g., promotions or deals to close sales gaps). There are no such meetings in Mexico. The main motivation for the finance planning manager in Brazil to attend the demand meeting and other marketing and sales meetings is to have first-hand information about plans and initiatives, which brings a better understanding about the logic of expenditures. Being present in the meetings, the finance planning manager also invests in team building by interacting with sales and marketing

teams and works preventively on risk mitigation in order to deliver the budget figures. But he is not present every month. In Mexico, finance managers and crew participate less during the cycle meetings but there is also good collaboration whenever their support is requested.

In the chemical company, the information generated along the S&OP cycle is used by finance to monitor actual results and plans versus budget and to understand the reasons for deviations and the corresponding mitigation plans. In the other hand, finance plays an important role in the construction of the S&OP plan, including financial figures and analysis of scenarios. As finances prepares the S&OP plan proposal together with supply and sales, it advocates for the plan and supports the management team's decision in the Executive Meeting.

In the pharmaceutical company, the IBP process provides important information to finance, including the demand plan with potential upsides and downsides, production and supply capabilities and gap mitigation plans, new products and promotions, KPIs, among others. Data Gathering is not considered a step of the IBP cycle. Providing information to whoever needs it and feeding the ERP is a regular activity. The Brazilian subsidiary, following corporate rules, can make four reviews of the expected financial year-end result with the headquarters, even though the budget is kept for records. These new numbers are generated along the IBP cycles.

On the other hand, finance leads the Pre-meeting and plays a very active role in the IBP Executive meeting. There is an understanding in the organization that Demand Planning and Supply Planning steps must be handled primarily in units sold/produced and not influenced by any financial figures. The unconstrained demand plan reviewed by supply, considering the production and sourcing constraints, is officially translated from units and SKUs to money in the Pre-meeting step. Discussions around the plan proposal from a financial stand point are made at this moment. The IBP plan proposal with potential upsides and downsides and the pending issues are taken to the IBP Executive meeting.

In the Brazilian subsidiary of the personal and home care products company, finance actively participates in the S&OP category team since the early steps, influencing the decisions to prioritize sales of items with higher margins, assessing promotions from a financial standpoint and building scenarios and

converting plans to financial figures. It officializes the S&OP plan proposal with financial analysis that will be reviewed during Executive Meeting. The information generated along the S&OP cycle every month is used by finance to monitor the subsidiary's progress towards budget achievement and anticipate risks. A plan that does not deliver budget figures hardly would be approved.

6.2
Finance during Demand Planning

In the consumer goods company, in the Brazilian and in the Mexican subsidiaries, finance attendance is not frequent during Demand Planning, although the company's S&OP project intended to acknowledge, in an early moment, any potential revenue downsides and upsides. By exception, sometimes, the Brazilian financial planning manager eventually attends the meetings to get first-hand information about launches and sales trends. In the Brazilian subsidiary, the sales team owns demand planning and builds the demand plan by SKU and in units but it is also visualized in financial figures. In the Mexican subsidiary, the demand plan is built by the sales team with strong support from the two demand planners / S&OP managers. In both subsidiaries, if there is a downside in comparison with the budget, sales and marketing teams do their best to find ways to resolve the gap, which may include proposing alternatives not previously forecasted that requires supply team's analysis and validation in the S&OP cycle.

One of the key activities in this cycle step is to compare the expected financial result of the forecast with the budget. Finance participation during the meetings does not happen very often, so the company loses quality in the assessment of alternatives and what-if scenarios. When a finance representative is present, these kinds of issues are addressed faster and broadly communicated, eliminating undesirable surprises. Otherwise, upsides and downsides are informed to finance out of the cycle meetings and discussed in parallel or during the Executive Meeting. Being informed is an entirely different situation from attending the meetings committed and actively adding value to solve the problems. Additionally, it was expected that finance could support sales and marketing teams build a robust forecast adding the financial perspective as well.

During the Demand Meeting new ideas to increase sales or to mitigate risks emerge and finance, whenever present in the discussions, adds value by providing financial insights and by assessing the initiatives feasibility based on cost versus return criteria, speeding up the processes. Frequently, sales and marketing initiatives involve customers with credit issues or constraints and extra expenditures that the finance representative present in the meeting can understand, evaluate and address appropriately. These meetings are also an unique opportunity for finance members to have a deep understanding of new product launches and promotions, assessing the plans, the projected sales and the costs involved, contributing to ensure success and healthy margins. Even though finance is not very proactive in the S&OP cycle in these subsidiaries, it gives support when requested.

In the chemical company, finance does not participate in the Demand Planning step. Marketing and sales develop the plan in SKUs, units and also converted to financial figures to check if it delivers the budget commitment, based on cost and price information available in the ERP.

In the multinational pharmaceutical corporation, the participation of finance in Demand Planning happens occasionally, by exception. The rule is handling the information and building the demand plan in SKUs and units. Because of the specific characteristics of the business (pharmaceutical industry), marketing owns the sales forecast construction. In the Brazilian subsidiary the finance manager attends the meeting if he is interested or if he is invited to add value in a specific topic. Otherwise finance does not participate at this point. Even though officially marketing and sales work only with SKUs and units, they have enough information to simulate the demand plan revenue. The company believes an unconstrained demand must be captured at this moment, not affected by budget or by supply constraints.

In the personal and home care products company, finance actively participates in this step, influencing the sales and marketing teams to prioritize products with higher margins, building scenarios and translating initiatives to financial figures. The company is highly benefited by finance's early presence in the S&OP cycle. Of course all studied companies seek to deliver or surpass budget figures but this company is culturally very aggressive on this purpose and

its structure with finance managers integrating the S&OP teams by category reflects that.

6.3
Finance during Supply Planning

In the consumer goods company, in both subsidiaries, in the chemical company, and in the pharmaceutical company, during the Supply Planning step, finance rarely participates in discussions with operations. The plans developed to mitigate supply issues typically involve more expensive urgent freights (e.g., express, airfreight), running production overtime, contracting additional labor or extra outsourcing costs, and purchasing raw materials or packaging materials from alternative suppliers with higher costs than the standard. These kinds of measures are usually suggested to overcome shortages, quality issues, capacity constraints, delays or unpredicted demands and they need approval from finance or its buy-in. Often the approval from finance is requested out of the meetings or in the Pre-meeting. As a result, the company loses finance's perspective for scenario analysis during Supply Meeting and finance is consulted later instead of actively helping to build solutions. In Brazil, in all three subsidiaries of these companies, there are big industrial plants with their own finance controller and then manufacturing decisions are supported. But smaller businesses and logistics do not have a finance controller specifically dedicated. They request support when needed and observations indicated that finance has collaborated although not always with the needed sense of urgency. In the Mexican subsidiary of the consumer goods company, there is no industrial plant, all products are imported or locally acquired. Finance does not take part in the Supply Meeting in Mexico but they support when they are requested with limited resources.

In the personal and home care products company, there is no Supply Planning step. The supply is assured by the corporation (global supply) within limits, based on a yearly agreement built based on the subsidiaries' demand forecast.

6.4
Finance during Pre-Meeting

During the Pre-meeting step, the S&OP plan or the IBP plan that reconciles and consolidates demand, supply and company's financial requirements is defined; gaps and mitigation plans are discussed; a financial analysis is prepared. Finance participation in this step is usually considered critical to validate the S&OP /IBP plan and the mitigation plans from a financial perspective.

In the consumer goods company, many times the Pre-meeting step does not happen in Brazil and Mexico because sales and marketing teams consider that the feasible demand plan according to market conditions is the one previously defined, reflecting their best effort to deliver financial objectives committed with the corporation. The supply team does its best to deliver it, pointing out the constraints and possible measures to overcome them, with the associated costs. The S&OP managers from operations usually call the sales managers designated to represent sales in each subsidiary and shake hands around the proposal that will be taken to the Executive Meeting. Moreover, in the third week of the month, every salesperson focuses on visiting customers and closing deals. Therefore, supply team builds its best plan to deliver the received forecast, eventually incurring some additional costs. These extra costs have already been analyzed from a financial perspective during Supply Meeting step, inside the cycle meeting or in parallel. The S&OP managers sometimes organize the regular cycle meeting including finance, sales, marketing, and supply but more often they talk directly to the sales representative in the S&OP team, confirm the information and then finish the S&OP plan proposal, listing and taking all pending issues beyond process team's decision autonomy to the Executive Meeting. Once more, finance participation during the process is necessary and adds value to the decision-making process to evaluate initiatives that imply in extra costs or to bring additional revenue. Also, having finance, sales, marketing and operations actively attending the Pre-meeting allows the construction, validation, and agreement on the S&OP plan proposal by all key business functional areas involved in the process, previously to the Executive Meeting. The pending issues to be taken to

the last step are discussed internally in each business functional area by its director with the team. Directors may talk to their peers before the Executive Meeting to avoid surprises. When finance does not validate the S&OP plan and the mitigation plans during the Pre-meeting step, discussions are held in the Executive Meeting, which is undesirable as there may be reworks and delays, if there are doubts and the proposed plans are not accepted. Moreover, what-if scenarios are less robust. When the S&OP cycle is performed with the active participation of all business functional areas involved in the first four steps, then the plan is smoothly approved in the Executive Meeting and finance participation is key for that.

In this company, finance is in charge of coordinating the budgeting process in each subsidiary, working with all the business functional areas and negotiating the plan approval with the corporate headquarters. These budgeting processes start in July of the current year to generate the following year's plan and occur in many rounds, when numbers, premises, and building blocks are reviewed and challenged, which may last until December. Once the budget is agreed and approved, it becomes the official reference for the business. Finance has a role as the guardian of the budget and every month, during the directors' business review meetings it presents the results and questions the functional areas' heads about the gaps. Apparently, in both subsidiaries, finance is more committed with the budget agreed with the company's headquarters than with the S&OP plan, and finance keeps a safe distance from the S&OP cycle to be in a position of auditing, controlling and questioning the results.

Some factual evidence illustrates the differences and similarities between subsidiaries regarding the gains from finance participation. In one instance, in the Mexican subsidiary, the marketing manager forgot to include promotional samples in the forecast and additional products had to be expedited by air freight from China. When finance is absent in such situations, it is not possible to respond immediately and the approval process is delayed. In both subsidiaries, when finance is present, excess and obsolete inventory is analyzed and the sales team is challenged to sell it. In both subsidiaries, when present during Pre-meeting, or even earlier in the Demand Planning, finance facilitates and expedites the analysis of credit-hold and credit limits for new clients. In one instance in Mexico, the

presence of the finance manager in the meeting hastened the acquisition an expensive promotional truck to travel to the countryside.

In the chemical company, finance owns the Pre-meeting and leads this step, building the S&OP plan proposal with the demand planner / S&OP manager and designated representatives from supply, sales and marketing. It also evaluates mitigation plans and alternative scenarios, with financial simulations. The S&OP plan proposal is taken to the executive meeting previously reviewed and approved by finance.

In the pharmaceutical multinational corporation, in the Brazilian subsidiary, finance leads the Pre-meeting. The demand plan with the constraints from supply is translated into value and all downsides and upsides opportunities and mitigation plans are assessed. The plan results are compared with budget and measures to close gaps are discussed. IBP process implemented in this company (and in the Brazilian subsidiary) focuses on the maximization of profit and finance has a central role in the process and leads this step.

In the personal and home care products company, the Pre-meeting in the Brazilian subsidiary is led by finance, represented by its financial director or by a senior manager. It happens with the presence of the marketing directors of all 8 categories of products commercialized by the company and it is the last opportunity to change the plan proposal. There is pressure to close any gap as plans that do not deliver the financial figures committed in the budget with the corporate headquarters will be very questioned and challenged during the Executive Meeting and probably not approved by the country president.

6.5
Finance during the Executive Meeting

In all the studied companies, the Executive Meeting step is held similarly. The S&OP or the IBP plan proposal is discussed by top executives of the subsidiary, decisions are made, additional measures are requested if needed, KPIs are reviewed, and the official S&OP or IBP plan is approved with a horizon of 18 months. Finance takes an active part in this step. The plan is compared to budget.

6.6
The role of finance in the S&OP literature and the research findings

The participation of finance in the S&OP process in the studied companies is consistent with the observations made by Ivert et al. (2015a) about the weak presence of finance in Demand Planning and Supply Planning steps. The exception is the personal and home care products company, which has active finance representatives in the S&OP team, during Demand Planning. The early participation of finance is very beneficial for this company as finance supports the decision making process with its analysis focusing on profit maximization and seeking to deliver or surpass the budget. Companies can integrate budgeting and financial planning in their S&OP (Baumann, 2010; Thomé et al., 2012a; Noroozi and Wikner, 2017) to evaluate return on investments, costs, revenues, margins and profit for alternative scenarios supporting decision-making process (Noroozi and Wikner, 2017).

In the chemical company, in the pharmaceutical company and in the personal and home care products company, finance leads the Pre-meeting and builds the S&OP plan proposal together with sales, marketing and operations representatives. Additionally it translates the plan into financial figures, compare to budget and often produces simulations of different scenarios and projections. In this case, the exception is the consumer goods company, which many times does not execute a Pre-meeting. By participating in the S&OP process, finance can also support in reconciling business functional areas' plans to deliver the firm's financial goals (e.g., Grimson and Pyke, 2007; Wagner et al., 2014).

In the Executive Meeting, finance is present and active to review and approve the S&OP plan in all studied companies. The field observations about the participation of finance in the Pre-meeting and in the Executive Meeting are in line Wallace and Stahl (2006) and Ivert et al. (2015a).

In accordance with the role of finance in IBP (Viswanathan, 2009; VICS, 2010), and despite the S&OP strong focus on sales, marketing, and operations, considering the objective of balancing demand and supply, the organizations could benefit from the proactive support and expertise of the finance team actively contributing in the meetings too. Finance is a key contributor, questioning,

bringing information, challenging the plans developed to mitigate gaps, helping to find solutions, building what-if scenarios, adding value to discussions, validating the S&OP or IBP plan from a financial perspective and comparing it with the budget (Badell et al. ,2007; Dougherty and Gray (2013), Van der Drift, 2018a and 2018b). The relevance of finance participation is confirmed by the observations made in the subsidiaries. Whenever finance members get involved and participate in any discussions, it adds value to the business providing reliable information, helping to find cost-effective solutions, communicating the situations properly to higher company levels and getting buy-in, supporting decisions as team members. Moreover, the lack of a proactive participation of finance runs contrary to expectations in theory of a more active role in more advanced stages of S&OP maturity. Seeling et al. (2021a), in a study performed in 15 companies in Brazil, identified that sometimes the finance representatives do not know their roles and responsibilities in S&OP clearly and the existent expectations around their contribution and the company does not have system tools to perform simulations of what-if scenarios and trained people, preventing finance to add more value to the process.

Differently from the other three studied companies, the pharmaceutical company calls its process IBP to demonstrate the difference and the evolution from a previous S&OP implementation that did not work as well as expected. Also IBP is the name of the process given by the consulting firm that supported the new implementation. The IBP philosophy, no matter it is considered an evolution of S&OP (e.g., Van der Drift, 2018a, 2018b; Oliver Wight, 2018) or a high maturity level implementation of the traditional process (e.g., Bauman, 2010), puts finance in a central position and for sure balances better the importance given to marketing, sales, operations and finance in the process. It also put more focus on the final results and in the strategic plan. By calling the process Integrated Business Planning, the words sales and operations are eliminated and involvement of all areas across the organization is reinforced, diminishing the weight given to supply and putting more focus on total company results.

Some of the key findings regarding the role of finance in S&OP are:

a) In three out of four of the studied companies and in line with the literature, finance is not active during Demand Planning and Supply planning.
b) In three out of four of the studied companies and in line with the literature, finance leads Pre-meeting. Additionally, in all the organizations investigated it is active in the Executive Meeting to review and approve the S&OP plan.
c) The research brought sound indications that the early participation of finance in the S&OP cycle adds value to the process, improving analysis and the decision-making process.

Figure 4 offers Seeling et al.'s (2022) Research synthesis framework for the role of finance in the S&OP process, which presents some of the key findings of the study.

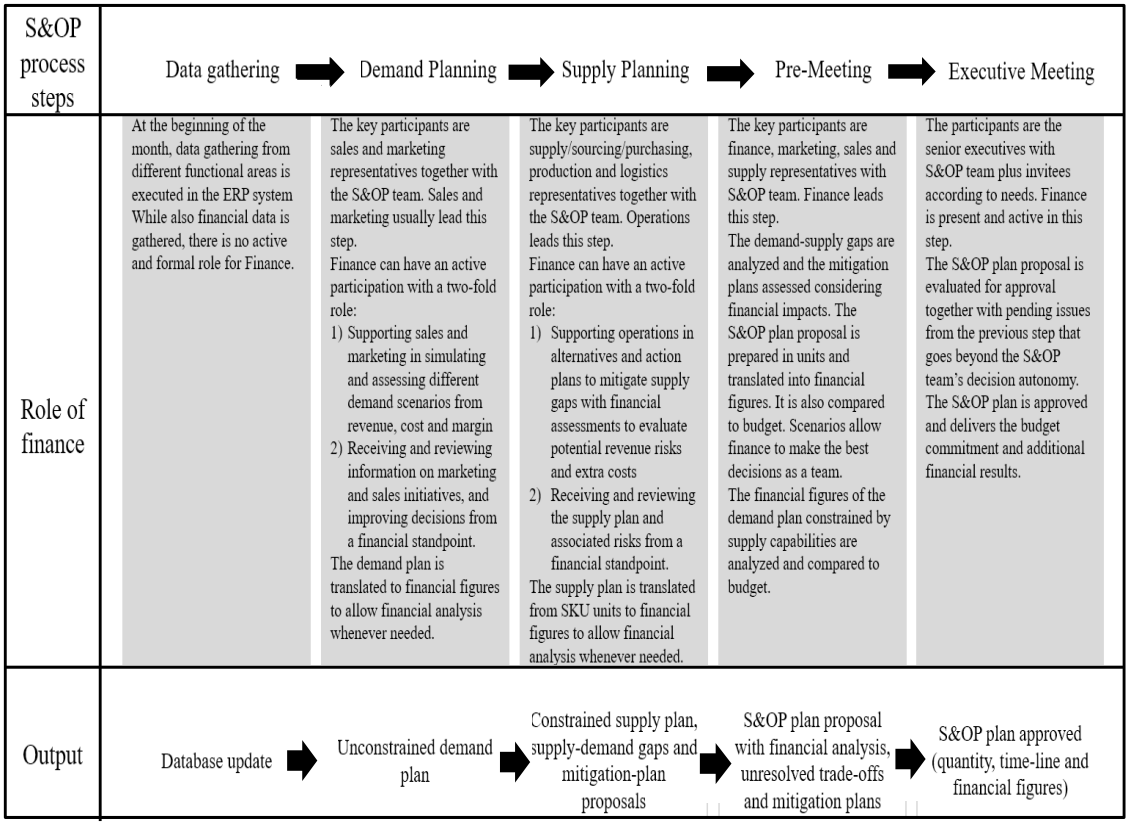

Figure 4: Research synthesis for the role of finance in the S&OP process.
Source: Adapted from Seeling et al. (2022).

7
Conclusion

Even though the interest on S&OP has grown (Noroozi and Wikner, 2017; Kreuter et al., 2021) as well as the number of publications associated to the topic (Kreuter et al., 2021), the academic literature still lacks studies regarding its complete characterization (Pedroso et al., 2016), its global steps (Global Roll-up and Global Executive Meeting) (Lim et al., 2017) and the role of finance in the process in global corporations, despite the recognized importance of this business functional area in the process (Viswanathan, 2006 and 2009), especially under the heading of IBP (Van der Drift, 2018a and 2018b). Additionally, there is room for more empirical studies regarding S&OP in different contexts (Kristensen and Jonsson, 2018). This thesis presents a multiple case study regarding the S&OP process performed in five Latin American subsidiaries of four multinational companies. Two well-known frameworks for S&OP widely adopted in the extant literature, Wallace and Stahl's (2006) and Thomé et al.'s (2012a) are used to guide the analysis of the S&OP processes executed in the studied organizations.

A research question naturally arose from the discussions about the theme:

RQ: How can the S&OP process performed in multinational corporations be characterized?

And the objectives of this thesis were defined as:

I. To improve the S&OP process characterization by performing empirical studies within multinational corporations of different industries and also to contribute to the debate around S&OP and IBP being different processes or not;

II. To investigate how the Global Roll-up and Global Executive Meeting steps are executed in multinational corporations, going beyond the standard and traditional S&OP five-step cycle, offering different lessons learned of interest for both academics and practitioners;

III. To analyze the role of finance along the S&OP and IBP processes in multinational corporations.

The thesis is built on a group of six articles listed in the introduction, published between 2016 and 2022, under the Projeto Brasil Alemanha (PROBRAL), a collaboration program held between PUC-Rio and the Münster University. This thesis is not a collection of papers as it expands the research investigating five subsidiaries of four multinational corporations. Only Seeling et al. (2022) discuss the five organizations but focused on the role of finance in S&OP. The other articles present the cases of one or two companies. Additionally, the connection existent between the six papers is clearly established through a research question.

Therefore, this thesis brings its contributions in four ways:

(i) The characterization of the S&OP / IBP process is presented in chapter four, based on the six papers listed in the introduction and analyzing the five subsidiaries of four multinational companies studied, addressing the research question.

(ii) Chapter four also depicts the S&OP / IBP cycles performed in these organizations, providing detailed information about the process in real life settings and different contexts, addressing objective I.

(iii) The global process (Global Roll-up and Global Executive Meeting) is investigated in-depth in chapter five, based on Seeling et al. (2021 b), addressing objective II. For more information about the Global S&OP steps in multinational companies, see Seeling et al. (2021b).

(iv) The role of finance in S&OP / IBP is analyzed in chapter six, based on Seeling et al. (2022), addressing objective III. For more information about the role of finance in S&OP, see Seeling et al. (2022).

7.1
Main research findings regarding the S&OP characterization

All of the studied companies perform a monthly S&OP cycle inspired by and very similar to Wallace and Stahl's (2006) classic model. Additionally, Thomé et al.'s (2012a) framework could be perfectly used to describe all the

S&OP / IBP processes executed by these organizations, guiding their complete characterization. All the studied companies consider S&OP a key process to link their strategy to their day to day operations, balancing demand and supply, integrating and consolidating the different business functional areas' plans to maximize profit. S&OP is sponsored by their C-suite and this vision is deployed by the headquarters to all subsidiaries to the local management teams and their crews. Adequate infra-structure and resources are allocated to execute the process properly. All the studied companies incorporated changes in the classic five-step model to adapt it to their culture, business environment and context. In three out of the four, Data Gathering is not a S&OP process step anymore because they consider that information is updated dynamically in the ERP in the beginning of the month and it continues along the cycle, many times automatically. Two companies created a new first step to evaluate their portfolio of products and to prepare the Demand Planning step. This trend is also identified in Seeling et al. (2021a), in a multiple case study with 15 companies in Brazil. The characterization of the IBP process does not differ from a mature S&OP implementation, which incorporates finance planning, focuses on profit maximization, while balancing demand and supply. The concept of Integrated Business Planning, which does not cite business functional areas in the name, puts finance in a key role, as important as marketing, sales and operations and focuses on delivering the planned financial results.

7.2
Main research findings regarding the Global S&OP steps

The Global S&OP steps are performed by some multinational companies that need to consolidate the information gathered from subsidiaries spread worldwide and decide to analyze it and put in front of their top executives to be reviewed and discussed. Thus not all the multinational companies execute Global Roll-up and Global Executive Meeting (steps 6 and 7), as described by Wallace and Sthal (2006). The four studied companies consolidate their S&OP information globally using different ways. The consumer goods company has a kind of Executive Meeting, while the other three companies investigated (chemical

company, pharmaceutical company and personal and home care products company) have a regional meeting to review the S&OP results and plans. The Global Executive Meeting held with the attendance of most senior executives of the company, presents previous difficulties to standardize and consolidate information gathered from subsidiaries with different contexts, structure and maturity; offers challenges to deal with too much detailed information; and the top executives do not want to micromanage the subsidiaries. In the consumer goods company that performs a kind of steps 6 and 7, the top executives in the Executive Meeting are monitoring the progress of the S&OP project deployment and, as a consequence, they are able to see business opportunities among the regions and could accelerate changes. Examples of global gains are excess of inventory in one region that could be sold in another one, excess of production capacity that could be used to supply other markets, products that could be launched in other geographies, and best practices that could be shared among subsidiaries. Additionally, the executives managing the subsidiaries increased their awareness and started to pay more attention to S&OP KPIs and overall results that are now being presented to the global top executives. Associated with the active participation of the CEO and the C-Suite in these meetings, the focus of the global S&OP bends towards strategic rather than tactical decision-making. Although preliminary positive results have been already obtained, it is still not clear precisely what benefits the company will get from the approach and how it will manage its current challenges. There is a long way to go to synchronize the S&OP efforts from each subsidiary towards a global S&OP planning. As a result of the steps 6 and 7, global gains were identified as well as local gains and synergies with ERP implementations. The local gains with the S&OP implementation are related to improving forecast accuracy, service levels, inventory management indicators and financial figures. Some projects and changes may be speed up locally because opportunities are now in front of the C-suite. The adoption of a single ERP by the multinational companies was identified as a parallel initiative that helps the S&OP process development as it helps to standardize the processes and facilitates obtaining information.

7.3
Main research findings regarding the role of finance in S&OP

Finance is not active during Demand Meeting and Supply Meeting in three out of four of the studied companies (consumer goods company, chemical company, and pharmaceutical company), which is in line with the S&OP literature. Only in the personal and home care products company, finance actively participates since the Demand Planning step, as part of the S&OP team. The company benefits from this early attendance as the finance representatives support the decision-making process with their perspective and contribute to maximize the results and deliver budget. Again, in three out of four of the studied companies and in line with the literature, finance leads the Pre-meeting step to build the S&OP plan proposal with financial analysis. Moreover, it is active during the Executive Meeting to review and approve the S&OP plan, in all the studied companies.

The research work indicates that the early participation of finance in the S&OP cycle adds value to the process. Whenever finance gets involved in the business discussions, the solution is faster and more robust. When finance is not properly involved in the first steps of the S&OP cycle, additional discussions and validations take part during the Executive Meeting, generating rework, fewer what-if scenarios to be considered and delays in the decision-making process, resulting many times in suboptimum plans. The research findings in the subsidiaries suggest that a higher involvement of finance within the S&OP process can improve its results.

7.4
Suggestions for future related researches

The literature about S&OP still benefits from more descriptive empirical studies bringing data from real-life settings in different contexts. In this sense, even though this study encompasses four multinational companies and five of their subsidiaries, the Global S&OP steps and the role of finance in S&OP can be studied in more companies to confirm or to complement the conclusions of this

thesis. It would be also interesting to revisit the consumer goods company after a while to verify how the Global Executive Meeting evolved, how its challenges were resolved and measure its benefits objectively. Another interesting topic for future research is an evaluation of the cycle steps adopted by the companies as there are indications that many organizations are adapting the classic 5-step model from Wallace and Sthal (2006) to their reality and needs and it may change more as the IBP approach of S&OP becomes even more popular. Other topic of interest would be investigating S&OP cycles implemented in companies that are using dedicated commercial S&OP systems to control the flow of the process activities. One last theme of interest, which is frequently commented in the literature but under-researched in real life settings, is the study of S&OP / IBP processes implemented in companies that really integrate key suppliers and key customers in their cycles working in collaboration. It would be interesting to analyze how it works, the challenges and the benefits obtained.

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Appendix 1 – Questionnaire

I) *Openings:* introduction of the interviewer and the interviewee; overview of the research scope; assurance of confidentiality.
II) *Demographic data:* title and job history of participants; background of the organization.
III) Questions for executive directors:
- Do executives consider their S&OP process implementation strategic? Why?
- Does the organization ensure that the S&OP cycle meetings happen every month?
- Does the organization ensure attendance in the S&OP cycle meetings?
- Are reports showing S&OP metrics reviewed regularly?
- Are there formal Executive Meeting every month with defined agenda/outcomes, meeting minutes and defined participants? Do all participants attend the meetings?
- Are action items and decisions from Executive Meeting documented and tracked?
- Are pending issues from Pre-meeting resolved during the Executive Meeting?

IV) *Questions for managers and operational staff (functional areas):*
- Does the organization ensure that the S&OP cycle meetings happen each month?
- Does the organization have an official list of empowered participants to support S&OP?
- Does the organization ensure attendance in the S&OP cycle meetings?
- Are reports showing S&OP metrics reviewed regularly?
- Is Data Gathering (S&OP Step one) fully completed prior to Demand Planning (Step two)?
- Does the organization generate a new forecast every month during S&OP cycle?
- Does the organization review excess and obsolete inventory, supplier lead times, SKU rationalization, forecast accuracy, customer service indicators, supply urgencies (e.g., air freights due to lack of product) during the S&OP cycle meetings?
- Does the organization have a formal Demand Planning Meeting with defined agenda/outcomes, meeting minutes and defined participants every month?
- Is Demand Planning (S&OP Step two) finalized before Supply Planning (Step three)?
- Is demand plan compared with budget and are financial gaps determined?
- Does marketing provide new product information and promotions plans?
- Does sales provide information on price increases, seasonality, new customers and other initiatives that may impact the S&OP plan?
- Is finance involved and committed with the S&OP process? What is its role?
- Does the organization have a formal Supply Meeting with defined agenda/targets/outcomes, meeting minutes and defined participants?
- Is Supply Planning (S&OP Step three) 100% finalized before Pre-meeting (Step four)?
- Are capacity and supply constraints identified, documented, addressed and regularly reviewed during Supply Planning?
- Does the organization have a formal Pre-meeting with defined agenda/ outcomes, meeting minutes and defined participants every month?
- Does the scope of Pre-meeting include finding solutions for issues related to Demand Plan x Supply Plan gaps? Is it documented and communicated to appropriate people?
- Is Pre-meeting (S&OP Step four) 100% completed before the Executive Meeting?
- Is an agenda for the Executive Meeting (Step five) prepared in the Pre-meeting (Step four)?
- What metrics are calculated, shared, and reviewed during the S&OP cycle? Are there defined targets for those metrics?
- Can the S&OP manual and documents regarding the S&OP process be seen?
- How is the global Roll-up step being implemented (Step six)? What are the main challenges observed? / How the Global executive meeting has being implemented (Step seven)?

V) *Additional unplanned / floating points:*
- Could you tell me more about that? / explain in more details? / provide more examples?

Appendix 2 – Observational guideline

Cycle Step	Action	Main inputs	Participants	Regularity	Outputs	Metrics
Steps one to five in Mexico and Brazil and steps six and seven in the headquarter (U.S.)	What is done within each step?	Which data is used and when? What are the data sources, including information system? Who is responsible?	Who attends the meetings? What are their role, commitment, empowerment and frequency attending?	When do the meetings occur and with which regularity? Are there event driven meetings?	What are the outcomes (e.g., information, S&OP plan, and time horizon)? To whom are results sent? What are the inputs for the following step? Is there an agenda for the next step?	Are there any metrics associated to the step? Which? How are they used, by whom and with what objective?