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# IMPROVING THE PERFORMANCE OF SALES AND OPERATIONS EXECUTION IN A CASE COMPANY

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**ABSTRACT**

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This Master's Thesis examines how sales and operations execution process can be improved in a case company. Sales and operations execution (S&OE) is a comparatively new part of planning process, and can be defined as complementation for S&OP, which is focusing on short-term balancing of supply and demand. The aim of this thesis is to gain in-depth understanding of the S&OE process and help improving the current process and to describe and suggest relevant performance measurement metrics for S&OE. This study uses process improvement methods and as a result as-is and to-be processes. The aim is to highlight the problem areas of the current S&OE process and present improvement suggestions as well as examine what kind of benefits can be achieved from measuring performance in S&OE.

The research was conducted as a qualitative case study and the data was collected through ten semi-structured interviews. The interviewees were selected from within the case company, all of who work closely with S&OE. As a result, it was found that the problem areas are in defining and structuring S&OE and setting targets. Also, issues related to IT systems, performance measurement and communication were also seen as a challenge in the current situation. In addition, there is a lack of relevant up-to-date data of S&OE, which is seen as an issue. For future improvement suggestions, S&OE needs to be better distinguished from other levels of planning. Thus, to ensure better performance of S&OE, clear responsibilities, communication and strong process performance are important. Secondly, by better following up and tracking incidents and other changes to plans may help improving S&OE process and the accuracy. Finally, performance measurement could improve the process.

**TIIVISTELMÄ**


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Tässä Pro gradu -tutkielmassa tarkastellaan, kuinka Sales & operations execution (S&OE) prosessia voidaan parantaa case yrityksessä. Sales & operations execution on suhteellisen uusi osa yrityksen suunnitteluprosessia, ja se voidaankin määritellä täydentämään S&OP prosessia, ja joka keskittyy kysynnän ja tarjonnan lyhyen aikavälin tasapainottamiseen. Tämän tutkielman tavoitteena on saada syvällinen käsitys S&OE-prosessista ja auttaa parantamaan case yrityksen nykyistä prosessia, sekä kuvata ja ehdottaa S&OE:lle soveltuvia suorituskykymittareita. Tässä tutkimuksessa käytetään prosessinparannusmenetelmiä ja kuvataan nykyistä prosessia, sekä tulevaa prosessia. Tavoitteena on tuoda esille nykyisen S&OE-prosessin ongelma-alueet, sekä esittää parannusehdotuksia ja tutkia millaisia etuja voidaan saavuttaa S&OE:n suorituskyvyn mittaamisella.

Tutkimus tehtiin laadullisena tapaustutkimuksena. Data kerättiin kymmenen puolistrukturoidun haastattelun avulla. Haastateltavat valittiin case yrityksen sisältä, niistä henkilöistä, jotka ovat tiiviisti tekemisissä S&OE:n kanssa. Tuloksena todettiin, että ongelma-alueet ovat S&OE:n määrittelyssä ja jäsentelyssä, sekä tarkkojen tavoitteiden asettamisessa. Myös IT-järjestelmiin, suorituskyvyn mittaamiseen ja kommunikaation liittyvät haasteet nousivat esille haasteena nykyisessä tilanteessa. Lisäksi ajantasaisen tiedon puute nähtiin ongelmana. Parannusedotuksena esitettiin, että S&OE on erotettava paremmin muista suunnittelutasoista. Lisäksi S&OE:n paremman toiminnan varmistamiseksi selkeät vastuut, viestintä ja vahva suorituskyky ovat tärkeitä. Toiseksi, seuraamalla paremmin tapahtumia ja suunnitelmien muutoksia on mahdillista parantaa S&OE prosessin osumatarkkuutta. Lopuksi, suorituskyvyn mittaus voisi parantaa prosessia.

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With a certain melancholy I am writing the last words for this thesis and thus leaving the 5-year student life behind me. But I am so grateful and happy to have so much to take with me when opening a new chapter in my life.

In Espoo August 21st, 2020

*Hanna Harjunen*

## Table of contents


1 Introduction 1

1.1 Background of the study 1

1.2 Objectives 2

1.3 Limitations 4

1.4 Research methodology 4

1.5 Structure of the thesis 6

2 Literature review 8

2.1 Overall business planning 8

2.2 Supply chain performance measurement 11

2.3 Sales and operations planning 14

2.3.1 Sales and operations planning process 16

2.4 Sales and operations execution 18

2.4.1 Benefits of using S&OE 20

2.5 Challenges 22

3 Research methodology and data collection 24

3.1 Introduction to case company’s S&OP and S&OE processes 24

3.2 Methodology 27

3.3 Data collection 28

3.4 Reliability and validity 31

4 Case study presentation 32

4.1 S&OP process structure description 32

4.2 S&OE process structure description 35

4.3 Challenges in the as-is process 36

5 Data analysis and results 38

5.1 S&OE’s role and impact on decision making 38

5.2 Current state: perceived challenges 44
5.3 Future state: improvement suggestions 51
5.3.1 Performance measurement 56
6 Discussion and conclusions 58
6.1 Evaluation of the study 62
6.2 Suggestions for future research 63
References 64

## ABBREVIATIONS

| | |
|---|---|
| BSC | Balanced scorecard |
| BPR | Business process reengineering |
| KPI | Key performance indicator |
| MoC | Management of change |
| S&OE | Sales and operations execution |
| S&OP | Sales and operations planning |
| SCM | Supply chain management |
| STI | Short-term incentive |

## APPENDICES

Appendix I. Interview questions

Appendix II. S&OE process structure in the case company

## LIST OF FIGURES

Figure 1. Overall business planning process

Figure 2. S&OP process

Figure 3. S&OP balance

Figure 4. S&OP input data

Figure 5. S&OP process in the case company

Figure 6. S&OE process structure in the case company

Figure 7. Chain thinking in the case company

Figure 8. S&OE to-be

## LIST OF TABLES

Table 1. Interviews

Table 2. Challenges in S&OE

# 1 Introduction

As international markets and operational environments have been expanding, also supply chains have become larger. Therefore, companies need to manage the entire supply chain, balance supply and demand and provide excellent customer service in order to compete with others. To be able to do so, an increasing number of companies are using Sales and Operations Planning (S&OP) as a tool for production planning. It was first discovered in the 1980's and the goal was to provide clarity to balancing supply and demand. (Smith, Andraski & Fawcett 2010, 4)

In addition to S&OP, there is a more precise process that helps firms to manage their short-term balance of supply and demand. The concept of Sales and Operations Execution (S&OE) was first introduced by IT service management company Gartner as a result of companies' struggle to make S&OP relevant and run operational planning but with a shorter horizon. (Chainanalytics 2019)

As companies start to implement S&OE process, it is important to recognize the benefits and the challenges of the process and learn to identify how the process performance can be improved. The purpose of this thesis is to study how can the S&OE process be improved, and how S&OE performance can be measured in a case company.

## 1.1 Background of the study

This research was conducted for a case company. The case company is operating globally in the field of environment, sustainability and energy sector. The case company's main focus is on creating solutions for transportation by road, air, sea and pipeline and their strategy is to offer their customers sustainable solutions and develop new ways for cutting carbon emissions and to become a leader in renewable and circular economy solutions.

The case company's supply chain department executes demand and supply planning from strategic and business planning purposes. They use sales and

operations planning (S&OP) as a tactical planning tool in one to fifteen-month periods. Moreover, the company uses S&OP in assuring cooperation in the supply chain and also in minimizing undesirable and surprising risks. The company has implemented S&OE process in order to find better economic or financial solutions to the prevailing situations, taking possible restrictions into account.

The number of earlier studies on S&OE is up to date very little. There are multiple previous studies on S&OP process, some of which touch slightly also the topic of S&OE, which is often described in different terms, such as operational planning. However, S&OE in academic literature is still relatively unknown, even if companies have been adopting it years ago. This indicates that there is an emerging interest in implementing S&OE in companies, which will most likely show an increase also in academia in the future studies.

That being said, this study is conducted because there is little to no research on sales and operations execution or performance measurement in that process. The issue in the case company is that there is still a lack of relevant up-to-date data from S&OE, so the information collected is always outdated and there should be a better follow up measurement or tool to help supply chain management to take action if needed. Another challenge is that there is yet no financial performance measurement metric in the process. In other words, the case company does not have any relevant performance measurement metric in use in the process that guides and assists in decision making at the moment.

The results of this study can help the case company create visibility to the process and simplify decision-making; what and when to sell, in order to get the best possible price. In addition, it aims at providing better understanding, gaining visibility and collective information from S&OE.

### 1.2 Objectives

Sales and Operations Execution process has been a part of Sales and Operations Planning. Only recently, it has been recognized as a separate process, with the focus on balancing supply and demand on a short-term level (Ostdick 2017a). This

study investigates what exactly is a S&OE process, and how can it be improved in a case company environment. The topic is relevant to the case company, because the process has been set up, and the company will benefit from the ideas of how to improve the process, since there are currently no relevant performance measures. The aim of this study is to find answers defined by research questions, which are presented below.

The main research question of the study is:

*How can the S&OE process be improved?*

In order to answer the main research question, it is important to first clarify what the current operating method and as-is process are, and what are the challenges and improvement areas. Thus, the first sub-questions are as following:

*What is the current operating method of the S&OE process?*

*What are the problem areas of the S&OE process?*

Furthermore, this study aims at improving and providing more visibility to sales and operations execution process and gain more insight to the sales and operations planning and execution. The aim of this thesis is to understand and improve the case company's sales and operations execution process and to describe and suggest relevant performance measurement system or metrics for sales and operations execution process.

Other sub question that this thesis is trying to answer is:

*What kind of benefits can be achieved from measuring performance in S&OE?*

## 1.3 Limitations

The aim of this thesis is to understand and improve the case company's sales and operations execution process and to describe and suggest relevant performance measurement metrics for sales and operations execution process.

There are few previous academic literatures on S&OE process, and therefore the thesis theory part uses sales and operations planning (S&OP) partially as a framework for the empirical part. Therefore, this might impact on the validity and reliability of the study. Validity measures how accurately a suggestion, argument or result expresses the object which they are supposed to refer to. Reliability describes the level of consistency. The material can be reliable, but not valid, or the opposite. In addition, the material can be neither reliable nor valid. (Koskinen, Alasuutari & Peltonen 2005, 254)

The overall supply chain performance measurement is a large and wide concept; thus, this thesis is only focusing a narrow part of supply chain planning. It will leave out for example supply chain strategy evaluation, customer relationship management and financial controlling. This thesis aims at finding improvement suggestions and describes an as-is and to-be models, but it will not focus on change management or implementation, but merely provide an insight to the challenges and suggest actions for improvement. In addition, this thesis is mainly focusing on managerial decision-making and thus aiming at analyzing the research questions from managerial perspective.

## 1.4 Research methodology

This master's thesis is case study research. Hirsjärvi, Remes & Sajavaara (2007, 135) describe that a case study is usually detailed information about a single case. Typical characters for using a case study is to choose a single case, situation or group. In addition, the examination is done on processes. The research can be described as a single case study, because the research is limited to only one case company. The thesis has two main parts, it is divided into theory and empirical research.

This master's thesis is using qualitative study as its research method, because process improvement and measuring performance requires first a wide understanding of the phenomena and the as-is process. This is best executed with qualitative methods. Hirsjärvi et al. (2007, 160; 260) describe qualitative study as a method of observation and analytical study, which aims at providing concepts, simplicity, definitions and symbols for typically non-numerical data. There are multiple different data collection methods in qualitative research, and this study collects the data by interviewing a selected group of the case company employees, as well as gathering observations, documents and survey report.

Interviews will provide a deeper understanding of the case company's current situation and the ideas for improving the process, in addition to documents and report of planning and execution, which prove a direction of what could be improved. They also help in describing what has been done before. All in all, the interviews, conversations and observations accumulated notes that were later used in describing the current situation and support particularly in describing and proposing improvement suggestions.

The data will be analyzed inductively, aiming at revealing unexpected findings. Interviews are conducted for Supply Chain Planners, Traders, Operative Planners, Business Process Manager and Business Controller. The interviews are semi-structured, which means that the researcher determines the questions, but the interviewee can answer them with his own words and suggest other questions. It is possible to also differ from the original question order. (Koskinen et al. 2005, 104) Thus, the flexibility of the semi-structured theme interviews also enables asking additional questions and gathering more information if needed. The questions will focus on S&OE process and detecting possible improvement suggestions. The interviews are held in the Case Company's headquarters in Espoo, at the beginning of 2020.

Through interviews, company presentations and reports, an "as-is" process is described. The interviews are analyzed, and the answers are grouped using nVivo program, so that similar types of answers create a group. Grouping will give further insight to the challenges and thus help with generating a to-be process illustration and describing the results of the study.

Because the main target of this thesis is to highlight improvement suggestions for sales and operations execution process, one of the aspects is to use process improvement methods. The process improvement methods are described as business process redesign or business process reengineering (BPR). Mohapatra (2013, 51) describes BPR as a tool for “reinventing the wheel”, which means that it focuses on redesigning the strategic processes and the processes which add value. It includes first identifying the processes and reviewing and analyzing an as-is process. After that, a to-be analysis is made and designed as a guideline for the company to show where it should go and what it has to accomplish. Once the steps are done, the final step is to test and implement to-be processes, aiming at continuous improvement. However, this thesis will leave out the testing and implementing the to-be process, in order to delimit the topic and research.

### 1.5 Structure of the thesis

The structure of the thesis is presented below. Each head chapter may also include subtitles, for example the theory and empirical part of the study are divided into smaller entities, which help structuring the thesis. Chapter one describes the introduction of the thesis, which includes the background of the study, research methods, limitations and description of the structure, which are relevant to the research. Chapter two consists of a review of the theory, which is separated into five parts. It will first look at the overall and business planning processes and then study how supply chain performance can be measured. After that, it will deepen to sales and operations planning, and after that it will study and introduce the sales and operations execution process. Finally, the challenges of the planning and execution processes are shortly discussed. The aim is to gain a deeper understanding of the relevant topics and help analyze the data in the empirical part of the study.

In the empirical part of the study, the case company is first introduced. Chapter three describes briefly the case company’s background and operating model for both S&OP and S&OE processes, data collection, presents the research methodology and briefly discusses the reliability and validity of the study. Chapter four describes the current situation, present challenges, and describe the “as-is” processes of

S&OP and S&OE in case company. In chapter five the data from the interviews is analyzed. In addition, it describes what was found in the data analysis as a result of the study and provides recommendations for future actions. In addition, a “to-be” process is introduced. In other words, the chapter aims at revealing unexpected findings and ultimately, the target is to figure out how S&OE process could be improved in the case company.

Finally, conclusions are presented in chapter six, which aims at answering the research questions and summarizes the empirical findings of the study. It discusses the findings of the study and hence presents some key topics that is still missing in the academic literature. In addition, the suggestions for future research will be presented.

# 2 Literature review

This chapter presents a literature review of the previous academic material of related topics. Literature review will result in the conceptual framework of the study and help identify the key concepts and their relationships. This literature review aims at revealing a research gap, a missing element in the existing literature.

This literature review consists of five parts; it will present overall business planning, supply chain performance measurement, sales and operations planning, sales and operations execution and finally, it outlines the challenges of the previous.

## 2.1 Overall business planning

The need for planning in management situations is great for several reasons: the lead time for decision-making varies from several years to several days or even hours, and forecasting is a critical support in efficient planning (Mendes 2011, 45). As the industries have been developing quickly due to technological improvement and globalization, supply chain leaders must decide new strategies and approaches that provide maximum return of investment (Masters 2016).

Supply chain planning can be seen as managing supply and demand facing activities to diminish mismatches and create value. In many firms, supply chain planning calls for cross functional effort. (Oliva & Watson 2011, 434) The core of supply chain operations planning is to assure that the best possible quantity of the commodity is delivered at the best possible time at the best possible cost, according to the constraints at that moment (Spitter, Hurkens, de Kok, Lenstra & Negenman 2005, 707).

Kepczynski, Dimofte, Jandhyala, Sankaran & Boyle (2019, 1) introduce the different planning levels as strategic, tactical and operational processes, where strategic planning processes can cover up to ten years, tactical planning shape business up to 3 years, and operational planning cover a horizon of couple of weeks up to 3 months. Lapide (2016, 5) presents that each planning level is unique in the planning or future horizons, but they all have to be integrated to make sure that operations

eventually synchronize to strategy. Despite the careful supply chain planning, revisions to forecasts or schedules are a common issue in manufacturing organizations. Revisions may be important in case of demand fluctuations, late delivery of materials, or for example breakdowns. (Pujawan & Smart 2012, 2252) Despite, planning horizons and processes vary between planning types, many firms struggle integrating these planning processes under one framework, which is also known as integrated business planning (Kepczynski et al. 2019, 1).

Figure 1 presents the conceptual framework of the study and the overall planning process in organizations. It illustrates the structure of a resource planning process and different planning levels.


*Figure 1. Overall planning process (Case Company 2019; Wallace 2004, 14)*

Business planning in general can be divided into three to four different parts. It starts with strategic planning, which includes strategic planning and business planning. This level can also be called business unit level, it's often long-term planning, usually

the scope is from one year up to five years, and it is performed annually. Strategic planning is critical, because it defines the direction of the business and strategy, which also impacts on the other planning levels. (Kepczynski et al. 2019, 2) However, strategic planning and business planning are not essential parts in terms of resource planning process, but they serve as leaders to the process (Wallace 2004, 13).

The next level is called tactical planning, which is highlighted as darkest blue in Figure 1. Inconvenient environmental challenges, like long production lead times or demand irregularity are examples of challenges in supply chains that call for efficient supply and demand planning. In particular, appropriate tactical planning is critical, because it can provide stability and set the basis for further operational decisions. (Dreyer, Kiil, Duskova-Popovska & Kaipia 2018, 115) It is more precise than business planning; the scope is around 1-27 months and it is performed monthly. Tactical planning can be understood as S&OP, but as can be further observed, S&OP is a combination of other individual planning processes.

In fact, a part of tactical planning is also supply and demand planning. Mendes (2011, 40) describes demand management as a “process that balances the customers’ requirements with the capabilities of the supply chain”. In addition, management can pair supply and demand proactively and perform the plan with minimum interruptions. Accordingly, the demand management process includes demand forecasting and adjusting it with production, procurement, and distribution capabilities. A crucial feature of demand management is to find ways to diminish demand variability, in order to support consistent planning and reducing costs, and to enhance operational flexibility, in order to help the company respond to changing internal and external events. (Mendes 2011, 43)

Demand and supply plans are important part of tactical planning, because if they are not properly adjusted, the seller company might have to solve for example logistical issues with ad hoc solutions, which usually are not economically friendly, or scale down oversupplied goods, which also undermine the profit base (Hübner, Kuhn & Sternbeck 2013, 513). Tactical planning, especially S&OP, ties the strategic and business planning together with S&OE and production scheduling and material planning (Wallace 2004, 13).

The final two levels are short-term planning, which can be understood as operational planning. It was later introduced in the firms because monthly S&OP or tactical planning was not precise to solve a short-term asymmetry between supply and demand on the product type, sales area or brand level. (Kepczynski et al. 2019, 1; 375) Thus, the third level is execution, which means S&OE in this case.

Sales and operations execution is a somewhat new planning process, which goal is to balance short-term supply and demand. It is product and/or order level planning, with the scope from 0-12 weeks (Elementum 2019a). S&OE is performed on a daily or weekly basis. The role of S&OE is to break down strategic input and form S&OP, and to adapt the information to precise instructions in daily business execution (Gartner 2019).

The fourth and final level is called scheduling or operational planning. It is order level planning with one to three weeks focus and it is performed on workdays. The information flows from up to down, but on the other hand, decision making in scheduling can be observed back in S&OE, from where the entire month's operations can be assessed as actuals in S&OP. Therefore, it can be understood as a cycle, where information flows both ways between the planning levels. Scheduling is basically executing day-to-day activities in companies. Generally, scheduling deals with uncertainty and interruptions of jobs and resources subject to optimizing targets (Ivanov & Solokov 2012, 202).

Operational planning in general can be driven by typical industry or product features. In addition, operational planning focuses on finding the best possible value from machines, materials, manpower and money available at the moment, also described as the "4M". Operational planning can be recognized as a tool for optimizing S&OP. (Kepczynski et al. 2019, 5)

## 2.2 Supply chain performance measurement

Performance measurement is widely studied and inspired by Kaplan and Norton's balanced scorecard (BSC), which was used to define company strategy from financial, internal process, customer and innovation point of view (Elrod, Murray &

Bande 2013, 39). On the contrary, businesses have recognized that supply chain management is a crucial strategic part for increasing organizational performance and for better understanding of organization's targets which may include for example better competitiveness and profitability as well as customer care. (Gunasekaran, Patel & Tritiroglu 2001, 71)

For example, Elgazzar, Tipi & Jones (2019), Papakiriakopoulos & Pramatari (2010) and Elrod, Murray & Bande (2013) have studied supply chain performance. In addition, performance measurement is also studied from planning perspective: Thomé, Scavarda, Fernandez & Scavarda (2014) & Hulthén, Näslund & Norman (2016), for instance. However, S&OP effectiveness is not very widely measured.

Bower (2018) and Gunasekaran et al. (2001, 71) indicate that for example technology is changing organizations' needs to respond to changing business environments rapidly. At the same time outsourcing has become a more popular business strategy. In addition, many companies have successfully made progress with operational excellence and lean manufacturing and accomplished service and cost benefits (Grimson & Pyke 2007, 322). Hence, performance measurement is a widely recognized and studied topic, which has become even more important since supply chains have become more complex and customers are more demanding. In order to succeed in the difficult competitive markets nowadays, it is important to know what functions add value to the chain, as well as what processes and ways of working improve supply chain performance.

A performance management system provides different performance measurement metrics that can be used for example supporting decision making and management control as well as improving coordination and communication (Papakiriakopoulous & Pramatari 2010, 1298). According to Hulthén et al. (2016, 811) the performance measurement system should be linked on organizational strategy and help carrying out and supporting strategy as well as giving feedback on the organizational course. In other words, if the company needs modification or if it is on the right track.

Harris & Tayler (2019, 64, 68) present that firms that work hard on their strategies and measure their development, frequently run into a specific problem. Namely, confusing what is being measured to the metrics that are used, this is called

surrogation. In order to decrease the risk of surrogation, one example is to use multiple metrics to evaluate performance. This method highlights the fact that one metric cannot entirely capture the strategy. Various metrics add complexity to evaluating performance, but it is essential in avoiding surrogation and keeping focus on the true strategy. Accordingly, it is important to combine such performance measures that assess supply chain performance from various perspectives, including financial and non-financial measures, that result in a balanced estimate of the supply chain. However, many organizations are still relying on classic financial measures, for instance cash flow, and return of investment (ROI). (Elgazzar, Tipi & Jones 2019, 296)

Supply chain measurements are essential for continuous improvement, because through measuring, there is potential to identify opportunities to lean processes, decrease costs and improve business functions. Measurement metrics can be divided into qualitative and quantitative, which can be further defined as output measures, resource measures or flexibility measures. (Elrod et al. 2013, 40)

According to Khan & Yu (2019, 207) and Kepczynski et al. (2019, 443) new measurement and evaluation techniques of supply chain that help improve the process include many measures, but they can roughly be divided into three categories: measuring effectiveness, measuring efficiency and measuring adherence. Effectiveness of a process is a useful performance measure, because it relates to the outputs. The best way of measuring effectiveness is to use multiple metrics, because it can provide details about the different attributes of performance and in fact draw a picture of the entire performance. (Kepczynski et al. 2019, 445) Measuring effectiveness applies to how well management can reach its targets and goals and how good the performance is, whereas measuring efficiency refers to the contribution to performance productivity and shows how complex and slow the processes are. Finally, adherence helps understanding whether process stakeholders contribute to inputs, review and decisions on schedule and execute process steps as agreed. (Khan & Yu 2019, 207; Kepczynski et al. 2019, 443)

In addition, process efficiency measurement can be seen as a metric which describes the value added created after a certain process step. Measuring efficiency is not easy, because the metric needs to describe the best way of how efficient the

process is. Therefore, it is important to choose an efficiency metric carefully, but if working well, measuring efficiency can help identify areas of improvement and understand how efforts on collecting inputs are interacting with forecast performance. Finally, measuring process quality or adherence means input provided on time. This is also important, because the strength of the process is seen as the degree of adherence to the rules illustrated by the management. (Kepczynski et al. 2019, 457, 458)

Performance measurement has many benefits to the firm. Namely, measurement can lead to better decisions by making the results more visible. It can support improving communication and performance feedback, which, in turn, may contribute to motivate behavior and ultimately improve the entire performance. (Khan & Yu 2019, 208) Measures should contain feedback, where team members get detailed information from their supervisors and peers, as well as customer and supplier evaluation of the process and functional measurements (Grimson & Pyke 2007, 333).

When it comes to aligning performance measurement with S&OP and S&OE, it is evident that there is always a time gap between the planning and the execution, what has actually been done. Consequently, plans do not include unexpected events, which, however, often occur in the execution phase. S&OE is therefore helpful in detecting and adapting to these changes in order to decrease the gap. KPI's or performance metrics thus offer visibility to the supply chain and support in assessing the forecast accuracy as well as the execution performance. In addition, exposing the gap between S&OP and S&OE, KPI's offer possibilities to cure the potential headaches. (Chae 2009, 423) Specifically in S&OE, KPI's such as sensed demand forecast error, agreed operational planning error and on time in full (OTIF) could be used. (Kepczynski et al. 2019, 382)

## 2.3 Sales and operations planning

Sales and operations planning (S&OP) has been a relatively widely studied planning model. However, it has gained academic interest only recently, because of the increased number of studies and academic articles in the past years. For example,

Tuomikangas & Kaipia (2014), Oliva & Watson (2011) and Grimson & Pyke (2007) have studied sales and operations planning practices. Some S&OP related academic and managerial guides have been written, for instance, Sheldon (2006) and Wallace (2004).

Council of Supply Chain Management Professionals (2019) define sales & operations planning (S&OP) as “a strategic planning process that reconciles conflicting business objectives and plans future supply chain actions. S&OP usually involves various business functions such as sales, operations and finance to agree on a single plan that can be used to drive the entire business. S&OP can be a very effective tool in eliminating functional silos, and improving overall operations.”

The S&OP is, in simple terms, a monthly planning cycle where customer expectations and internal operations plans are studied and analyzed for example for risk management, accuracy and process liability (Sheldon 2006, 2). It is a tactical planning process, which aims at providing management the capability to lead its businesses strategically in order to gain competitive advantage, by integrating supply chain management with marketing plans for new and current products (Thomé et al. 2012, 360). It is used for balancing supply and demand, as well as to connect company’s strategic and business plans with operations (Thomé, Sousa & Do Carmo 2013, 2108).

S&OP links the firm’s strategic and business plans to its precise processes, as order entry, master scheduling and plant scheduling, as well as purchasing (Mendes 2011, 53). In other words, S&OP connects business plans with day-to-day activities and schedules. Some organizations include suppliers and customers in their S&OP processes (Council of Supply Chain Management Professionals 2019). S&OP is a significant part of supply chain management, because without appropriate volume plans, the supply chain can be slow reacting to unavoidable changes. Supply chain pulls to two directions: on the one end there are customers, and on the other end suppliers, with the company in the middle. (Wallace 2004, 15) Thus, S&OP can be seen as a key function in supply chain management (SCM) (Thomé et al. 2012, 360).

Wallace (2004, 57) presents that the essence S&OP is decision making. Some of the benefits of how S&OP can help in decision making are presented below (Sheldon 2006, 12; Mendes 2011, 53):

- It can help to choose if management needs to assign more resources on a new product introduction.
- It allows managers to have a holistic view of the business and
- it gives a window to the future, i.e. seeing if there is enough capacity in the production for the next quarter.
- Understanding the root causes of the operations failures.

In addition, there are also other, corporate level benefits of S&OP (Sheldon 2006, 25; Wallace 2004, 8):

- Considerable communication and balance improvement between supply and demand.
- Decreased inventory levels and better customer service.
- Decreased lead times in order to cash.

The inputs of S&OP process include plans and forecasts and the information on customers and suppliers, resources, inventories, capacities and S&OP targets. In addition, S&OP is connected to supply, financing and logistics. (Dreyer et al. 2018, 116) In order to gain S&OP success, the S&OP team has to adjust the supply and demand plans in detail and combine levels but still keep balance with the overall business plan. This sets a major challenge for many firms, because the S&OP process is often complex and cross-functional. (Ambrode & Ruthenford 2016, 17)

### 2.3.1 Sales and operations planning process

Wallace (2004, 59) presents the S&OP process and the business functions that are involved in the process. Figure 2 represents this five-step cycle process.

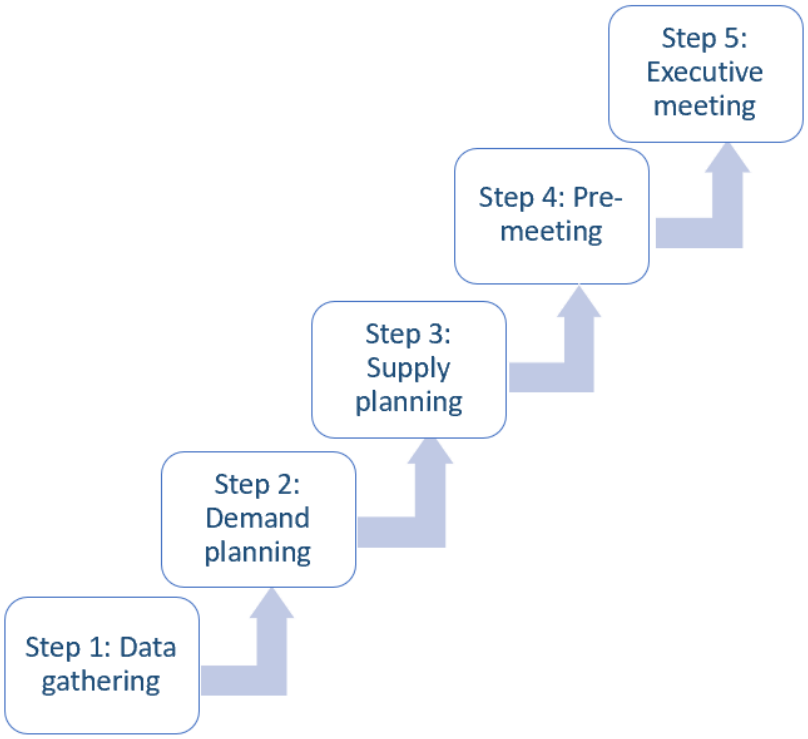


*Figure 2. S&OP process (Wallace 2004)*

**Step 1.** S&OP starts shortly after the end of the previous month, with reviewing, analyzing and collecting files and forecasts for sales, supply and inventory. In addition, key performance indicators are updated based on the previous performance. It generates information for sales and marketing to utilize in constructing the new forecast. (Wallace 2004, 59; Ambrose & Ruthenford 2016, 19)

**Step 2.** Demand planning requires sales, marketing and product management to be attendant. The target is to create a new forecast, which also includes new products. The key decision is the planning horizon, which usually ranges from 6 months up to 3 years, depending on the industry or for example the product's seasonality. (Wallace 2004, 60) This step is one of the most crucial one, because it refers to harmonization of the demand figures used by all units for analyzing availability of the capacity and operational impacts (Mendes 2011, 55).

**Step 3.** In a supply planning meeting the participants need to check if supply meets demand, and in the opposite case, provide reasons for the imbalance (Wallace 2004, 64*)* The participants may be from different functional areas, such as

manufacturing, warehousing and inventory. Each department or functional area should analyze operational ability to achieve the demand volumes. (Mendes 2011, 55)

**Step 4.** In pre-meeting different business functions discuss plans on a more specific level and updated plans are reviewed. The objective is to make decisions considering the demand and supply balance, and for example defining scenarios showing different courses of action to solve presented problems. All decisions should be made in this, or the next, executive meeting. The key members in this meeting usually are for example demand manager, production manager, sales and marketing manager, finance planning manager and logistics manager. (Wallace 2004, 65; Mendes 2011, 56)

**Step 5.** In the executive meeting the managers review, accept and/or modify the decisions from the pre-meeting. The objective is to authorize the changes in areas where considerable costs are included, such as in production, procurement and distribution. In addition, most important KPI's are reviewed. (Wallace 2004, 58-71; Mendes 2011, 56; Grimson & Pyke 2007, 324)

## 2.4 Sales and operations execution

Sales and operations execution (S&OE) is a comparatively new part of planning process, and can be defined as complementation for S&OP, which is focusing on short-term balancing of supply and demand. Gartner (2019a) defines sales and operations execution as "a weekly cyclical multistep process that involves at least four subprocesses or steps running in parallel with an underlying financial-alignment process. These subprocesses include a merchandising review, a demand review, an inventory plan and gap reconciliation, and an executive S&OE meeting". In the weekly S&OE meetings, operational plans are reviewed against the actual performance. In addition, supply and demand variables are managed. (Mendes 2011, 125)

However, Kepczynski et al. (2019, 381) recommend a simple three-step process for S&OE, which includes meeting preparation, agreeing decisions and communication

and follow-up. In meeting preparation demand planner(s) prepare data and coordinate required inputs form for example logistics and demand management. In the next phase, on S&OE the meeting, a demand manager should take the lead and ensure proper focus on decisions. In addition, outputs should be registered in an agreed operational planning forecast. Finally, demand planner(s) should communicate and register decisions in the systems and indicate actions to follow up. (Kepczynski et al. 2019, 381)

The process has not been very widely studied, but for example IT service management company Gartner has investigated it. Gartner (2019) describes S&OE as a middleman that collects, defines and sends information between strategic and operational level. It sees S&OE as a different aspect from S&OP, which complements S&OP and has a more precise, up to twelve-week tactical horizon. S&OE can be seen as an essential part of supply chain planning, because without a clear and defined S&OE process, a company supply chain can be locked with hidden potential. It is rather difficult to draw a process structure for S&OE, since it is executed and operated differently in every firm depending on their market, customers, and products. However, there are some distinguished considerations to construct the process: right data with high detail and overview and right people who can make decisions precisely (Kepczynski et al. 2019, 381).

Moreover, S&OP and S&OE have been seen as a part of the same process, but in fact S&OE is an individual process with a symbiotic relationship with S&OP. Namely, the target of S&OP is to focus on the tactical horizon, which varies from three to 18 months, while the aim of S&OE process is to address the short-term operations, meaning the horizon from zero to three months. This way, S&OE can proactively respond to the volatile supply chain, reducing the required facilitating raw material orders and production rescheduling, while the S&OP team can focus on coordinating the supply chain with overall business goals. (Ostdick 2017a)

In short, according to Kepczynski et al. (2019, 383) S&OE together with scheduling helps finding answers to questions such as:

- Which orders can be fulfilled, when taking current constraints across the supply chain into account?
- What-if scenarios: What are the impacts of a new order?
- How closely does the S&OP correspond to actuals, and how the differences can be solved?
- How can I etch the plan with my business priorities?

Most of the variability comes from for example shortages, delays, production shortfalls or disruptions. Hence, no matter how reasoned and thoughtful the plan is, success is eventually measured how teams manage unplanned or surprising exceptions. (Elementum 2019b) These unplanned and surprising events will be later described as “incidents” in the thesis.

In 2019 Supply Chain Industry S&OE Benchmark report the status of S&OE in different companies was investigated. The results show that, for example, companies do not effectively measure performance of S&OE but on the opposite, most companies are starting to implement S&OE processes. The report concludes, that even if firms have clearly defined S&OP process, fewer than half of firms are following the basic S&OE practices. (Elementum 2019b)

### 2.4.1 Benefits of using S&OE

S&OE has many benefits for firms. Lapide (2016, 6) presents that while S&OP creates monthly planning, it is essential to provide shorter planning horizon that are in terms of weeks and days, for various departments for reasons. For instance, specific information about country, product or account level is necessary by demand-side managers to drive sales and marketing execution. On the other hand, supply side execution needs inventory, transportation or product or even sometimes item level information. This is where S&OE is needed.

In addition, there is more and more data available of the business processes, and almost everything is under radar, which creates a wide range of possibilities to take corrective actions immediately as market dynamics change. This adds value to the

companies only if action is taken precisely on time. S&OE within the S&OP process is allowing weekly or daily discussions to amend the supply response to real-time changes in demand. (Covas 2016, 6) Furthermore, S&OE can respond to daily and weekly demand variations to maintain long-term strategic and operational plans working and precise (Hoey 2019a). This is also the essence of it, where it creates the most value. Especially in inventory management, S&OE's purpose is to ensure that any dips in demand for a certain product is being met by an equivalent decrease in stock levels (Hoey 2019b).

S&OE focuses in real-time on actual demand and production metrics in order to create a more accurate illustration of the stages of demand and production. This helps to detect possible incidents early and ensure effortless production cycles. (Ostdick 2017b) Firm's long-term strategy is usually based on financial data, which is collected from historic data, instead of looking forward. As a result, supply chain can be invisible in the strategic decision-making process, which might lead to poor trade-off decisions. However, S&OE can also help improve visibility of the supply chain, by offering data and insights for the S&OP, where again S&OP can align the supply chain with overall business goals. (Masters 2016)

Furthermore, the essence of S&OE is that it can offer significant opportunities for short term and long-term cost savings, because S&OE helps to increase the efficiency as well as eliminate the gap between future plans and present actuals. But in order for S&OE to succeed, the level of visibility required is crucial. (Hoey 2019b)

Supply chain effectiveness culminates into two things, how fast problems are detected and how fast they are solved. The longer it takes to detect and solve an error, the more value is consumed. This is where a well-established and accurate S&OE process plan can help. S&OE closes the feedback loop for S&OP, and the results indicate how the plan turned into actions. (Elementum 2019a) Ultimately, S&OE is customer service, with helping to balance short term supply and demand the best possible way.

Elementum (2020b) presents S&OE best practices as a simple four-step process:

1. Consistent capturing of supply chain incidents
2. Integrating incidents to facilitate weekly review
3. Collaboration between teams for finding quick solution
4. Analyzing core elements to prevent future issues

One important factor in the best practices is the importance of cross-functional perspective. S&OE enables cross-functional team to make short-term decisions with the best possible value and making the most out of available resources. In other words, in order to prevent chaos when incidents arise, it is crucial to have cross-functional perspective and ability to coordinate between stakeholders. S&OE has a straight connection to operational activities like transportation, customer service and production. (Elementum 2020, 2; Kepczynski et al. 2019, 375)

To conclude, S&OE and S&OP might seem like similar processes but separating S&OE does not require substantial investment, but can provide significant returns, both in running daily operations and long-term strategic planning (Masters 2016).

## 2.5 Challenges

Even if S&OP and S&OE can have multiple benefits in the company, Hulthén et al. (2016, 810) present that, even though S&OP is not relatively new concept, there are still multiple difficulties in measuring S&OP process performance. First, there is no standardized approach for consistent evaluation of S&OP process performance. In addition, in the academic or practitioner literature, the term of sales and operations process performance is not precisely defined. Therefore, measuring S&OP process performance has not been developed. Furthermore, according to Thomé et al. (2012, 361) there is not enough empirical evidence to support that S&OP process would improve company performance.

Tuomikangas & Kaipia (2014, 255) present that one of the essential S&OP coordination mechanisms is S&OP performance management, which includes

performance measurement, goal setting and support activities, and illustrates the essential approaches needed for these activities. In their study, Tuomikangas & Kaipia (2014, 256) also conclude that it seems that companies have challenges to predict changes in demand and coordinate their supply operations accordingly cost-efficiently. Thus, S&OP can be understood as a complex phenomenon, which can also influence S&OE process performance. Supply chain leaders still do not acknowledge S&OP and S&OE as different processes, rather they usually get mixed and the result does not work effectively for either planning or execution (Gartner 2019). On the contrary, Grimson & Pyke (2007, 324) state that S&OP is easy to understand but challenging to implement. Based on the academic literature, it seems that there is not a clear common understanding of S&OP, which can be typical to the topic, because it is usually different in every company.

There are also challenges in performance measurement. For example, all of the chosen measurements cannot handle the large amount of data. Another issue might be that the measures are not long-term focused. Accordingly, many companies measure only financial and operational data. (Khan & Yu 2019, 209) However, sometimes the collected data is reported but making the information meaningless. Hence, a lack of detail may be a challenge in firms. In addition, it is crucial to choose the right measures, because wrong measures can drive behavior that is not relevant or needed. On the other hand, firms tend to look for factors that can easily be measured, which do not always support the ultimate targets. (Khan &Yu 2019, 210)

When deciding what to measure and how in the case company, these challenges should be taken into account. However, in this case these issues are particularly not relevant, because S&OE process is short term focused and the company does not have any performance measures yet. As Elementum (2019) presents, the issue is that today’s supply chain IT solutions do not answer to the needs of S&OE. Namely, the need to adapt quickly to possible incidents. Still much of the S&OE work is conducted using e-mails, conference calls and spreadsheets in preventing and tackling the incidents. Hence, there are no relevant performance measures yet for S&OE.

# 3 Research methodology and data collection

After the theoretical background of overall business planning, supply chain performance measurement, S&OP and S&OE processes, the empirical part of the study is conducted. The objective of this chapter is to introduce the case company and the background and current operating model for S&OP and S&OE processes. In addition, this chapter describes the research context, data collection and methodology of this research. The reliability and validity of the study and the research methods are presented also in this chapter.

The aim of the data collection is to gain an in-depth information and understanding about the sales and operations execution. It focuses on obtaining knowledge about how the company has implemented S&OE and what is yet to be improved. Qualitative research method was chosen to conduct this research, because S&OE is a somewhat new concept and there is not much scientific research about that topic in academia.

## 3.1 Introduction to case company's S&OP and S&OE processes

This study is a case study for a large Finnish company. The company's supply chain department executes demand and supply planning from strategic and business planning purposes. They use sales and operations planning (S&OP) as tactical planning, usually starting with a minimum of three months, continuing it for fifteen months. As a part of the tactical planning, S&OP can be implemented over several years, but this requires additional effort in terms of input and reporting. On the contrary, when it comes to 1-3 months of tactical planning, it is already on the S&OE horizon. Thus, the boundary between the two planning levels is vague.

The company uses S&OP in assuring cooperation in the supply chain and also in minimizing undesirable and surprising risks. There are many other reasons why the case company uses sales and operations planning. The planning is making sure that the sales, supply, production and operations are working in-line. In addition, this is used to improve customer satisfaction, marginals and working capital.

Furthermore, this way operative and business plans are integrated and the holes between supply and demand can be filled up. Accordingly, S&OP can be understood as a compass, where the x axis is balancing between supply and demand and y axis balancing production capability and financial performance.

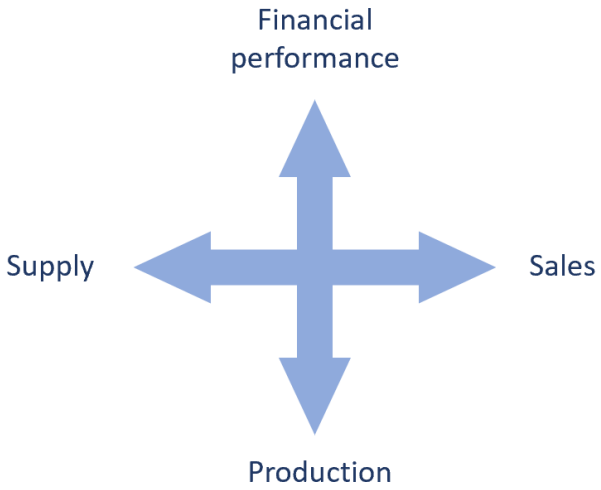


*Figure 3. S&OP balance.*

Supply chain planning has three overlapping stages in the company: Plan and optimize supply chain (S&OP), assess order feasibility (S&OE) and schedule production. The illustration of how S&OP process creates input data to S&OE and scheduling can be seen in Figure 4 below.

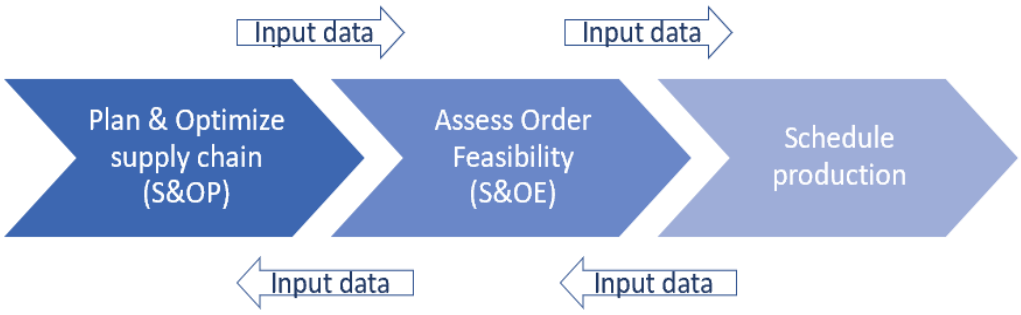


*Figure 4. S&OP input data.*

S&OP generates month level planning from sales, supply and warehouse levels to S&OE. In other words, S&OP gives a framework for sales and supply as well as the inventory targets, market analysis defines values and qualities, and trading provides premiums and discounts, which can be considered as an input for S&OE. The outputs of S&OE, however, are the decisions of sales and supply, which is then informed forward to traders, scheduling and risk desk, as well as communicating deviations back to S&OP and business controllers. Scheduling is then making decisions regarding for example how much, what and when to produce, i.e. the manufacturing decisions.

On the other hand, the information flows also down to up. Namely, decision making in scheduling can be observed in S&OE, from where the entire month's operations can be assessed as actuals back in S&OP. Ultimately, the entire planning process creates a loop where information flows both ways. Each process also receives input from outside the processes and the information can be considered as input or as an objective. Thus, operational planning and decision making is done in a circle from day to day basis up to fifteen-month periods.

S&OE is implementing the outputs of S&OP, which means that the sales and supply of every month is divided into smaller entities and ultimately to single loadings. The core of S&OE is to react to the changes in the markets so that S&OP can focus on planning longer term sales. S&OE also monitors the market and tries to balance and control the optimization of markets between the S&OP cycles together with trading. Consequently, the case company defines S&OE as a tool for finding the best possible financial or monetary option for executing sales and operations, considering the restrictions at that moment.

The case company measures the accountability of the forecasts and the actuals. To supply or to sell at the last minute is usually not as good as carefully planning the sales and supply in advance, because during one month there can be so many changes, that without steering the stocks could run out or go over. Therefore, careful planning and using S&OP and S&OE in the case company is essential.

### 3.2 Methodology

First, according to Saunders, Lewis & Thornhill (2012, 164) a decision of the research design has to be done. The research methodologies are qualitative and quantitative. This study uses qualitative method as a research methodology. Hirsjärvi et al. (2007, 160; 260) describe qualitative study as a method of observation and analytical study, which aims at providing concepts, simplicity, definitions and symbols for typically non-numerical data. Accordingly, qualitative research was chosen, in order to gain deeper information about the topic, because the precise nature of it is not fully understood in the academia.

The second decision is to choose what kind of research strategy is to be used. Generally, a research strategy aims at reaching the goal the researcher has set by defining the research questions. Consequently, the decision of research strategy should be guided by the research questions and provide answers to them as well as meeting the objectives. (Saunders et al. 2016, 177) The research strategy in this study is a case study. Hirsjärvi et al. (2007, 135) describe that case study is usually detailed information about a single case. Typical characters for using a case study is to choose a single case, situation or group. In addition, the examination is done on processes. This research can be described as a single case study, because the research is limited to only one case company. According to Voss, Tsikritsis & Frohlich (2002, 197) case study are often needed in the early stages when the topic is new and still relatively unknown.

The primary data is collected from ten different theme interviews from the case company employees. The data is then analyzed through process improvement method called as-is to-be. Process improvement methods are understood as business process redesign or business process reengineering (BPR). Mohapatra (2013, 51) describes BPR as a tool for “reinventing the wheel”, which means that it focuses on redesigning the strategic processes and the processes which add value. It includes first identifying the processes and reviewing and analyzing an as-is process. After that, a to-be analysis is made and designed as a guideline for the company to show where it should go and what it has to accomplish. Once the steps

are done, the final step is to test and implement to-be processes, aiming at continuous improvement.

Through interviews, company presentations and reports, an “as-is” process is thus described. The interviews are analyzed, and the answers are grouped, so that similar types of answers create a group. Grouping will give further insight to the challenges and thus help with generating a “to-be” description and presenting improvement suggestions.

Hirsjärvi & Hurme (2015, 14) present a four-step research process model, which is also used in this study. The process begins with identifying the preliminary research questions. After the idea of the research problem, the decisions about the type of research setting, how the material is acquired and what are the methods used to obtain it is to be done. The next step is to collect the data and analyze it. Finally, the conclusions are presented.

### 3.3 Data collection

Data collection can be separated into two parts. First, the data for case company presentation and description of the current operating processes was collected. The data was collected from company reports, observations and presentations. This part of the study is aiming at illustrating the current operating method of the S&OE process and the problem areas of the as-is S&OE process.

The second part of the data collection is aiming at answering the main research questions along with other sub questions. The data is collected through semi-structured interviews. Semi-structured means that the researcher determines the questions, but the interviewees can answer them with their own words and suggest other questions. It is possible also to differ from the original question order. (Koskinen et al. 2005, 104) In addition, semi-structured interview questions can vary in different interviews, depending on for example the organizational context or the flow of the conversation (Saunders et al. 2016, 391).

The interviews were held in the case company's headquarters, at the beginning of 2020. The persons chosen for the interviews were suggested by the case company, the Head of Supply Chain Steering and the Head of Supply Chain Development. All the interviewed persons are working closely with S&OE, which was the main criteria for the decision.

The interviewees are case company employees from different company departments. In the data collection phase, ten interviews were conducted. The interviews remain anonymous in this study in order to keep open and in-depth conversations during the interviews, however, the positions of the interviewees are presented below in Table 1.

All interviews were individually held, except for one for supply chain planners, which is called "Interviewee 9". The interview questions were sent to the participants beforehand, so that the participants had a possibility to consider the topics and questions before conducting the interview. The structure of the interview questions presented in each interview can be found in Appendix I.

| Interviewees | Position | Length (min) | Interview method |
|---|---|---|---|
| Interviewee 1 | Supply chain planner | 60 min | Face-to-face interview |
| Interviewee 2 | Supply chain planner | 35 min | Face-to-face interview |
| Interviewee 3 | Supply chain planner | 60 min | Face-to-face interview |
| Interviewee 4 | Trader | 60 min | Video call |
| Interviewee 5 | Trader | 30 min | Video call |
| Interviewee 6 | Business controller | 30 min | Face-to-face interview |
| Interviewee 7 | Operative planner | 40 min | Video call |
| Interviewee 8 | Operative planner | 60 min | Video call |
| Interviewee 9 | Supply chain planners (2) | 45 min | Face-to-face interview |
| Interviewee 10 | Business process manager | 45 min | Face-to-face interview |

*Table 1. Interviews*

In addition to supporting the interviews, a survey report and results of the case company's S&OE process maturity assessment was investigated. The survey is conducted annually to the teams, and based on the answers, the process maturity level of the company is evaluated. The survey results are from 2019, and the number of respondents was quite low, only 3. However, the results reflect well with the topics in the interviews.

For this research, the data is collected through interviews, which were recorded and later transcribed. Next, the data was imported to nVivo program, where it was inductively grouped and coded based on the similar answers, which will be presented in the next chapter below. Grouping was based on the themes found and

observed from the interviews. Behind these groups are things that the interviewees brought up as challenges in the current S&OE process.

### 3.4 Reliability and validity

Validity measures how accurately a suggestion, argument or result expresses the object which they are supposed to refer to. Reliability describes the level of consistency. The material can be reliable, but not valid, or the opposite. In addition, the material can be neither reliable nor valid. (Koskinen, Alasuutari & Peltonen 2005, 254)

All the interviewees are carefully selected from the relevant field. In order to improve the reliability, more than one employee under the same team was interviewed. In addition, the interviews were recorded for better reliability and later analysis. The interviews were held in Finnish and later translated to English, which may decrease the reliability of the study but on the other hand, by interviewing in the native language of the participants, a more in-depth conversation could be held. Accordingly, a better level of validity has been attempted by carefully using clarifying questions and exploring answers from different perspectives.

On the other hand, the study was conducted in one case company, and may not be generalized to other companies or industries. The possible issue with reliability is the issue of bias. The interview answers may be biased, if the interviewees have not answered honestly, but more considering what they should say or what is expected to say. (Saunders et al. 2016, 397) In addition, there are few previous academic literature on S&OE process, and therefore, this might impact on the validity and reliability of the study.

# 4 Case study presentation

This chapter first presents the case company's current S&OP and S&OE processes, and highlights some of the challenges in the as-is processes. The data for this was collected through company presentations and observations. The data analysis and results of the study will be presented in chapter five.

## 4.1 S&OP process structure description

This chapter presents the process structure of the company's sales and operations planning process. It serves as background information for the sales and operations execution process after every month. Thus, it is intended to be merely a "nice-to-know" information and help to set a framework for the S&OE process.

S&OP process structure is easier to present as a SIPOC model. SIPOC is a tool for Suppliers, Inputs, Process, Outputs and Customers analysis, which helps identifying all important factors of a process for process improvement purposes (Brown 2018, 198). The SIPOC model for S&OP process in the case company is illustrated in Figure 5 below.

The case company executes S&OP every month for the next three to fifteen months, depending on the cycle. S&OP meetings start around the second half of every month after all the sales and other forecasts are updated. The meeting starts with going through a task list of notes and tasks that need to be considered. During the S&OP meetings, supply chain planners go through the plans and inventories together with production planners and the rest of the team, based on the collected data and information about sales and supply. In the monthly S&OP meetings, there are multiple company representatives: Supply Chain Planners and their manager, Business Controller, Production Planners, Head of Supply chain Planning and modelling team. In other words, the process starts with data gathering from different units, which are described as "Suppliers" in Figure 5.

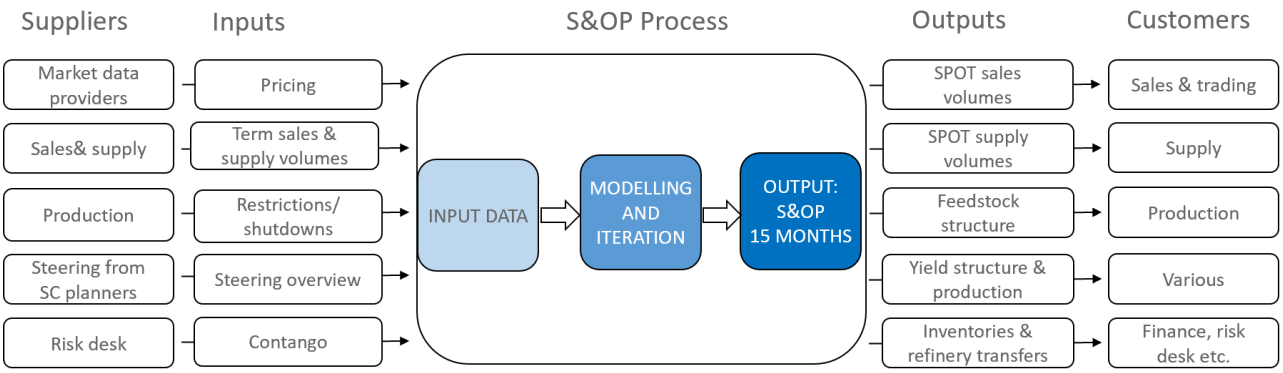


*Figure 5. S&OP process in the case company.*

Suppliers and inputs are organized through importance and effectiveness so that the most significant suppliers and inputs are presented on the top and the least significant on the bottom. Therefore, the most important suppliers are market data providers, which consists of several areas such as market, freight and premium levels. These all have different suppliers. Next are sales and supply, production, steering input, and finally risk desk. The inputs of S&OP, as illustrated in Figure 5, are pricing, term sales and supply volumes, restrictions, steering overview and contangos. Contango is a situation where the future price of the product is higher than the current spot price. This means that it is better to sell it with a higher future price than sell it now. In contrast, backwardation is a situation where it is not ideal to reserve or store the products.

One of the challenges in the planning process is to forecast seasonal products' manufacturing; how and when should the manufacturing of seasonal commodities start. In other words, supply chain planners must forecast the demand of the seasonal products well in advance. In addition, taking restrictions and possible shutdowns into account is also important for the planning. Another target in the S&OP meetings is to align the actuals from the first half of the month with the plans. Basically, optimizing plans with scheduling, so that the plans for the rest of the ongoing month match with the actual inventory levels in scheduling.

After all the inputs from the different suppliers have been collected, the input data is being modelled and iterated in S&OP process. In the pre-meetings, S&OP is run

multiple times for iteration. The plans are presented against previous S&OP and analyzed how well the plan met the actuals previously. Every product group is first planned individually and then aligned with the entire S&OP plan. The data can be adjusted and modelled again multiple times in order to match with the actual inventory or warehouse levels for instance.

Finally, 15- or 3-month S&OP is created, depending on the company's cycle. Final S&OP generates output data to multiple units: The most important function is to produce a production and operative forecast for economic forecasting processes. It indicates spot sales and spot supply volumes, which sales, SCM and trading use. It illustrates the feedstock structure for production purposes and generates inventories and refinery transfers data to different customers, such as risk desk, finance and other departments. In addition, finalized S&OP is the framework and basis for S&OE.

In the final S&OP executive meeting, other company departments are also invited to see the final S&OP, for instance Vice President of Supply Chain Management, Head of Supply Chain Development, Logistics Planners, Process Engineers and Manufacturing Managers. In this meeting, the participants present an updated profit forecast, the most significant points and differences compared to the previous S&OP, important findings and necessary changes in the model, and possible scenarios. In the review, possible management of change (MoC) items are presented, which means for instance that it is identified that a change in the process must take place in order to implement the S&OP. In that case, the items will be listed, and a responsible person will be put forward. In this meeting, final S&OP is thus communicated to other company business departments and S&OP is ready to be carried out.

All in all, S&OP is a significant planning process, which generates data from different company departments and provides guidelines for multiple units in the company to use. S&OP offers information flow to both levels: from business planning to master scheduling and execution. The key take-away is that the initial data for S&OE is always the decisions made in S&OP. Thus, the information flows from upper planning levels to lower planning levels.

### 4.2 S&OE process structure description

S&OE starts after the S&OP planning has been done and finalized. Depending on the product group, the time horizon in S&OE is from 1-2 weeks up to one month. In many cases, S&OE can be seen as a combination of scheduling and weekly planning. The goal for S&OE in the company is to assess new market opportunities in sales and supply and determine the flexibility of the plan and communicate changes. Another important task is to follow and respond to supply and demand fluctuations.

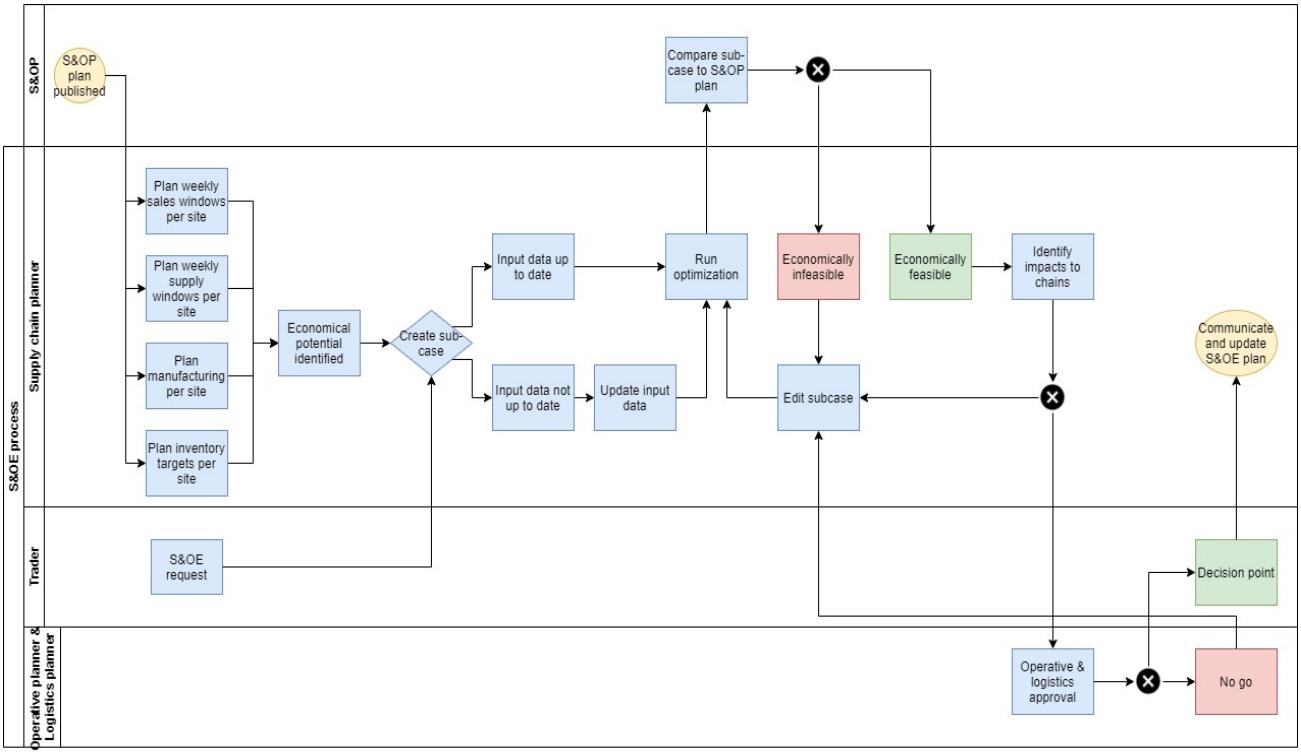


*Figure 6. S&OE process structure in the case company*

Figure 6 is a swimlane diagram which shows the actions of the process by the performer (attached also to Appendix 2). The process performers are a) Supply chain planner, b) Trader and c) Operative planner and Logistics planner.

S&OE process starts always after S&OP is published. Supply chain planners are responsible for different product chains and thus their responsibility is to plan weekly sales and supply windows as well as plan manufacturing and inventory targets per site. In addition, economical potential is identified. The initials for S&OE or S&OE request can come from many directions. For example, different market situations can drive change in the plans, or the incentive can come from scheduling and operative planners or in this case, from a trader, who scans the markets and finds potential customers. After a subcase is created, input data needs to be updated and optimization is run. Subcase is compared to S&OP and economic feasibility is assessed. Only economically feasible subcases are accepted, otherwise the subcase is edited, and optimization is run again.

After the assessment, the impacts of the subcase have to be compared to other chains. If everything is aligned, the sub-case needs operative approval. Operative approval has to come from operative planners and logistics planners, who provide information about the transportation and delivery. Only if the plan is approved, the decision can be made. Finally, the changes are communicated, and S&OE plan is updated.

However, the process varies between every chain, because the products and their markets are comparatively different to each other and Figure 5 illustrates one example of S&OE, because every product chain is different and thus there is not a certain process for S&OE and this is why the process may vary from chain to chain. For example, for other products or chains, the role of trader might be bigger, meaning that before the case is moving for operative approval, the trader has to accept or reject the case.

### 4.3 Challenges in the as-is process

The issue in the case company is that there is still a lack of relevant up-to-date data from S&OE, so the information collected is often outdated and there should be a better follow up measurement or tool to help supply chain management to take action if needed. Another challenge is that there is yet no financial performance measurement metric in the process. This is especially challenging in the

management decision making, because there is no reliable data to show and indicate why a certain kind of decision should be made.

Henceforth, there should be more visibility to the supply chain, meaning that all information should be in the same place, and possible to observe. The goal of supply chain planning is to plan and execute sales and operations as good as possible, but also to ultimately improve the financial and economic decision making.

Some challenges appear also in the S&OP process, which might have impact on S&OE as well. In the meetings, much work is still done manually, which is time consuming and liable to human errors. Another challenge is that the business environment is very volatile, thus it is difficult to forecast.

However, there have also been positive changes, the company's SCM unit is satisfied with dividing S&OP cycles to shorter, 3-month periods. The company used to have all the S&OP's in 15-month planning periods before, but after the change, SCM finds that it is easier to plan and forecast production in depth and in more detail, than before.

# 5 Data analysis and results

This chapter presents the analysis and the results of the interviews. The results are based on ten different theme interviews conducted in the case company. The first part will focus on what type of information the interviewees get from S&OE and how do they use it. The second part will focus on the challenges. Challenges have been grouped based on the similar answers. The third part presents improvement suggestions based on the interviews and other research done in the case company.

The answers were coded and grouped by using nVivo program. First, all the interview responds were transcribed and then imported to nVivo. Later, similar types of answers were coded and moved under nodes.

## 5.1 S&OE's role and impact on decision making

As already mentioned, S&OE provides information to multiple stakeholders. In general, after S&OP has been published, S&OE starts. The information that S&OE provides is more precise, meaning that for example product or production specific information should be available. Practically S&OE agrees with the sales office on the next month's SPOT sales and imports. These can be adjusted along the way. The plans for the next week or two are considered together with the refinery, especially if they do not appear in the systems.

From the very beginning of the interviews, it was evident that S&OE is a relatively new concept, and there is no one particular way of doing it. In fact, the definition of S&OE is still not clear concept, especially in terms of the case company business planning. It seems that S&OE term is in theory understood, but in practice there is no general way of doing it. Therefore, the interviewees experience S&OE in different ways. From the answers it can be also seen that the position of the interviewee has an impact on the perceived importance of S&OE:

*“S&OE is not a specific process for us, it is rather a way we carry out S&OP the best possible way.”*

- Interviewee 9

*“S&OE should be a more concrete version of S&OP, but I have to admit that we don’t use S&OE much in our planning here. Therefore, in regard to the implementation of S&OE design, there is still room for improvement for us.”*

- Interviewee 7

*”We wouldn’t cope without S&OE in practice, because we need to see the effects from there in two-three weeks and that they (the products) will be what we wanted. These can all be seen from S&OE.”*

- Interviewee 4

It can be stated after Interviewee 4 that S&OE is a crucial tool for decision making in the company. S&OE is needed the most for example in inventory management, which helps illustrating what is happening and what is possible to do, and price management, which helps figuring out what types of combinations works the best at that moment.

In addition to the Interviewee 9 comment, business controllers follow the success of S&OE compared to S&OP every month. According to Interviewee 6, they monitor the success of execution and bring up suggestions for improvement. As presented in the literature review, in overall company business planning the information flows both up and down, and for example company strategic planning might give guidelines for S&OP from where the information flows down to S&OE. For example, there might be guidelines for cash flows or working capital levels which need to be taken into account in the decision-making in S&OE.

As presented in the literature review above, weekly S&OE meetings should be organized in order to keep the process running and effective. Firstly, right now there are no weekly meetings dedicated to S&OE specifically. Other types of meetings may occur weekly, and for example traders keep in touch with SCM in some cases on a daily basis. SCM informs traders and operative planners and logistics planners

whenever there are some new changes. There is one weekly meeting where all stakeholders discuss the weekly themes and issues, however that is not assigned S&OE meeting.

However, when asked about the weekly S&OE meetings, the answers were divided into two different categories. On one hand the interviewees say that the one weekly meeting does provide enough information regarding S&OE, because all urgent information is communicated as soon as they occur. This weekly meeting with all relevant stakeholders is seen as enough and efficient. On the other hand, interviewees experience that there are no appropriate weekly S&OE meetings, which can be an issue if there is not enough communication. From the answers it is evident that the role of the interviewee is highlighted.

"*We do have a weekly call and in addition we communicate daily with Supply chain planners. One meeting per week feels sometimes too seldom, so therefore daily communication plays a big role here… There might be many changes during the week."*

- Interviewee 8

*"There should absolutely be at least once a week a call, but it feels like a waste of time because there might not be much to tell. I usually inform them of the updates as they come."*

- Interviewee 3

As already presented in the literature review, supply chain effectiveness culminates into two things, how fast problems are detected and how fast they are solved. The longer it takes to detect and solve an error, the more value is consumed. Therefore, S&OE can help providing more visibility into the chain. This was also highlighted as an important factor in the interviews. Interviewees find it valuable to get information about the changes, and thus visibility can be seen as a key factor in S&OE.

*“I think that the best way to gain value from S&OE is recognizing and reacting to changes in the plans. We have to constantly be up-to-date about the changes and their impacts to the supply chain.”*

- Interviewee 4

*“Especially in the unplanned events it is valuable to be informed and work as a team. The surface in S&OE works well when we all know what we are doing. On the contrary, it works poorly if we don’t. If there are any problems, they have to be highlighted early enough.”*

- Interviewee 5

Furthermore, the best way to gain value from S&OE is that it provides information on what is sensible and possible to do at a certain moment. Sometimes, for example, it could be useful to sell everything, but S&OE provides understanding of what is the most sensible, for example from the refinery’s point of view. Thus, S&OE is recognized as a valuable tool in the company.

S&OE is a tool for balancing short term supply and demand and provides the ability to react to unplanned or surprising events. According to the themes presented in the literature review, these events were called incidents. To figure out the level of incidents, the interviewees were asked if they recognize and react to them. In general, the bigger the incident, the more it has been given attention. S&OE in the case company is used for finding the best possible financial or monetary option for executing sales and operations, considering the restrictions at that moment, which means that behind the decisions made in S&OE, there has to be a revenue, cost or cash impact.

Because there might be multiple incidents during one month, only the most critical ones in monetary terms gain attention. It is important to consider the best way of getting through an incident, and most of the times it is communicated between supply chain planners, operative planners and traders. When incidents occur, the best way of working around it is the alliance between scheduling and S&OE. In fact, the interviews highlighted that S&OE does not work separately from other planning

and execution processes, rather it is best carried out together with scheduling. S&OP plays also a big role in S&OE, because it is the framework for operating in S&OE. In addition, after every month, the decisions made in S&OE are highlighted back to S&OP. However, S&OP is not the only input for S&OE, the inputs may come for example from scheduling or market. Furthermore, the input does not obligate to act accordingly. This is why it is important to be up to date on S&OE on what is happening around the company and sometimes a quick reaction to occurring events is essential despite plans of S&OP.

Accordingly, incidents happen regardless how good the S&OP is, and thus the reaction to them is critical in order to maintain good level of performance. When asked how the interviewees experience the reaction to incidents, the answers were quite similar:

*"Sometimes if something bigger happens we try to find the best financial or economical solution of how to tackle it. And in general, what options do we have. This is often an alliance between S&OE and scheduling."*

- Interviewee 2

*"In case there is an incident, we always consider different options and how to deal with it. Fortunately, the operation plans are updated before S&OP, in order to be aware of any upcoming limitations or restrictions."*

- Interviewee 8

According to the interviewees, there is usually two variables acting: time and economy. Scheduling calculates and communicates the restrictions regarding time and in S&OE the Interviewees are trying to find the best possible financial or monetary option. Consequently, this is how the case company defines the purpose of S&OE. One question was also if the interviewees know the revenue, cost or cash impact of the incidents. Generally, the cost impact can be calculated, but more often there is a greater focus on monitoring other costs such as feedstock accuracy. Only if something bigger happens, or if management requires the calculations, they are monitored.

Furthermore, Business controller collects and tracks the incidents after every month for reporting purposes, because one performance metric they have is forecast accuracy. After a month, business controller starts collecting information about the past month, compare it to S&OP and reviews the incidents, and discuss about them with supply chain planners. It should be acknowledged that an incident can also be a positive deviation from the plan. Positive deviations are taken into account, in case if the original plan is deviated because of better revenue, cost or cash impact. But there might be cases where the plan has not been followed due to some unit disruption. This type of information is seen important, but there is still a lack of relevant up-to-date following.

*“Action was taken on the sales side, when monitoring was carried out at the customer level, especially for those with a poor plan versus execution accuracy. We had offered customers quite much flexibility in the past but now sales accuracies have improved.”*

- Interviewee 6

It is unlikely to hit 100 % forecast accuracy in the industry, since it is quite volatile, but the optimal target should according to business controller be set at 90 %. The bigger picture can often be illustrated based on the reviews, but however, the target accuracy is still a challenge, and that among other perceived challenges will be analyzed in the next chapter.

In the literature review, one of S&OE best practices is to have a cross-functional teams working together. In the case company, S&OE works together with scheduling and operational planning and it is seen as a positive thing. The interface between S&OE and scheduling should be working well in order to succeed in the planning and execution. All in all, S&OE together with scheduling is the only decision-making tool for many. Therefore, it is always important to have the process running smoothly. However, many interviewees find that S&OE has not improved much and is not working effectively or efficiently, in addition, the interface between S&OE and scheduling should be better, in order to improve the entire process. This is crucial also in regard to the literature review, because S&OE is not a disconnected

single process, but rather a joint process, where information flows on both directions from S&OP to scheduling and operative planning.

### 5.2 Current state: perceived challenges

A crucial part of conducting the interviews was to find out what are the key challenges in the current S&OE process. Some of the challenges were highlighted more often than others, and the summary of the frequency of the highlighted themes is presented in Table 2.

| | | | Frequency | Frequency (%) |
|---|---|---|---|---|
| Challenges | S&OE | Chains | 8 | 16 % |
| | | Implementing S&OE | 8 | 16 % |
| | | Defining S&OE | 10 | 20 % |
| | Communication | | 5 | 10 % |
| | Changes to plans | | 6 | 12 % |
| | Performance measurement | | 4 | 8 % |
| | IT Systems | Information delays or errors | 2 | 4 % |
| | | Scattered information | 2 | 4 % |
| | | Need for system updates | 5 | 10 % |
| **Total** | | | **50** | **100 %** |

*Table 2. Challenges in S&OE.*

Table 2 presents the most common themes that the interviewees found challenging. The frequency means the number of how many times a certain topic or issue was brought up during the interviews. Therefore, one topic can be brought up during the interviews multiple times. First group is defined as S&OE. It includes the concept of SCM chain thinking, implementing and using S&OE and defining S&OE. This group is thus the most critical, because it covers up to 52 % of the frequency of the topics

the interviewees presented. Communication topic includes issues in communication, information sharing and weekly meetings. Changes to plans relate to incidents and the difficulties in planning and forecasting. Performance measurement includes measuring and reporting. Final group is called IT Systems and it includes information delays or errors, scattered information and need for system updates. All of these topics will be further presented and analysed in this chapter.

**Difficulties in defining and structuring S&OE**

Firstly, one issue is that S&OE would require a more precise definition. At the moment, there is no common vision and understanding between all the interviewees of how S&OE differs from other planning processes. Some interviewees comment that S&OE is as if a new name has been put on top of the old activity and nothing has really changed. In general, when discussing about S&OE during the interviews, many interviewees said it is challenging to know what counts for S&OE, because the line between S&OE and for example S&OP is often hidden or volatile.

*"We have often tried to illustrate it but it always starts and ends as quickly."*

- Interviewee 8

*"There are so many abbreviations, so how much does this eventually differ from S&OP…there are some products where we don't use S&OE, only S&OP."*

- Interviewee 4

*"What is the best way to gain value for S&OE…Here again the challenge is to first recognize what counts for S&OE."*

- Interviewee 5

This indicates that S&OE is understood as what is means, but the fine line between S&OE and other planning stages, like operative planning and S&OP is hidden. One way to simplify the core of S&OE and distinguish it from other planning levels is to describe it according to Gartner (2019), who portray S&OE as a middleman that has

three purposes: to collect, translate and send information between strategic and operational level. Accordingly, S&OE filters out any unnecessary information and provides leaders a crisp screenshot of reality, which can be compared to the plan to see if the business is on the right level. Based on the interviews, there are still challenges in this matter, for example there are always some unexplained differences left in between production, supply, inventory and sales, which do not always match together.

In addition, when interviewing company business process manager (Interviewee 10), it was evident that the process maturity level for S&OE is currently quite low, only on the second level, from a ten-level scale, which supports that there is still a challenge in implementing S&OE process. The case company measures process maturity annually based on an online survey. The last survey was conducted 2019. For instance, the respondents know only vaguely the inputs and outputs of the process and the respondents do not know whether everyone involved would describe the process the same way. This indicates that the S&OE process is not yet clear to the persons involved. However, the issue is related to chains, because it is difficult to structure S&OE in an efficient way if the chains work individually. This issue will be discovered next.

**Supply chains**

One of the challenges at the moment is that every chain works as its own, and thus the bigger picture is often hidden. S&OE should take it into account and search for the overall optimum between the chains. At the moment, how it is handled is spread over different chains and therefore, the weakness is that everyone has their own challenges and in addition one chain is understood by one person, often the supply chain planner who takes care of the chain in particular. This causes also other problems. Namely, if someone is absent, or there is a need to cover for someone, no one has the full understanding and know-how of the chain.

The interviewees presented that S&OE’s weakness is now that is does not have visibility to what else is happening between the chains. There should be a way to improve it, however, often if actions are taken, the implementation is not finished, because the interviewees find the workload then too large. The issue with single

chain thinking is that some critical products' planning and steering is done as if they do not have any effect on other chains or products. According to Interviewee 7, the sales of these certain products is a huge challenge, because it changes a lot all the time and it is hard to forecast and plan the sales, and in addition it has impact on many other units. The interviewee sees that the sales should be better organized and managed. In addition, Interviewee 2 agrees that S&OE should have broader view in optimizing, at the moment it does not work well and would require updating.

However, it is difficult to design and implement S&OE so that it would work the same between every product chain. It would require that the company move away from product chain thinking and thus only carry out S&OE as a unit rather than individually. The challenge here is that the planning of the products vary a lot, which means that product A could be entirely dependent on S&OE, but product B can be planned and optimized based on S&OP or scheduling. Interviewee 8 bring this issue up by saying that there has to be product specific planning, because for some products the timeframe for planning is only a matter of a week, which makes their work as scheduler difficult.

**Issues related to IT systems**

The other key issue is considering the systems. According to many interviewees, the current systems are not up to date, requires lot of manual work or there are too heavy, too many or too slow systems. A lot of S&OE work is done by using Excel, but some interviewees highlight that it is not as good tool as this work would require. For example, Interviewee 2 mentioned, that much work is done using excels, which can sometimes be a little bit dangerous in terms of accuracy. At the moment, there is no tool which could tell whether to choose product or component A or B, and especially how to evaluate them to each other. Current excels can only show the value of a certain supply chain at that moment. Furthermore, Interviewee 9 states that the current S&OE planning system is stiff, meaning that only one person is able to edit it at the time and the changes and updates are not clearly visible in excel. Therefore, the risk is always that they may go unnoticed.

Another issue here is, that there is little integration between the systems, and so much of the information is scattered between different systems. The company use

for example SAP and Excelman side by side in the planning processes and therefore the information is spread and thus may cause some errors or unexplained differences between the systems. Forecasting accuracy level is thus quite low. However, the interviewees see that even if there is still room for improvement in this matter, forecasting accuracy is getting better and developing constantly.

Moreover, there is a lack of up to date information in systems. Especially Interviewees 7 and 8 present that it can be problematic if for example information about planned SPOT sales is not in the systems on time or if something has changed and the information is incorrect. It often also raises questions of who is responsible of the errors. These problems occur almost monthly and causes headaches in terms of planning. In this particular issue, the interviewees highlight that effortless communication plays a big role. It is crucial to inform all stakeholders in any new changes, because the information systems may not always be up to date. However, communication errors also occur, which will be further analysed later.

**Performance measurement**

Challenges occur also in performance measurement. Namely, there are no accurate measures, and the level of measuring is still poor due to scattered information, meaning that information can be all around the systems, which makes performance measurement difficult. Big picture can be illustrated with a certain accuracy, but there are always some unexplained points left. Now there might be contradictions in numbers between stakeholders, for instance Interviewee 4 mentions inventory levels and profitability. Therefore, there should be a measure which could combine warehouse forecast accuracy and profitability. In addition, it should be somewhat real-time, so that the decisions made in S&OE could be easily justified and hence, reward those who have succeed.

At the moment the information is often outdated, and changes can be difficult to highlight. SCM measures forecast accuracy, but it does not always reflect the reality, since positive deviations also affect to the metric. In addition, forecasting accuracy should always be measured carefully, so that it reflects the reality in a best possible way. This means, that the forecasting units should be the same as the actual units.

Theory supports that finding the right measures for the process can be complicated, because the measures should be accurate in order to drive strong performance, but specific measurements for S&OE are still quite rare.

Interviewee 9 specifies that in their team they use customer delivery performance as a KPI. In addition to that they have annually changing KPI's and inventory level metrics that guide their execution. Interviewee 9 highlights that the biggest goal for them is to keep production at planned utilization rate.

In the future, in order to improve the process, it would be critical to have all the data in one place, and the data should be automated and visualised better than now by implementing tools like Power BI. Currently, the process data is not visible for end users.

**Last minute changes to plans**

In the previous chapter the concept of incidents was presented. To summarize, S&OE should work as a tool for detecting and tackling incidents so that the short-term supply and demand are in balance. Reacting to incidents is thus seen as an important way of controlling the short-term performance, but interviewees see that there are not enough resources or time to catch up with everything. Therefore, there are still quite many incidents and as some of them can be handled, some incidents are left unnoticed. This causes challenges according to the interviewees.

*"These incidents occur unnecessarily often due to unit disorders or market changes. It means more additional work and headaches, because we have to think of many other solutions…"*

- Interviewee 8

"*The problem here is that we have many changes and incidents that may go unnoticed."*

- Interviewee 4

Constantly changing plans also affect cost effectiveness and it complicates planning. For example, a product is manufactured for a higher price than what the

market value is, or that the raw materials have already been purchased, which afterwards turn out to be useless as the plans changed. Interviewees also ponder if last minute changes occur because something was simply done wrong, or because they were not aware of the situations happening in S&OE and scheduling. Moreover, there is no penalty for planning inaccuracy, because the variables are endless, and it is impossible to separate the effects. Therefore, seems that much of the work is now focusing on firefighting which is keeping resources from driving strategic plans.

Interviewee 6 suggests that there would be weekly follow-up instead of monthly follow up in order to better react to the changes, but acknowledges also that there might be many changes in a month, so the follow up should be done effectively, so that tracing the incidents would really be efficient and not time consuming. If the company does not want to implement it, the current model works as the biggest deviances can be traced.

*"Then there may be purely mistakes that no one has noticed going past the plan. In order to better catch them, maybe there should be weekly monitoring."*

- Interviewee 6

In order to improve this, there should be a better follow up, and S&OE should be given more attention. However, it is important to acknowledge, that different interviewees handle S&OE from a different perspective. Accordingly, supply chain planners have different view than for example traders or operative planners. One possibility is to have better weekly follow up on the changes. As Interviewee 6 mentioned, weekly follow up could be time consuming, but if there was a way to do it efficiently, it would improve the performance measurement. In general, the difference between forecasts and actuals should be monitored more closely, because S&OP figures will drown during the month if there are many last-minute changes.

**Communication**

Few times in the interviews lack of communication was seen as a problem. For example, Interviewee 7 sees that much of the work is done individually, without informing or discussing with others. Even if the volumes are lower with certain products, it would be good to communicate more about the plans and changes between S&OE and scheduling. Already in the theory, it was acknowledged that much of S&OE work is still done using e-mails, chats and spreadsheets, because there has not been good tools or systems that would help operating S&OE. However, much of this issue seems to be a work role or individual experience. Because, on the other hand, the interviewees see that communication works well and there are daily discussions around S&OE.

The importance of communication on especially highlighted when errors or incidents occur. It is important to inform all stakeholders in any new changes, because the information systems may not always be up to date. Thus, increasing information and interaction is seen important. It was also highlighted that the final S&OP should be better reviewed with operational planners, and they should have a better know-how of the plans in order to explore it themselves.

As a matter of fact, it seems that also in this matter the role of the interviewee in S&OE process plays a big role. Namely, on the other hand, communication was seen as a strength of S&OE during the interviews. Some interviewees say that there are daily discussions and interaction around S&OE, and that it is also what brings the most value to the process:

*“At its best, it is about working together and working as one team.”*

- Interviewee 5

## 5.3 Future state: improvement suggestions

The interviews bring up similar types of answers. The answers were grouped and summarized in Table 2 above. Based on these, the improvement suggestions can be presented in this chapter and the to-be model can be illustrated.

First and foremost, S&OE needs to be better communicated in the case company. At the moment the case company defines S&OE as a tool for finding the best possible financial or monetary option for executing sales and operations, considering the restrictions at that moment. The interviewees find it difficult to draw a line between the different planning levels, but it is difficult to draw a consistent framework for S&OE, because it is not a clear separate process, but rather a tool for executing S&OP. The issue in the case company is that there is still a lack of relevant up-to-date data from S&OE, so the information collected is outdated and there should be a better follow up measurement or tool to help supply chain management to take action if needed.

In the interviews, it became evident that one of the challenges was that the interviewees experience that the chains work as their own and therefore, the full potential of S&OE is not realized. Because of this, the bigger picture is often hidden, the decision making in S&OE is focused only on one supply or product chain, and often only one person has the understanding and know-how of one particular chain. This emphasizes the need for transparency, the interviewees wish that they could be more aware of what kind of actions and decisions are made elsewhere, but there are no tools for better follow up, and at the moment it is seen as time consuming and ineffective. Moreover, S&OE does not at the moment provide overall optimization, rather all the chains use S&OE for their own planning purposes. The chain thinking in the case company is strong, and it can be difficult to implement other ways for working. Particularly, if the current workload is already excessive. Figure 7 illustrates the issue.

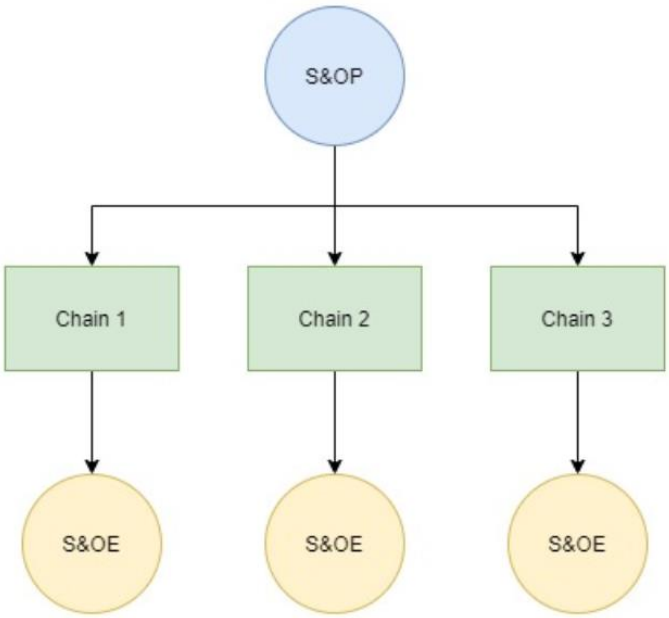


*Figure 7. Chain thinking in the case company*

Nevertheless, in order to implement S&OE's full potential, it should be integrated, cross-functional process. Figure 8 presents a future suggestion for S&OE for the case company. It could help also in defining S&OE better, because in this case it would not be an individual way of executing S&OP. In this way, S&OE does take all the chains into consideration and could help decision making in a way that visualizes the impacts on other chains as well. In Figure 8, all the chains work together around S&OE, which would improve the transparency. Many interviewees highlight that the issue is that S&OE does not provide a bigger picture. Another option is to revise the current work roles of the SCM team and consider adjustments or changes so that the team would gain better visibility and transparency, which was one of the most beneficial aspect of S&OE in the literature review.

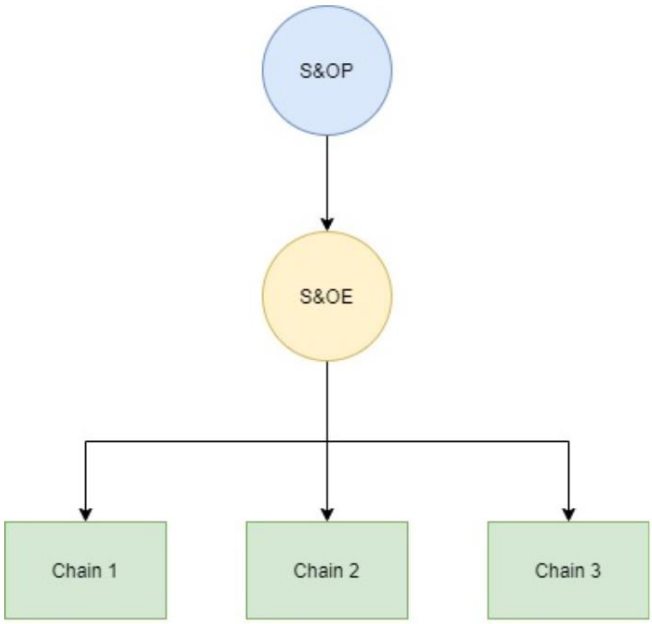


*Figure 8. S&OE to-be.*

Furthermore, in order to improve the short term demand and supply fluctuations, a specific S&OE planner(s) could be someone who has an overview on all the chains and decisions going on, or that the supply chain planners could have a backup player who would be able to review, collect and help in decision making. Having regular S&OE meetings could also help improving the process. Based on the feedback given in the interviews, the respondents see that the weekly meetings with all stakeholders is a good way of catching up with everything, but there is also a room for improvement in that matter.

According to Interviewee 10, one good way for improving the understanding of the process is to have regular meetings and invest for example ten minutes of your agenda regarding business processes to remind that they actually work in a process, they are not just a function. This creates awareness and might help further improving the process and generating new ideas. In order to add value to the company and their business processes, it is important to realize what it is that they actually do in a context. How does it affect on customers, other departments and units.

One issue presented in the challenges was changes to plans and how many of the incidents happen unnoticed. It is impossible to avoid all changes to plans as well as delays, disruptions, market changes or production short-falls, but it is possible to improve the method of how to track and react to them. Clearly, as the S&OE process is better defined and all the chains carry it out together, the better they notice the incidents. As in the literature review, implementing S&OE best practices could improve the tracking of the incidents and possibly prevent future ones from happening. Furthermore, according to Interviewee 6, in order to hit better forecast accuracy and track incidents, it would be good to have a weekly follow-up. In other words, following the number and status of incidents, average solution rates and solution times as well as total cost of resolution are among others good ways to measure performance, according to Elementum (2020, 7). Moreover, as there is currently no STI targets in the planning accuracy and no penalties for inaccuracy, this way, it could also be easier to acknowledge the responsible persons for each step and set clear expectations for roles.

Another topic that the interviewees saw challenging was the lack of up to date information, which is also often scattered. Data visualization tools, such as info screens and up-to date whiteboards could improve how easily the information can be found. In order to increase transparency, the planning tools for example between S&OE and scheduling could be in the same place. In addition, actively recoding and reacting to incidents as Elementum (2020b) presents, where there is a) consistent capturing of supply chain incidents b) integrating incidents to facilitate weekly review c) collaboration between teams for finding quick solution d) analyzing core elements to prevent future issues. Thus, as there is more data available of the business processes, it creates a wide range of possibilities to take corrective actions immediately as market dynamics change. This adds value to the company only if action is taken precisely on time.

### 5.3.1 Performance measurement

For improvement purposes, a relevant and reliable performance measurement essential. When performance is measured, it is easier to pinpoint actions that need to be taken.

One of the topics that were presented in the interviews was that it would be easier if for example traders and SCM had the same metrics to follow. Shared performance measurement has the benefit that the teams can no longer talk past each other because of different performance measurement. Furthermore, this could also improve the visibility of S&OE. According to Interviewees 4 and 5, shared metrics could be improving the visibility and search for a common understanding. Thus, they could start working against the model so that it provides the company cash. Interviewee 5 presents that for example profit could be a common metric:

"*…because everything we do, we do for the company. It would be good to work for it together with the same resources."*

- Interviewee 5

One concern about the shared metrics that interviewees ponder is the netback issue. Namely, the company has had shared metrics before, but it was later abandoned, because the relevance of the metric could not be ensured. Earlier, shared metrics could be manipulated so that someone could in theory control what kind of bonuses they get based on the calculated price. Therefore, it requires a built model against which to act, that it cannot be tampered with.

The challenge with shared metrics is to ensure that the figure is a genuine manufacturing cost and there are no additional which could drive better bonuses for someone. Interviewee 1 argues that the issue with shared metrics with traders could improve the performance, but on the contrary, it could lead to a competition between the chains, where their own benefit becomes a priority, and it does not improve the overall S&OE or company benefit. As previously presented, business controller collects information about forecast accuracy. However, this can be difficult to measure, since positive deviations have to be excluded from the metric, and the

tracking is done monthly, from systems that may have different numbers, which all may cause inaccuracies in the measurement at the moment.

All in all, when discussing with the interviewees about measurement, it became clear that rather than focusing on what to measure, it is important to understand how to measure. A more frequent tracking and review of the situation together with shared performance metrics could improve S&OE process performance and ultimately provide the entire company a better result.

# 6 Discussion and conclusions

This thesis examined S&OP and S&OE processes in a case company and conducted a study where the aim was to recognize how sales and operations execution process could be improved. This chapter provides answers to the research questions, describers the conclusions and presents suggestions for future research.

The theory covered the topics of overall business planning in companies, and further deepened to sales and operations planning and sales and operations execution. The level of academic literature in this topic is still quite vague, even if companies have been implementing sales and operations execution for a while. This indicate that there is still a research gap in this field. The study was conducted as a qualitative research, and the data was collected through semi-structured interviews and observations.

In order to answer the main research question, it is important to first clarify what the current operating method and as-is process are, and what are the challenges and improvement areas. Thus, the sub-questions are as following:

*What is the current operating method of the S&OE process?*

*What are the problem areas of the S&OE process?*

This study has examined the current operating method of S&OE, through first presenting the case company's planning process (S&OP) and execution process (S&OE). In short, S&OP gives a framework for sales and supply as well as the inventory targets, market analysis defines values and qualities, and trading provides premiums and discounts, which can be considered as an input for S&OE. The outputs of S&OE, however, are the decisions of sales and supply, which is then informed forward to traders, scheduling and risk desk, as well as communicating deviations back to S&OP and business controllers. Scheduling is then making decisions regarding for example how much, what and when to produce, i.e. the manufacturing decisions. Similar processes has also been described in the

literature, for example Wallace (2004, 59). In S&OE planning level the sales and supply of every month is divided into smaller entities and ultimately to single loadings. The core of S&OE is to react to the changes in the markets so that S&OP can focus on planning longer term sales. S&OE also monitors the market and tries to balance and control the optimization of markets between the S&OP cycles together with trading. Consequently, the case company defines S&OE as a tool for finding the best possible financial or monetary option for executing sales and operations, considering the restrictions at that moment.

Based on the interviews, the respondents find S&OE valuable and useful tool for operations. The greatest value is achieved by reacting rapidly to possible changes and incidents together, as a team. Similarly, Chae 2009 argues that it is evident that there is always a time gap between the planning and the execution. S&OE is therefore helpful in detecting and adapting to these changes in order to decrease the gap. Similar types of benefits of S&OE were also presented by Hoey 2019 and Covas 2016.

Another aspect was to investigate the problem areas of the S&OE process. The challenges could be divided into five different groups and further divided into six smaller sub-groups. In general, the problem areas are in defining and structuring S&OE and setting targets. Also, issues related to IT systems, performance measurement and communication were also seen as a challenge. Because the topic is relatively new, the previous academic literature does not cover in depth the problem areas of S&OE. Hence, this is a topic which could be discovered in the future academic research.

Other sub question that this thesis tries to find answer is:

*What kind of benefits can be achieved from measuring performance in S&OE?*

Implementing S&OE best practices could improve the tracking of the incidents and possibly prevent future ones from happening, and therefore improve the overall process performance. Furthermore, in order to hit better forecast accuracy and track incidents, it would be good to have a weekly follow-up. In other words, following the

number and status of incidents, average solution rates and solution times as well as total cost of resolution are among others good ways to measure performance. This way, it is also easier to acknowledge the responsible persons for each step and set clear expectations for roles. Shared metrics could improve the process performance, since the teams can no longer talk past each other because of different performance measurement. All in all, measuring performance could improve the visibility and of S&OE.

After the sub questions have been studied and answered, the main research question of the study can be examined. The main research question was:

*How can the S&OE process be improved?*

Improvement actions in a company environment usually are well thought out and change often takes a lot of time. However, this thesis presents some suggestions for future improvement. This study finds room for improvement for S&OE in the case company. Firstly, S&OE needs to be better distinguished from other levels of planning, in this case S&OP and scheduling, and structured into the case company environment. Thus, to ensure better performance of S&OE, clear responsibilities, communication and strong process performance are important. In addition, the team could benefit from someone who has an overview on all the chains and decisions going on, or that the supply chain planners could have a backup player who would be able to review, collect and help in decision making. Having regular S&OE meetings could also help improving the process.

Secondly, by better following up and tracking incidents and other changes to plans may help improving S&OE process and the accuracy. Specifically, if plan versus execution accuracy ought to be better, a better follow up should be included. The importance of tracking incidents was highlighted in Elementum 2019b: no matter how reasoned and thoughtful the plan is, success is eventually measured how teams manage unplanned or surprising exceptions.

Finally, in order to improve S&OE process, the performance should be measured. Based on the interviews, for example a common performance measure should be established. This could be for example profit, which is generated from measuring the revenue of the decisions made in S&OE. If common metrics face netback conflicts, focusing measurement on incidents could also be improving the process. All in all, a well-functioning process and its continuous improvement are key success factors for operational performance and financial competitiveness. Both the literature review and this study highlights also the issue in performance measurement, which is still hardly used. For example, Kepczynski et al. 2019 present examples on how performance can be measured in S&OE, which include KPI's such as sensed demand forecast error, agreed operational planning error and on time in full (OTIF). The conclusions of this study support also the findings of Elementum (2019), which is that the issue is that today's supply chain IT solutions do not answer to the needs of S&OE. Namely, the need to adapt quickly to possible incidents. Hence, much of the S&OE work is conducted using e-mails, conference calls and spreadsheets. This calls for developing S&OE tools and practices which could improve the overall process.

The case company does not have good performance measurements for S&OE, which supports the findings also from the Elementum (2019b) study, which conclude that companies do not effectively measure performance of S&OE but on the opposite, most companies are starting to implement S&OE processes. The report concludes, that even if firms have clearly defined S&OP process, fewer than half of firms are following the basic S&OE practices.

It is important to acknowledge, that different interviewees handle S&OE from a different perspective. Therefore, the answers from the interviews were quite contrasting. Whereas one sees that the process is clear and works well, the other can observe it from another point of view, and notice that there are significant challenges.

This research contributes to academic literature, which is to this day quite unfamiliar phenomenon although the concept of sales and operations execution has been implemented around the industries a while ago. This research increases the current theory and understanding about the topic by presenting current operating methods

for S&OE process and the perceived challenges, form where the conclusions and improvement suggestions could be drawn. Additionally, this study agrees with Elementum (2019) in that the effectiveness of supply chain can be seen in two things, how fast errors are detected and how fast they are solved. The longer it takes to detect and solve an error, the more value is consumed, and that well established and accurate S&OE can provide tools to tackle the errors and create the most value.

### 6.1 Evaluation of the study

The results of the conducted qualitative research can be evaluated with reliability and validity. Validity measures how accurately a suggestion, argument or result expresses the object which they are supposed to refer to. Reliability describes the level of consistency. (Koskinen et al. 2005, 254)

The reliability of this research can be seen as satisfactory. The results of this study cannot be considered researcher-related because of the same interview questions could have been carried out by another person, and the results would remain the same. The interviews were planned well in advance and the questions were sent out to the participants beforehand. In addition, the interviews were recorded for better reliability. However, the interviews were translated to English, which may decrease the reliability of the study.

Carefully selected interviewees proved to be good, as all participants were suitable to answer the questions asked and had knowledge about the subject. The chosen qualitative method was suitable as well for the implementation of the research and the interviews provided new information about the topic. The chosen methods can thus be described as valid considering the objectives of this research. Although the sample size was appropriate for conducting the study, however, the results of the research cannot be generalizable for all companies or industries.

## 6.2 Suggestions for future research

This thesis is conducted as an assignment from the case company. Thus, the study covers only one company and does not take any other companies or business environments into consideration. Furthermore, it focuses only on one specific business unit, in order to fully describe the processes and answer to the research questions. Therefore, the results of the thesis targets helping the case company in decision-making as well as monitoring the overall S&OE success in the specific business unit but might not be applicable to any other industry.

In the academia, there is still very few studies on S&OE, hence the previous research on this topic is still lacking in-depth information about S&OE. Companies have been implementing S&OE and other short-term planning tools and processes a while, so there might be a rising interest in the topic in the academia. In other words, an in-depth researches and studies on sales and operations execution is needed. In the future, research on for example implementing and defining S&OE and its effects on supply chain performance should be studied together with S&OE performance measurement. Both qualitative and quantitative studies would provide better understanding for this topic. In conclusion, support from academia could improve and develop S&OE processes to a great extent, which help companies benefit from it.

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# APPENDICES

**Appendix I.** Interview questions structure

Supply Chain Planners

- How does S&OE work?
- What has improved?
- What are the challenges?
- How do you make forecasts? (SPOT)
- Do you have weekly S&OE meetings?
- Does anyone track “incidents”, (unplanned and surprising events)? How?
- How do you react to incidents?
- Do you know the revenue, cost or cash impact of the incidents/ the decisions made in S&OE?
- Is S&OE the only decision-making process?

Operative Planners

- How does S&OE impact your work?
- What information do you get from S&OE? What information would you want/need?
- What are the challenges?
- How should the process be improved, so that the line from planning to blending to customer would be complete?
- Do you have weekly S&OE meetings?
- On which time-horizon is it possible to forecast production planning?
- What is the state of production planning and what it could be in the future?
- Do you track/how do you react to incidents?

Traders

- How does S&OE impact your work?
- What information do you get from S&OE? What information would you want/need?
- What are the challenges?
- Do you have weekly S&OE meetings?
- What is the best way to gain value for your work in the S&OE?
- What are the factors that make it possible to say whether the interface works well/poorly?

- What metrics can be found in the interface? What there should be?

Business Controller

- How does S&OE impact your work? What kind of information do you get from S&OE?
- What are the challenges in (performance) measurement?
- How could the visibility of S&OE be improved?
- What has improved?
- What should be the stage of measurement in the future?
- Do you know the revenue, cost or cash impact of the incidents/ the decisions made in S&OE?

Business Process Manager

- What is the maturity level of S&OE at the moment?
- How can the maturity be improved?

**Appendix II.** S&OE process structure in the case company.