

LAPPEENRANTA-LAHTI UNIVERSITY OF TECHNOLOGY LUT
School of Business and Management
Master's Programme in Supply Management

Ilona Luoma

**INTEGRATED BUSINESS PLANNING IMPLEMENTATION IN A CASE
COMPANY – BENEFITS AND EFFECTS ON INVENTORY MANAGEMENT**

Examiners: Professor Veli Matti Virolainen
Professor Katrina Lintukangas

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Ilona Luoma

Integroidun liiketoimintasuunnittelun toteuttaminen kohdeyrityksessä – hyödyt ja vaikutukset varastonhallinnassa

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Tutkimuksen tarkoituksena on tutkia integroitua liiketoimintasuunnittelua ja sen toteuttamista kohdeyrityksessä. Tavoitteena on selvittää, miten integroitu liiketoimintasuunnittelu vaikuttaa yrityksen varastonhallintaan liittyviin prosesseihin. Konseptin tärkeimmät osat käydään läpi, minkä jälkeen niiden vaikutuksia ja mahdollisia hyötyjä varastonhallinnan prosesseihin tutkitaan tarkemmin. Integroidun liiketoimintasuunnittelun tärkeimmiksi osiksi todettiin kirjallisuuskatsauksen myötä strateginen suunnittelu, yrityksen sisäinen integraatio sekä suorituskyvyn johtaminen. Tutkimus on toteutettu laadullisena tapaustutkimuksena, jossa tutkimusaineisto on kerätty haastatteleamalla kohdeyrityksen työntekijöitä. Haastattelujen pohjalta yrityksen nykyisiin prosesseihin on tehty kehitysehdotuksia. Tulokset osoittavat, että integroidun liiketoimintasuunnittelun toteuttaminen yrityksessä parantaa varastonhallinnan prosesseja tehden niistä tehokkaampia ja parantaen tiedonkulkua ja eri funktioiden suorituskykyä. Tulosten mukaan strategian ja päivittäisen operatiivisen toiminnan yhdistämisellä, funktionaalisten sillojen murtamisella ja yrityksen sisäisen integraation vahvistamisella on positiivinen vaikutus kysynnän ja tarjonnan suunnitteluun. Lopputuloksena varastotasot laskevat ja palvelutaso nousee. Lisäksi integraation, johdon tuen ja strategisen tiedonvälityksen puuttuminen haittaa tai jopa estää integroidun liiketoimintasuunnittelun toteuttamisen yrityksessä.

ABSTRACT

Lappeenranta-Lahti University of Technology (LUT)
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Ilona Luoma

Integrated Business Planning implementation in a case company – benefits and effects on inventory management

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The purpose of this study is to explore the concept of Integrated Business Planning (IBP) and how the implementation of the concept affects inventory management related processes in the case company. The objective is to examine the main elements of IBP and to study them in the context of inventory management and how they benefit the related processes of the case company. The main elements were identified as strategic planning, internal integration and performance management. The study is conducted as a qualitative single case study. The data is collected through four semi-structured interviews with the employees of the case company and improvement suggestions for the current processes in the company are made based on the collected data. The results indicate that the implementation of IBP improve the inventory related processes making them more efficient and enhancing the information sharing and performance of different functions. The results show that connecting the company strategy to the day-to-day operations, breaking down the functional siloes and strengthening functional integration positively impact the demand and supply planning. As a result, inventory levels decrease, and service levels increase. Moreover, the lack of integration, lack of management's support and poor communication of strategy hinder, or even prevent, the implementation of IBP into a company's processes.

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Espoo, May 24th, 2021

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LIST OF ABBREVIATIONS

IBP = Integrated business planning

S&OP = Sales and operations planning

KPI = Key performance indicator

NPD = New product development

1 INTRODUCTION

The previous financial crisis and the global pandemic have accelerated multiple issues in businesses such as unreliable forecasting, excess inventories, decreased liquidity and productivity and a lack of visibility and access to necessary information. The crises have increased uncertainty throughout the supply chain due to longer lead times, demand randomness, shorter product lifecycles and supply unreliability. In addition, companies are constantly trying to improve their performance as well as the competitive and strategic position and reduce costs and inefficiencies in their processes.

The mentioned internal issues most often stem from a lack of collaboration and communication between different business functions, separation of strategy and operations, and functional - and therefore communicational – silos inside a company. Clear strategic vision, efficient business processes and well executed business planning are therefore more important than ever and a key to better business performance. (Jurecka 2013, 28) The importance of inventory management is highlighted in the process management literature and is one of the biggest issues managers struggle with. An inventory ties a large amount of working capital and therefore there is an incentive to decrease the inventory levels and improve overall business processes around it.

Previously, companies have attempted to tackle the issues by applying Sales and Operations planning – known as S&OP - into their operations. However, S&OP has been found insufficient to tackle the complex problems companies face in their operations and business environments. Due to the limitations experienced with S&OP, Integrated Business Planning (IBP) was developed as an extension to S&OP with a purpose of aligning all functions with short-, medium-, and long-term goals set by the management. When S&OP's main idea was to align productions and sales volumes with the responsibility of supply chain, IBP covers the whole business by changing the processes throughout the organization. Therefore, IBP is a broader concept that includes all the function as well as senior management from the very beginning. IBP includes the technologies, applications and processes that connect functions across the organization and improve organizational alignment. Improved strategic planning, strategy execution, forecasting and information sharing are also a way to improve working capital management in a company by lowering inventory levels while maintaining service levels. Moreover, inventory management and forecasting should no longer be only

supply chain's responsibility as the problems often originate deeper in the company and all the functions are needed to make a profound change in the processes.

S&OP have been written about and studied a lot during the past few decades. It has been one of the main planning instruments in supply chain management. Compared to S&OP, IBP is a relatively young and less studied topic, which does not have such coverage yet in the academic literature. Especially case studies and other publications about the implementation are not largely available. Partially for these reasons, it might be challenging for companies to get familiar with the topic and evaluate if such change could benefit their operations. Companies might be hesitant to start the change or even see the point of investing in such process transformation when research is lacking robust evidence of successful implementations. Consultant companies such as Deloitte, PWC and KMPG offer glimpses of success stories, where their customers have benefited from aligned operations and planning by implementing IBP. In Deloitte's examples IBP projects have achieved 20% increase in forecast accuracy, 25% decrease in inventory levels and 6% increase in revenue (Deloitte 2018, 11). However, independent studies may give a better idea what to expect from the IBP project and what is required to make it successful. Contributing to the topic is therefore interesting both academically and practically.

This thesis will discuss the concept of IBP and its main elements. The literature review concentrates on the processes and implementation of IBP in an organization and discusses the effects IBP will have on inventory management. From the point of view of the case company, the topic of this thesis is especially pertinent as it supports the ongoing project of implementing a new it-tool related to forecasting and demand planning and helps to tackle the issues of unreliable demand and supply figures and excess inventory. The aim is to provide options for improving these processes in the company and help with problems related to process inefficiencies. It is also recognized that there is no common planning through organizational units in the company. Therefore, it needs a process change where all the necessary players are considered and functional and communicational silos in the company are broken down. The company is looking for a theoretical background and assessment to support the change and gain top management interest that the change is needed.

1.1 Research problem, objectives and limitations

The main objective of the study is to find out how IBP as a process could be implemented in the case company and how it could benefit its inventory management. The aim is to turn theory into practice and help with process change by giving a starting point for the IBP project. The study aims at investigating the current processes and how they could be remodeled according to IBP to best suit the company's goals. Moreover, the study focuses on improvements in inventory management as the company struggles with excess inventory and inefficiencies in the related processes. Therefore, one of the objectives is to explore how IBP could help decrease inventory levels while keeping a good service level. Areas related closely to the objective are strategic planning, internal integration and performance management, which are in the center of attention in the study.

From the described research problem and the set objectives, the main research question was identified:

How could IBP implementation benefit inventory management in the case company?

And the following sub-questions were identified:

How the current processes can be improved with internal integration?

How can inventory levels be reduced with IBP?

How can service level be maintained with lower inventory levels?

With theoretical background the objective is to get familiarized with the concept of IBP and the main elements that should be considered in the process implementation. Through process mapping, the objective is to gain better understanding of the as-is-processes and provide insights to the company. With process analysis, the aim is to explore improvement opportunities and the possibilities of implementing IBP into the processes. Suggestions of to-be-state with IBP are given based on the theoretical background of IBP's potential benefits.

As a case study, the thesis doesn't aim at making generalizations or offer quantitative implications of the benefits of IBP process implementation. The main idea is to find out how IBP could be used in practice in the case company and therefore give other companies an

idea of its possibilities. The study also aims at clarifying the research on IBP and adding to the existing knowledge of the topic.

The thesis focuses on processes and people in IBP implementation, and leaves out it-systems, technologies and other tools related to IBP. The last part of the theoretical background focuses on inventory management with an emphasis on costs and service level. The focus is not on warehouse management such as locations or layouts, but inventory policies about stocks and the related processes with an emphasis on demand and supply planning. External relations such as customer and supplier integration are not discussed as the study concentrates on internal processes of a company.

1.2 Conceptual framework

The conceptual framework (figure 1) of the study presents the main concepts and perspectives discussed in the study and their linkages to each other. The framework illustrates the progress of the study and the theoretical part the study is built on. It provides a comprehensive understanding of the context and path the researcher has chosen.

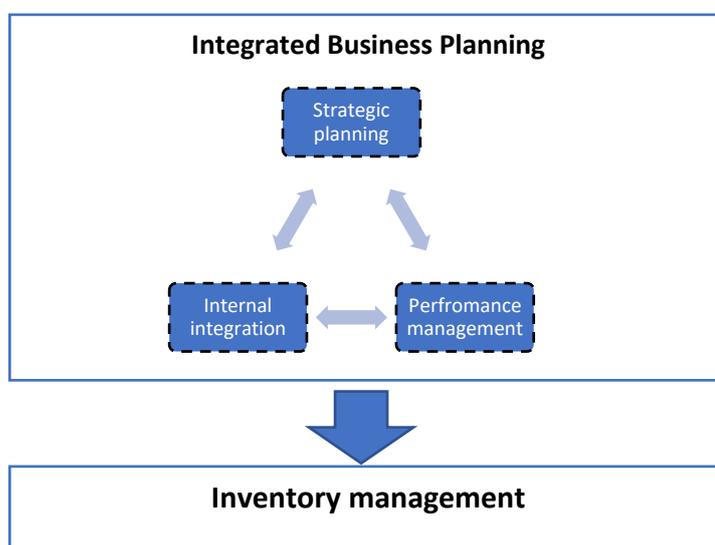


Figure 1. Conceptual framework.

The framework is divided into two parts that construct the theoretical section of the paper. The first theoretical section aims at exploring the concept of IBP in general and provide comprehensive outlook on the subject. The conceptual elements of the first part are the main elements identified from IBP literature. These are strategic planning, internal integration and performance management. The three concepts come up in the IBP literature often and are

thought as the most essential aspects when implementing IBP in a company. The three concepts form the heart of the IBP ideology and are therefore in a critical role in the implementation process.

The second part of the framework explores the concept of inventory management and how the implementation of IBP supports inventory management and the related processes in a company. The main elements of IBP identified in the first theoretical part are discussed in the context of inventory management. More in detail, how can IBP positively impact inventory levels, how internal integration can be utilized to improve the inventory related processes and how a company can benefit from performance management regarding the context of inventory management. Also, the strategic planning and decision making in inventory management is discussed as there are strategic decisions and tradeoffs to be made about inventory levels and service levels. The strategic planning in the first part is thus linked to the inventory management through the strategic decision processes.

1.3 Key concepts of the study

The main concepts used in the study are defined in this chapter to familiarize the reader with the terms. The aim is to ensure that the reader comprehends the concepts similarly to the author, and thus misunderstandings are avoided.

Integrated Business Planning

Integrated Business Planning (IBP) is a business planning process that is developed from the principles of S&OP and provides a seamless management process. It includes all activities across an organization from strategic planning to demand and supply management. (Oliver Wight 2021) IBP connects planning processes across an organization through technologies, applications and process improvements. It links the company strategy to tactical and operational planning, and thus fosters alignment and strategic position and balances the interests of different functions. (Thoor & Dhir 2011, 275-276)

Strategic planning

Strategic planning comprises of the vision and mission of a company. It describes how a company views the future and how it has planned to reach the goals it has set. (Bonham 2008, 63-64) It is carried out by top managers to guide what needs to be done and how and

when. Strategic planning includes setting objectives, establishing policies, providing personnel, facilities and capital to reach goals, and activating people to act in accordance to the strategy. (Silver & Peterson 1979, 19-20)

Internal integration

Alignment of cross-functional practices, objectives and behaviors, that results in collaborative decision making and information sharing across an organization. (Williams et al. 2013, 545)

Inventory management

Inventory management consist of all decisions and procedures related to the stocks carried by a company such as ordering, storing and selling materials. The objective is to ensure a correct amount of stock to minimize costs and maximize service level. (Waters 1992, 4)

Demand and supply integration

Demand and supply integration refers to a mechanism that matches demand and supply information to make optimal decisions on demand and supply forecasts and to reach financial objectives. Integration happens when demand planners and supply planners work together to match numbers and pursuit common set of goals. It is a set of highly coordinated activities related to demand and supply planning and forecasts. (Moon 2018, 2)

Performance management

Performance management is the activities needed to continuously improve and assess performance of every employee. It is done by identifying the performance indicators and targets that supports the performance of the employee in relation to the role, the team and the organization he/she works in. (Rao 2016, 1)

1.4 Structure of the study

The study is divided in six chapters that are further divided into multiple sub-chapters. The theory chapter discusses the theoretical background of the themes and goes hand in hand with the conceptual framework. The idea of the theoretical section is to explore the concept of IBP from multiple perspectives and emphasize the most important aspects of the concept.

The aim is also to familiarize the reader with the existing research and build a solid foundation for the empirical part of the study.

The first part of the theory is divided into three parts: strategic planning, internal integration and performance management. The second part of the theoretical background explores inventory management and links the concept of integrated business planning to inventory management. It covers the same topics that were discussed in the first part of the theory – planning, integration and performance management - from the perspective of IBP. In particular, process integration and KPI alignment are explored and the opportunities and benefits of the concept on inventory management are discussed.

Next, the study proceeds to discuss the research methodology of the study, which describes the research process and explains how the empirical research is conducted. The empirical part includes an analysis of the current processes of the case company based on the interviews. Main issues related to the demand and supply management processes are analyzed. The results chapter of the study aims at making improvement suggestion. The suggestions are made against the theoretical background, and the structure of the chapter follows the structure of the theory chapter. Therefore, the topics covered in the results are strategic planning, internal integration and performance management in terms of inventory management and the related processes. At the end of the research, the research questions are answered and the results from the previous chapter are concluded. Limitations and avenues for future research are also discussed.

2 INTEGRATED BUSINESS PLANNING

Integrated Business Planning is a management's planning tool that links a company's operations and strategy. It evolved from S&OP, which was not able to offer solutions to the multiple problems that companies are facing because of the lack of integration and structured cooperation between different business functions. The IBP process is led by senior management and gives them guidelines to execute a business strategy and make decisions proactively based on reliable supply and demand figures. It provides executives and management the ability to integrate business planning and forecasting. These will result in improved coordination in creating plans that are consistent with the corporate strategy.

Figure 2 visualizes the role of IBP in linking strategy and operations. Managers can use IBP to leverage the company's information assets and use it to evaluate activities based on the actual economic impact of each consideration. IBP covers the whole organization – not just one business function – in an integrated fashion and is more than anything about planning. The ultimate objectives of IBP are increasing efficiency, providing decision support, optimizing asset utilization, quantifying financial risks and increasing agility. (Toor & Dhir 2011, 275-276) In order to orchestrate the efforts of all functions into a single integrated process, an alignment of incentives and individual target setting are also required. IBP has been called a 'Structured Gap Management Process' because it identifies gaps between business functions and the planning methods they use. Gaps are also closed between budgets, targets and forecasts, and various demand scenarios. (Jurecka 2013, 30)

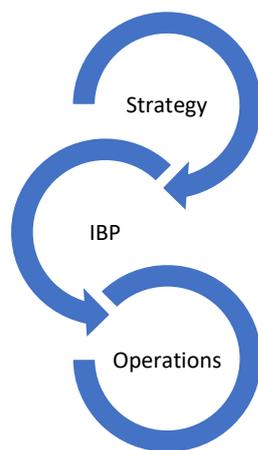


Figure 2. Strategy and operations linked by IBP.

There are various benefits of implementing IBP successfully, which attracts senior management to get involved. The most valued benefits include the ability to evaluate activities based on their true economic impact, the improvement of strategic position and financial performance and the improvement of organizational internal alignment. Other benefits that emerge from the mentioned are the optimization of capital and asset utilization, improved cash management, increased business flexibility and quantified business risk. Moreover, IBP process breaks down silos and pushes separate business functions to operate together which results in alignment and synchronization of the internal functions. (Toor & Dhir 2011, 275). Changing processes to make them more integrated has been agreed to be one of the key measures to take when management wants to gain control of its business operations. Integration within a company also benefits the employees as they usually obtain

a clearer and wider picture of the processes and are more likely to utilize resources that are mostly used in other departments. (Swink & Schoenherr 2015, 70)

There are several ways of implementing IBP and they may differ in process designs, transformation, and implementation approach. Rarely one size fits all as companies have different organizational designs, sizes, maturity levels and processes. (Kepczynski 2018, 11) However, there are certain aspects that connect successful IBP implementations. Companies need to be aware of their strategic focus and current processes and fully commit to the change. In addition, appropriate performance measurements need to be put in place to keep track of the developments. After all, the objective of IBP is to routinely review the current and expected business performance, which includes the review of changes in the strategy and portfolios, updated customer demand, required supply and financial implications. (Jurecka 2018, 28)

2.1 Moving from S&OP to IBP

A common view is that S&OP is the best way of dealing with forecasting and inventory issues and that IBP is just a marketing hoax or just a new name for S&OP without a significant change. As many businesses struggle with gaining all the expected benefits from S&OP implementation, new terms have emerged such as ‘integrated S&OP’ or ‘executive S&OP’ to describe new improved S&OP processes. However, it is not about the name the process is called, it is about the ways of implementation and process changes that are put in place. The reasons for unsuccessful process changes in the past need to be identified to gain new insights for the future and improve existing processes. (Iyengar & Gupta 2013, 11)

Scholars have identified various limitations with S&OP and highlight the reasons why companies have not benefited the expected way from its implementation. The first limitation with S&OP is that the processes are not integrated but it is rather a balancing system of demand and supply. This limited approach does not meet the requirements of the highly competitive business environment, which pressures companies to be more effective. S&OP is mainly concentrated on supply chain and therefore it becomes only a supply chain plan. Even though it is meant to lead to a consensus forecast, the demand signals from sales and marketing, product life management or finance tend not to be considered. For this reason, the S&OP might not be fully adopted by other functions than supply chain, and without the

whole organization's support there will not be a meaningful impact on business. (Jurecka 2013, 28; Wilson & Raman 2017, 12-13) Moon (2018, 18) elaborates that S&OP is often put into place to solve the issues thought to be only supply chain's fault and therefore supply chain managers get the responsibility of putting S&OP in practice. However, without the participation of sales and marketing, the drivers of demand, the expected benefits are rarely gained.

Even if sales and marketing is included, S&OP often fails to be a strategic process. Without the strategic link, S&OP meetings tend to make only short-term operational decisions. Therefore, there is a lack of strategic vision, proper planning and engagement provided from executives. The strategies established are not clearly communicated and balanced across functions, and therefore functions still find themselves pursuing only their own functional goals. (Wilson & Raman 2017, 12) The leading IBP consultant company Oliver Wight (Oliver Wight 2021a) also states that one of the main differences between IBP and S&OP is the inclusion of strategic initiatives and activities. In addition, the planning horizon in S&OP often stays within a fiscal quarter, which prevents companies making proactive decisions and responding appropriately to unexpected changes in supply and demand (Moon 2018, 18)

Moreover, other issues noticed in S&OP processes are associated with performance measurement and meetings. Companies sometimes stay stuck in using KPIs that actually have competing objectives within the company and fail to develop indicators that measure the impact on whole business. In addition, meetings are not well thought through and therefore fail to do what they are for: plan for the future. Instead, in meetings the time is spent evaluating what has been planned before and how it went. (Wilson & Raman 2017, 12)

The limitations associated with S&OP led to the development of IBP and the holistic approach it has on the company. The next chapters discuss the main elements of IBP, which are divided into strategic planning, internal integration, and performance management. Later on, IBP's effects on inventory management are explored with the emphasis on demand and supply integration.

2.2 Strategic planning

Strategy is a set of goals with instruction on how to achieve them or how they could be executed. In other words, the idea of a strategy is to determine how a company should use its resources and organize itself so that it could achieve those goals. (Bonham 2008, 60) Strategic planning includes the vision and mission of a company. It describes how a company views the future and how it has planned to reach the goals it has set. For the most part, the strategic planning processes evolves and becomes more structure as the company becomes more mature. (Bonham 2008, 63-64)

Decades ago, strategy was considered as primarily determined by market conditions and other external factors to a company. However, more recently organization-specific, internal factors have been given the primary importance, which has roots in the resource-based theory of a firm. According to the theory, a company is a pool of resources and value is created by combining different tangible and intangible resources. The ability of combining resources in an efficient way is called capabilities and these capabilities determine the implementation of strategies. (Mazzucato 2002, 2)

The resource-based approach argues that differences between companies arise from differentiating via unique capabilities. The differences will last for a long time because the capabilities are difficult to imitate, and the strategy of company is based on renewing the core competencies. Moreover, achieving sustainable competitive advantage is mostly about the organizational differences and exploring new improved ways of doing things. These organizational differences between companies are the source of sustainable, not imitable capabilities that enable companies to increase their returns. (Mazzucato 2002, 3-4) However, operational effectiveness alone is enough to achieve sustainable competitive advantage and survive the ever-increasing competition. It requires a strategic decision making about which activities are carried out and how they are performed. In other words, a company needs a unique and valuable strategic position. (Mazzucato 2002, 13-14)

IBP is more than anything a strategy-oriented planning process with a goal to integrate strategic management more profoundly into a company's operations. The inclusion of strategic initiatives into operational management is one of the requirements when moving from S&OP to IBP. Some strategy implementations can be complicated, but IBP is relatively easy to achieve. After all, it is meant to be a sustainable and efficient way to link strategy

and operations. (Jurecka 2013, 29-30) However, IBP requires dedication as it is expected to replace the other planning processes that are often running in the company simultaneously. Therefore, management's full support is a requirement for its success. (Swink & Schoenherr 2015, 72) According to Oliver Wright, IBP needs to be led by senior management and the real power of the concept is in effective decision-making and planning as it serves as a critical link between the current reality and the strategic plans. At its best, IBP performs as a warning system to any performance gaps. (Oliver Wright 2021b)

Integrating planning processes is important, because it leads to decreased processing costs through target alignment and comprehensive resource optimization. (Swink & Schoenherr 2015, 72) When companies do not integrate their planning processes, they often struggle with operationalizing strategies, in other words, connecting planning with execution. Integrated planning will help minimizing problems related to reacting on changes in business environment and understanding risks and opportunities. (Kepczynski, G. 2018, 7) Moreover, improving planning activities will make a difference in reaching KPI targets of, for example, forecast accuracy, order fulfillment, inventory turnover, supply reliability and supply chain costs. Therefore, enhanced planning will affect positively the profitability of a business. (Hertog 2019, 26) In addition, integrating planning processes offers solutions to multiple common problems such as a lack of alignment on priorities and assumptions, lack of transparency, having multiple sets of figures for next year business plans, lack of functional integration and lack of operationalization of strategic initiatives. (Kepczynski et al. 2018, 38)

A company implementing an IBP process should be aware of its general strategic focus because it ultimately defines functional ownerships, emphasis points and performance measurements applied. For example, Jurecka (2013, 30-32) suggest adopting Porter's generic strategy view, where IBP set-up has three different paths based on the strategic direction: cost leadership, product differentiation and customer (relationship) focus. In addition, the structure of product portfolio effects on how IBP process is established in a company. Usually, the product portfolio consists of four segments; current products, extension of current products, products new to the company but known in the market and products that are new to the company and market. This aspect should be included into the monthly planning cycle when implementing IBP processes as different combinations of the portfolio segments and the overall structure of the portfolio have different impacts on the

IBP set-up. Only by understanding the future of market and portfolio situations and how they differ from the current situation, a company can manage change and translate the strategy into its planning process. (Jurecka 2013, 31)

Multiple planning horizons should be considered when improving strategic planning. Usually, three planning horizons are used; Strategic, operational and tactical. Strategic planning is often divided into annual and monthly business planning, where annual planning addresses business development and strategy for long-term horizon (up to 10 years) and is led by business development team. The discussion is held once a year and includes an assessment of business risks and opportunities and their impacts on the revenue as well as a viewing of market positioning and developments. Monthly strategic planning is organized by supply chain managers and focuses on mid-term horizon impacts of assets and products. In a tactical business planning the objective is to discuss how to achieve the goals of the ongoing year and possible the next ones as well. The process is led by management and is very cross-functional. The discussion should cover topics of products, demand, supply, financial and volumetric reconciliation on a local and global level. (Kepczynski 2018, 1-7)

Finally, is operational planning that was added to the planning horizons to support monthly S&OP meetings which were not contributing enough to solve the imbalances and unreliability of demand and supply data. Operational planning has also been called as “optimization to tactical S&OP”. Depending on the needs of a company, the operational planning process can have a variety of frequencies from weekly to twice a month. Similarly, the time horizon can differ from a week to even 16 weeks. The participants in these meetings are different experts in the company, people who are doing the job and the meetings focus on extracting the biggest value from the “4Ms”: manpower, machines, materials and money. (Kepczynski 2018, 1-7) The planning horizons should be relevant to the company and fit its needs. Ultimately, they should be tailored to meet the needs of the industry. In addition, all the planning processes need to be tightly integrated so that the information flows down from strategic planning to the operational levels and vice versa management receives market feedback from operations. The integration enables the decisions makers to look at the big picture and connect the strategic vision with daily operations. (Iyengar & Gupta 2013, 12)

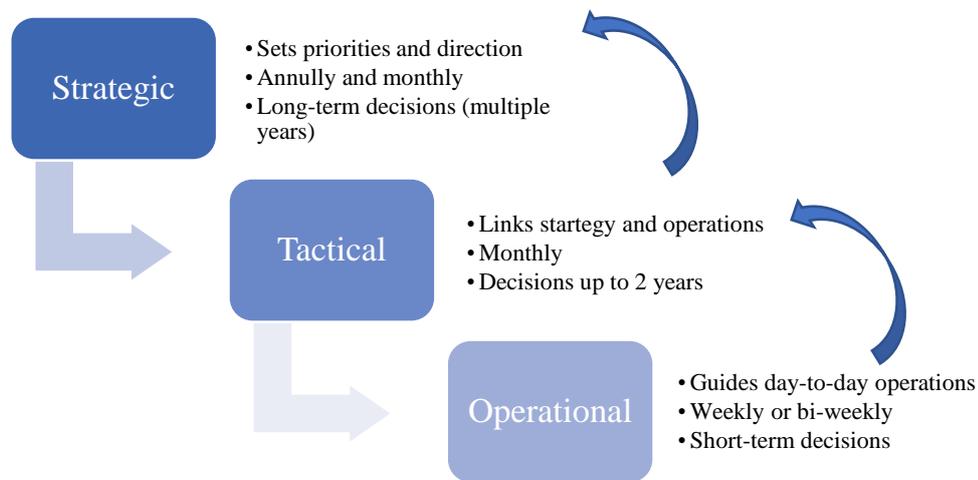


Figure 3. Planning horizons.

There should be a consensus between top-down strategy execution and direct bottom-up feedback from the markets. This can be achieved by aligning different planning processes across the company and managing the gaps between the plans. (Jurecka 2013, 30) Homchick (2010, 18) supports Jurecka’s idea of the strategic planning and introduces an integrated business planning process which starts with annual plan, where financial plan provides revenue and profitability targets and the basis for sales plan and sales forecast. According to the author “the gaps between the revenue predicted by the bottom-up forecast and top-down financial plan are identified by product, account, customer, and geography”. The identified revenue gaps are closed by using sales and marketing strategies that are developed through collaborative planning processes. Moreover, reconciliation rounds should be in place to establish a one-number demand forecast and the forecast should be reviewed also by supply chain and finance. As this is a base case forecast, multiple sales scenarios should be added to evaluate different business opportunities and risks.

The established business plan becomes a demand plan for supply chain. S&OP can be used to balance supply and demand and to ensure that revenue targets are achieved. The IBP process then screens actual sales and generates new forecasts based on the updates to sales (the business plan becomes the operating plan). Deviation from the baseline forecast is identified. Management is kept aware and informed about the potential impact of changing market conditions and sales performance by continuously sending the updated estimates to financial planning. (Homchick 2010, 18)

2.3 Internal integration

The main difference between S&OP and IBP is the word *integrated* and what it means in practice. It is also the challenging part of the concept as functions, IT-systems and other processes coexist interdependently in a company and finding the correct way of connecting them is critical for the success of a company. To succeed in the IBP implementation and be able to concentrate on the essential, a company needs to have a clear vision of its strategy and business priorities. In addition, analyzing and mapping business processes helps avoiding misinterpretation of causal connections. (Kecpczynski 2018, 8) Integrating roles is essential in executing strategy, because they enable the distribution of information to the right people in the company, and therefore enable management to come up with strong decisions and optimal strategies. Therefore, cross-functional integration in a company supports the implementation of a consistent strategic vision. (Swink & Schoenherr 2015, 72)

Internal integration in a company means the organizational practices, procedures and behaviors that drives collaborative and synchronized processes that provide guidelines for cross-functional decision making and information processing. (Williams et al. 2013, 545) Swink and Schoenherr (2015, 69) define internal integration as “the mutual alignment of cross-functional interdependencies through interaction, information sharing, and collaboration”. The authors argue that internal integration reduces uncertainty and equivocality by improving information gathering and processing and by distributing the information to the appropriate parties in the company. Increased integration and information sharing are likely to result in better decision making, because bounded rationality often decreases across the company. In addition, it enables the utilization of each function’s strengths and competencies and encourages functions to work toward common targets. The authors found in their study (2015, 69-70) that internal integration is positively linked to profitability because of process efficiencies, and that the profit is magnified by companies’ process spans. This is supported by information processing theory that suggests that improved capabilities in information processing can be used to manage high levels of uncertainty. (Swink & Schoenherr 2015, 72) The findings of Williams et al. (2013, 544) support the theory as their study demonstrates that investments in information sharing technologies and processes yield greater returns when internal integration processes – and thus complementary information processing capabilities - are in place. Another finding in their study is that supply chain responsiveness can be improved with visibility and internal

integration. Pimenta et al. (2016) studied cross-functional integration between marketing and logistics. Integration between the two functions aid maintaining a balance between demand and supply, and therefore the integration is seen beneficial.

The benefits of internal integration are mentioned in various studies. Feng et al. (2013, 491) emphasize the reduction of waste and mistakes through frequent interactions with different perspectives. This can result in fewer unnecessary steps, fewer delays, faster market response and more opportunities for more agile processes. The positive relationship between internal integration and operational performance is evident and has been proposed by several researchers. (Feng et al. 2013, 492).

Emphasis on internal integration, and moreover the full IBP implementation process, correlates with systems theory and the theory of dynamic capabilities. According to the systems theory, organizations are social systems that constitute of sub-systems and elements that should work in an integrated and harmonious way in order to have an efficient organization. In the heart of systems theory is the idea that the whole is more than the sums of its parts. An organization can only be fully understood by analyzing how its components work together as a system, not in isolation from one another. In other words, a company must analyze its functions and other components in relation to one another and the outcomes of their interactions. (Teece 2018, 360-361)

Dynamic capabilities are, according to the one of the most used definition, “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece 2018, 360). The author wants to add to the definition by saying that in a more recent context, the degree of uncertainty is more relevant than the speed of change in the environment. Moreover, it is important to analyze the dynamic capabilities as a part of a system and focus on the need to have the different elements internally aligned. Linking dynamic capabilities to systems theory is a way to see the connections. Teece (2018, 366) emphasizes the need for an integrated approach, where ‘dynamically capable’ managers endorse unifying strategic vision and cross-functional integration with a goal of having an organization that works efficiently.

Pimenta et al. (2016, 584-585) found in their study that cross-functional integration motivates people to work together when the discussion needs many functional perspectives. In addition, well-being and mutual understanding increased and integrated teamwork

reduced stress, conflicts and the need of finding guilty parties. The authors also found out that performance was improved in a company that had a high level of integration. Alignment of priorities and goals increases the likelihood of achieving competitive advantage. In particular, integrating supply management with other functions is linked to the achievement of competitive targets, because cross-functional integration has a positive effect on purchasing performance. (Foerstl et al. 2013, 695)

However, communicational, and functional silos are common and incentives across the organization are not often sufficiently aligned towards common targets. The silos encourage individualistic behavior which is inherent to the specificity and complexity of the tasks and problems of the functions. (Pimenta et al. 2016, 572) The level of cross-functional integration therefore describes well the culture of the firm – specifically the level of transparency, collaboration and commitment to organization-wide goals. (Moon 2018, 75).

A cross-functional integration in a company is difficult to reach without the engagement and commitment from all functions. Steps towards more aligned processes, better inventory management and more reliable forecasts often come from supply chain executives and therefore, are supply chain's issues to solve. However, the problems arise from much deeper from the organization as the problems of poor forecasting or inventory management are usually just a tip of the iceberg. It is vital that sales, marketing, product management and senior management are fully committed to the integration processes. In order to convince functions to cooperate and change the overall organizational mindset, the IBP implementation should be the responsibility of the manager to whom these functions report. (Moon, M. 2018, 37)

Management's role is addressed in IBP literature multiple times as it is the driving force in the implementation. Integrating functions offers challenges to the managers because different functions have different values, goals, and behavior guidelines. Managers often need to face change resistance and concentrate on the big picture instead of the individual aspirations. Managers have great responsibility in facilitating the cross-functional integration by for example organizing cross-functional meetings and teams, adopting joint planning, setting common goals, implementing new incentives, delegating tasks to solve conflicts, and organizing trainings to develop cross-functional competencies. Issues related to implementation are often associated with lack of management support and the way change management is carried out. (Moon 2018, 37)

A common trade-off that companies tend to make is between centralized and decentralized organizational designs where the former has the benefits of control, standardization and efficiency and the latter specialization and local responsiveness. With internal integration, however, companies can preserve functional specialization and autonomy while benefiting from efficiency, immediacy, and breadth of information processing. The integration mechanisms reduce process waste and minimize the costs and time related to transactions between functions. (Swink & Schoenherr 2015, 72) Figure 4 displays the factors needed to have high levels of integration and the impacts it has on the business.

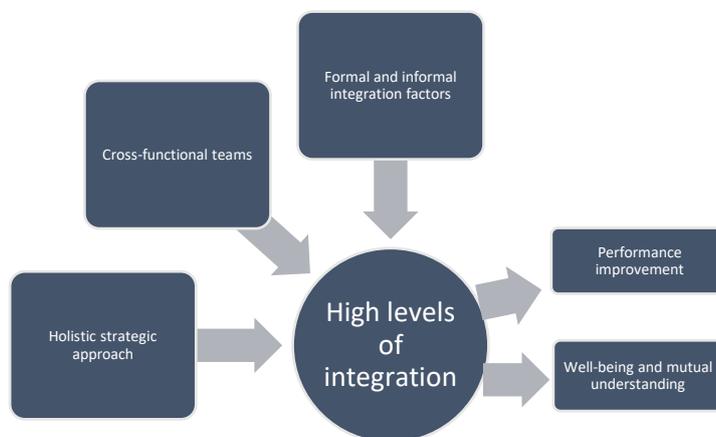


Figure 4. Integration factors and impacts (modified from Pimenta et al. 2016).

To promote and generate cross-functional integration, a company can implement management tools and states of collaboration – or so-called integration factors. Most of the factors can be applied as a formal or informal way but some only either formally or informally. Using both ways improve the overall integration level. For example, a company mainly using solely formal ways to implement integration may face a lack of trust and group spirit. Alternatively, when using only informal ways the issues can arise from conflicts of objectives and a lack of understanding between functions. The following list illustrates the most common factors used in promoting cross-functional integration. (Pimenta et al. 2016, 580)

- *Joint planning*
- *Mutual understanding of each other's activities*
- *Longevity of relationships*
- *Cross-functional meetings*
- *Information Sharing*
- *Mutual evaluation and reward system*
- *Support from senior management*
- *Consideration of the informal work groups*
- *Trust*

- *Hierarchical dependence among functions*
- *Cross-functional training and education*
- *Adequate communication*
- *Cross-functional teams*
- *Willingness and teamwork to resolve conflicts*
- *Physical proximity of workplaces*
- *Job rotation*
- *Group spirit*
- *Non-conflicting objectives among functions*
- *Congruence between functional goals and organizational strategy*
- *Recognition of functional interdependence*

The presence of these factors in a company and between its functions indicates the intensity and level of the integration. The factors enable integration and carrying out tasks that require integration. (Pimenta et al. 2016, 573)

2.4 Performance management

Performance management is about continuously assessing and improving performance of an employee in relation to the employee's role, team and organization. Performance management is usually discussed in the context of short- and long-term goals of an organization. Performance targets and indicators are set to follow-up on the progress and to measure how well the employee performs in relation to the goals. (Rao 2016, 1)

The importance of performance measurement can be summarized in one sentence: "what gets measured gets rewarded, and what gets rewarded gets done". Without measuring, it is impossible to know if things are improving and to foster a culture of continuous improvement. As IBP is a new process to be implemented, it is important to know that things are getting better, and the processes are working. Measuring helps to spot problems and make changes when needed. (Moon, M. 2018, 150)

One of the critical success factors of strategy implementation and execution is performance management. Performance measures are needed to manage processes and there should be a link between the strategy and the measures used. Strategic performance measurement helps in strategy execution as they clarify the strategic focus to the managers. (Verweire & Van

den Berghe 2004, 3-4) However, to avoid measurement madness and focus on the important, an integrated measurement approach is presented. Integrated performance management focuses on activities that will lead to long-term competitive advantage and growth. And just like in IBP, strategy and cross-functionality are the key elements. (Verweire & Van den Berghe 2004, 8) Functions should have their own metrics but also joint or overlapping metrics that are used by multiple functions. The measures drive accountability and ownership for mutual goals and encourage healthy organizational behavior. They help managers and executives to gain confidence in the processes by making the processes more disciplined and factual. It is also beneficial to separate the metrics for strategic, tactical and operational decision-making. (Iyengar & Gupta 2013, 14-15) Table 1 displays how different metrics can be used on different planning horizons and in different functions separately and together cross-functionally.

Table 1. Metric tree (modified from Iyengar & Gupta 2013, 15)

	Sales	Marketing	Finance	Supply chain	All
Strategic	Net working capital	Turn/Earn Index	Net working capital	Forecast variances SC costs (%COGS)	ROCE Inventory costs % Achievement of plan
Tactical	Customer fill rates Days inventory on hand			Days inventory on hand Obsolescence cost Fill rates Forecast accuracy	
Operational	Customer fill rates Days inventory on hand	Marketing forecast accuracy Promo schedule adherence	Financial forecast accuracy (%) Promo budget adherence	Days inventory on hand Obsolescence cost Fill rates Forecast accuracy	NPD Schedule adherence

For example, when net working capital is set as a KPI for sales managers, it ensures that they are aware of the stock situation and help them to provide accurate demand forecasts. Similarly, supply chain is kept aware of service level by measuring inventory fill rates. Moreover, across organization everyone has the same metric of achievement of plan and inventory costs and therefore has the same objectives. (Iyengar & Gupta 2013, 14)

One of the key elements of integrated performance measurement is the strategic alignment where all the measures are drawn from the strategy and incorporated in current processes. (Verweire & Van den Berghe 2004, 9) Alignment must be also execute on a single maturity level because without maturity alignment performance initiatives often fail due to the frustration of managers or employees. (Verweire & Van den Berghe 2004, 12) The management's role is emphasized in bonus systems and other incentives used in the company because these are the mechanism that steer functions effectively into right direction. Getting functions to work toward common goals is often mostly about cultural change and correctly implemented bonuses help with this change. Instead of using function-based incentives where every function has their own siloed (and often competing) goals, every function should have the same incentives and goals. (Moon 2018, 60) The appropriate incentives can be solution for getting all the needed functions working toward the same goal. They facilitate integration and the cultural change that is required when transitioning from siloed operations to working together with other functions.

Managers also have important practical roles in conducting efficient and useful meetings. Moon (2018, 31) offers a mechanism for improving meetings and supporting continuous improvement, and therefore increasing the overall IBP process effectiveness. One way of fostering the culture of continuous improvement is to have the participants asses the quality of a meeting after the meeting is over. They are expected to answer question such as did the right people attend to the meeting, was the focus on future actions or did it stray and was every essential perspective given the proper attention. Furthermore, the culture of feedback can be implemented widely in different meetings and outside of meetings to foster continuous improvement and process efficiency.

Iyengar and Gupta (2013, 16) suggest using the participants in the integrated process, in other words the employees in the company, to implement continuous improvement. After all, the employees are the experts of the functions and can offer a diversity of perspective of what is working and what is not. The ideas for improvement coming from the employees are usually less radical, realistic and relatively easy to implement. In addition, it encourages the employees to speak their minds and take ownership of their work since they feel like they are heard, and their ideas are at least considered. Thus, the motivation level tends to increase.

IBP implementation is often a cultural change in a company and takes time to be fully in place. Well-planned measures, incentives and bonus systems are effective way to steer the

function to the correct direction and often speed up the adoption of new processes. For example, getting rid of functional incentives such as rewarding salespeople for revenue generation is a place to start, because it doesn't encourage them to engage in integrative behaviors and contributions to forecasting accuracy are unlikely. Instead, a new incentive could be to place inventory levels as a part of their performance plan. (Moon, M. 2018, 13) In addition, people tend to respond to rewards and bonuses well. Companies that reward sales, marketing, product managers and supply chain for accurate forecasting or lower inventory levels, see improvement in their forecasting and inventory levels. (Moon 2018, 150)

When measuring forecasting performance, it is good to also consider so-called outcome metrics in addition to traditional process metrics such as percentage error. Good outcome metrics are inventory turnover, out of stock rates, working capital levels, and customer satisfaction. Outcome metrics are linked to the strategy and therefore help in strategic decision making and evaluating the overall corporate performance. (Moon 2018, 206)

3 INTEGRATED BUSINESS PLANNING IN INVENTORY MANAGEMENT

Rapidly occurring changes in the global business environment have had an impact on inventory management as complex markets translates into complexity in inventory management. The complexity derives from various changes such as increased demand uncertainty, longer lead times, stretched global supply chains, heightened competition, increased stock holding costs. In addition, epidemics and financial crises around the world tend to worsen the situation. Companies have to balance with two conflicting aspects; provide the best possible service level to meet their customers' needs and minimize costs by lowering inventory levels. The following chapters discuss the concept of inventory management and the most common issues related to it. The benefits of IBP implementation on inventory management are explored with an emphasis on integrating demand and supply management.

3.1 Inventory management

Inventory management is a well-covered area of research, and it can be explored from multiple different perspectives. Usually, perspectives include aspect such as strategic importance of inventories, cost management, classifications of inventories, purchasing decisions, demand management, forecasting and production planning. Already in 1979, Peterson and Silver provided manifold of perspectives for inventory management and discussed the impact inventories have on individual businesses and even national economies. More importantly, the authors recognized that even though there is a large amount of research done for inventory management, companies and managers lack systematic decision making and thus many of the decisions are still made as an ad hoc approach. For the purpose of this study, the focus is in this chapter on strategic decisions regarding inventories and the factors that influence inventory levels and the demand and supply planning processes. To research the benefits IBP could bring to the inventory management, the topics of demand and supply planning and integration process alignment, and KPI alignment were chosen because they are important from the perspective of IBP implementation.

The concept of inventory management means the classification, planning, steering and control of inventories and the strategic decisions related to inventories are often called inventory policies. Inventory management is one of the main ways of optimizing working capital, because the capital tied up in the inventories make up a great – and usually the largest - amount of the working capital in companies. There are many reasons for a company to have an inventory, but most commonly inventories are held to balance supply and demand and thus ensure a certain service level and avoid losing a sale. Inventories protect against uncertainties, provide flexibility and responsiveness to businesses. However, it is often viewed as a financial burden as it incurs more costs than benefits, and therefore targeted for reduction. Inventory reduction strategies highlight short lead times, efficiency, accuracy and streamlining with a goal of increased profitability. (Tersine & Tersine 1990, 24)

Costs caused by inventories are important to recognize and quantify in order to assess the total economic impacts of inventory management. It is important to consider all the costs caused by inventories, and not only the costs of items laying in the inventory in a certain moment. Other costs to consider are opportunity cost, warehousing cost, insurance cost, obsolescence cost, purchasing cost and out-of-stock cost. (Hofmann 2011, 31-34) For

example, opportunity cost is a cost of the capital that could have been invested in other projects and obsolescence cost arise when there are products in the inventory that cannot be sold anymore and need to be disposed. (Muckstadt & Sapro 2010, 13)

Inventory management is often studied as an isolated supply chain issue where other functions do not seem to play a big role. However, various decisions and activities inside and outside of an organization affect how well the inventory is meeting the cost and service targets. For example, demand creation and forecasting, purchasing, strategic decision making, new product introductions and marketing initiatives have a significant impact on the inventory planning. (Lloyd 2018, 17) Lloyd (2018, 15) points out that there are multiple people that can and make decisions regarding inventories. Therefore, the topic of inventory management is a wide and complex process that includes people from various business functions. In addition, some of the decisions need to be made on a strategic level, some on a tactical and some on an operational level. The decisions affecting inventories are for example EOQ calculations, sharing forecasts with suppliers, setting service targets, minimum order sizes and portfolio lifecycle management – just to name a few. Silver and Peterson (1979, 19) discuss the role of strategic planning in inventory management. They emphasize that decisions made about inventories should not be done in a vacuum but rather coordinated with other functions in the company. Inventory management should start with the top management which defined the targets and outlines of what needs to be done.

There are various elements that affect the size of the inventory and they are called inventory drivers. These are often also the basis for decisions made about inventories in a company. Lloyd (2018, 15) identified lead time, supply variability, service level, demand variability and lot size to be the main inventory drivers. De Leeuw et al. (2011, 438-439) identified uncertainty, seasonality, speculations, and company size in addition to the once identified by Lloyd. Moreover, all expect company size have a positive relation to the inventory level. In other words, when for example uncertainty or service level increase the inventory level increases as well. All the seven inventory drivers are presented in figure 5.

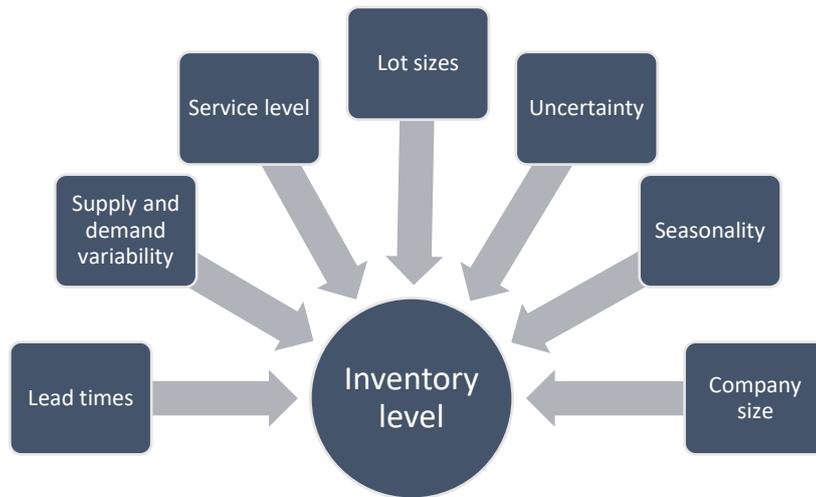


Figure 5. Inventory drivers. (Modified from Lloyd 2018, 15)

One of the main inventory drivers is the expected service level that a company wants to offer its customers. Decreased service level results in loss of sales and can have a negative impact on reputation and competitiveness of a company in the long run. However, a good service level increases inventory levels and buffer stocks almost inevitably, which is also undesirable. There is an ongoing conflict and a need for balance between service and inventory levels. From companies' perspective achieving a target customer service level or minimizing the cost function are the most important outputs of the inventory system. These outputs are determined by the combination of demand forecasting and inventory control policies, and therefore these two and their interaction is important to understand. (Ali et al. 2012, 831)

The role of strategic decision making in inventory management emerges from these trade-offs between service level and amount of inventory. The decision has an impact on customer demand response and may on the other hand increase inventory levels. Operational procedures together with certain constraints result in excess inventory and therefore a company should aim at efficient operating procedures and limited amount of constraints. (Tersine and Tersine 1990, 17)

Moreover, a maximum service level should not usually be reached for because the costs tend to increase to a level which is not cost-effective. There is a positive correlation between operating costs and service level, and therefore the higher the service level the higher the costs. However, the likelihood of a stock-out and thus a penalty cost decreases when service level approaches the maximum. The optimal service level can be found at the lowest point of the two costs combined, in other words when calculating the total costs. Figure 6 by

Miranda and Garrido (2009, 279) demonstrate the relationship between the service level, operating costs and the possible penalty in a situation of a stock-out.

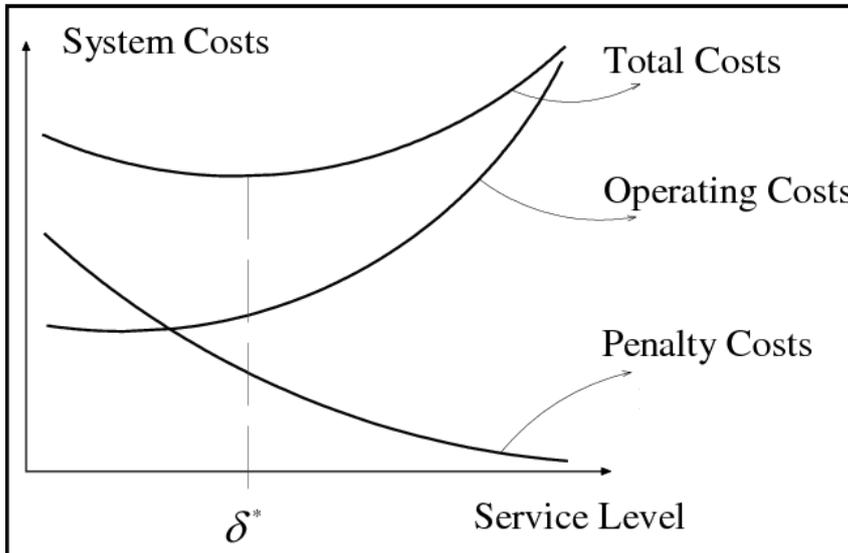


Figure 6. Service-level cost functions. (Miranda & Garrido 2009, 279)

Another decision regarding inventories that should be done on a strategic level is the classification of inventories and stocks, and the control and monitoring measures that are used to manage them. Inventories are usually divided into different types of stocks in order to improve the management and measurement capabilities. The types of stock used in a company depend on the nature and requirements of the business. Most typical stocks are work-in-progress stock, finished goods stock, safety or buffer stock, in-transit stock and end-of-life stock. (Muckstadt & Sapro 2010, 1-2)

A good starting point for inventory reduction is to divide the overall inventory into different classes. The disaggregation of inventories enables better analysis of imbalances at the operational level and reveals the financial magnitude of each inventory type. For example, financial turnover ratios and average cycle times can be used for the analysis. Tersine and Tersine (1990, 18) propose a classification of inventory types into productive and unproductive, where productive stock includes safety stock and working stock and nonproductive surplus and excess stock. Firstly, a company should get rid of all nonproductive stock to decrease inventory levels and generate cash. These are the products and materials that should not be carried, and the reduction has minimal impact on customer service levels but improves cash flow. When looking at the turnover analysis for

nonproductive stock, the turnover is low meaning the stock is almost dormant. A turn and earn- measure (gross profit margin x inventory turnover) can be useful to identify items that do not sell anymore. Achieving more accurate forecasts and record keeping, realistic product specifications and improved product line updates prevent increases in the non-productive stock. To decrease the levels of productive stock, the amount of safety stock (by lowering service level, improving quality, shortening lead times), lot sizes and lead times must change. Simplified product lines, improved reliability and quality of supply and efficient distribution also have an important role in strategies lowering productive stock. (Tersine & Tersine 1990, 19-23)

Other major inventory factors are uncertainty and lead times. Uncertainty makes inventory management more difficult as it increases the need for safety stocks which in turn increase costs. Uncertainty can be divided into supply uncertainty, internal process uncertainty and demand uncertainty. Demand uncertainty is the most influential as it is linked to the service level of the inventory. If a certain level of customer service is to be achieved, a company needs to invest in safety stock to meet the demand. This is also called ‘buffering against demand uncertainty’. In case of supply uncertainty, companies need to buffer against uncertain replenishment. Seasonality increases demand uncertainty and might result in gradual inventory build-up during quieter season and stock-outs during the peak season. In addition, product lifecycles have become shorter which has increased demand randomness. (de Leeuw et al 2011, 439) When there are multiple sources of uncertainty in the supply chain, the management of inventories become even more complicated. A phenomenon where demand variability increases as it moves through supply chain from a customer toward a supplier is called the bullwhip effect. In practice, a small fluctuation in demand results in even larger fluctuations in inventory. Sharing information on demand and forecasts reduces the effect. Inadequate inventory policies add to the instability and increase inventory costs exponentially. Therefore, one of the main objectives of an inventory system and supply chain should always be to maintain it as stable and robust as possible and minimize uncertainty throughout the demand and supply processes. (Ali et al. 2012, 832)

Distortion of demand information leads to bullwhip effect which results in excess inventories and inefficiency throughout the organization. The bullwhip effect is caused by insufficient communication and inefficient information sharing inside the company. Accordingly, the effect can be mitigated by improving internal integration and speeding up the information

flow. (Heikkilä 2002, 751). Sheu (2005, 797) agrees with Heikkilä and explains that a distortion of demand information is a major factor in the bullwhip effect and results in systematic inefficiency in the supply chain. The demand distortion is related to a bias demand information offered by the downstream chain members, delayed information transferring and inappropriate operations responding to the demand including demand forecasting.

Lead times play a role in inventory management as long lead times decrease the accuracy of demand forecasts which in turn increases the need for safety stocks. The longer the lead times the more complex the supply chain becomes, which drives up costs, increases delays and results in overall system and process inefficiencies. (Heikkilä 2002, 750) Lead time is the time between placing an order and receiving it. Safety stock requirements increase when the length of the lead time is uncertain because then also the demand over the lead time is more uncertain. (Muckstadt & Sapra 2010, 12) Usual causes for lead time and demand uncertainty are lead time and demand variability or incomplete knowledge (Oeser 2015, 6).

3.2 IBP in inventory management

Many of the issues of inventory management can be mitigated by implementing integrated business planning and its enhanced planning processes and cross-functional coordination. Cross-functional planning and coordination leads to decreased uncertainty in demand and supply and more stable cash flows in purchases. Therefore, cash and inventory buffers can be reduced as less cash and product is needed to protect against uncertainties and forecast errors. (Swink & Schoenherr 2015, 73) In addition, internal integration and training are positively associated with enhanced supply chain risk management capabilities (Riley et al. 2016, 953).

Risks can be managed by being reactive and agile and therefore quickly adapt to changes in supply and demand and address inconsistencies. This can be achieved by improved planning and forecasting, information sharing and internal integration. Internal integration helps managers to observe supply chain risks and assess information related to the risks as integration improves disruption detecting capabilities and therefore also the recovery from these disruptions. In addition, internal integration is positively associated with supply chain

responsiveness and it is found to reduce uncertainty and equivocality. (Williams et al. 2013, 549) By implementing IBP into its processes, a company takes a step towards more accurate information and decreased uncertainty, which will lead to less need for buffers and therefore decreased inventory costs. The positive loop started by the main elements of IBP is presented in figure 7.



Figure 7. Impact of IBP implementation on inventory levels.

Moon (2018, 177) highlights the importance of demand forecasting in the overall integration process and its role in inventory management as inventory and service level related risks are often related to imbalances of supply and demand. Gallmann and Belvedere (2010) studied companies that perform well regarding inventory management and service level. The authors found out that the companies focused on improving forecasting processes and demand management, because their excellent inventory management relied on the accuracy of demand forecasting.

By implementing integrated business planning, the organization and its supply chain functions can address the conflicting objectives, unnecessary costs and the decisions affecting inventory drivers. The organization can reduce uncertainties related to supply and demand variability and increased visibility on the lead-times and lot sizes and their effects on business help to make the correct decisions. In order to enjoy the benefits, there must be early visibility on opportunities and risks, quick and precise decision-making where planning and execution are tightly integrated and continuous improvement and feedback loop that drives for better decisions on each round. (Lloyd 2018, 21-22)

3.2.1 Integrated planning with IBP

When improving inventory related processes, required supply and demand planning processes need to be in place and carried out in a structured manner. There are various ways

of conducting and running IBP workflow and people from multiple functions need to actively participate to ensure the optimal outcome. Lloyd (2018, 64-69) suggest the following IBP workflow visualized in figure 8.

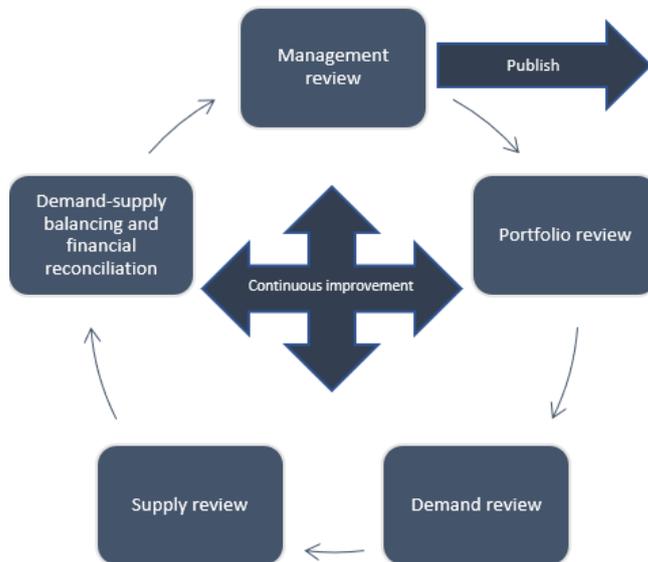


Figure 8. An IBP workflow (Modified from Lloyd 2018, 63)

The IBP cycle begins with portfolio review and requires preparation from product management and marketing department. The target is to answer question of what products and services will be sold. It also should look at market forces, emerging products and which products to introduce or drop out. (Lloyd 2018, 66) New product introduction and development bring more challenges to the forecasting, but they need to be considered, because they also have an impact on old products. From the point of view of accurate forecasts, it is important to have a disciplined portfolio analysis process in place. The process provides essential information to the forecasting, but also spares the supply chain from unnecessary costs. (Moon 2018, 34) A few KPIs can help to determine the state of the processes. For example, the level of obsolescence of products, launches on time and time to market and the number of out-of-life products are good indicators how well the processes are working. The meeting should result in an updated product master plan with prioritized projects. (Lloyd 2018, 66)

The product master plan created in the portfolio review meeting is used in the demand review meeting. The meeting is based on the underlying process of demand planning which involves the sales function, but supply planning is often included in the discussion as well. Demand

planning is based on volume, value and margin and requires segmentation of customers and products and answer the question of how much, where and when the company is going to sell the products. (Lloyd 2018, 66) A good starting point for the meeting is to review past performance, but it is critical to efficiently move to reviewing the initial future forecasts and continue to discussion of results from the portfolio review and their impact on the forecasts (Moon 2018, 222.) In addition, behavioral measures, such as attendance and behavior in meetings, can be needed as demand planning is often quite politicized in companies. In particular, the sales people often have tendencies to over-forecast to ensure the supply or because they have optimistic views of the sales they are going to make. Incentives to forecast accurately is also a solution for these types of problems, and management needs to take responsibility for the issue. After all, the goal of the demand review meeting is an unconstrained, consensual demand forecast which can be used in supply planning. (Lloyd 2018, 67)

Supply review meeting is based on the information supply chain planning tools provide. It aims to provide answer to the questions of can we supply and with what lead time. The focus is on short-term constraints and gaps in the plan. More importantly, the supply review considers alternative scenarios and creates plans for special events and projects. It prepares for seasons and unprecedented changes. The main KPIs are service level, stock-outs, capacity utilization, inventory days of supply and conformance to plan (tests quality of the plan and discipline in the organization). (Lloyd 2018, 67-68)

The demand and supply consensus is further established in a demand-supply balancing review where the responsibilities of demand and supply planners are cleared out. In addition, the meeting provides clarity on financial aspects such as revenue, operating margin, working capital ratios and return on investment. The aim is to have a financial reconciliation between financial and operational plan. This is a needed step because for example the revenue targets can be so ambitious that operations are not able to reach them. Situation like this might create two different realities inside a company and make conversations difficult because functions have different ideas of what is possible. Moreover, the behavioral measures should be also included and can consist of meeting preparation, attendance and how actions are taken and followed up. (Lloyd 2018, 68)

At the end of the IBP cycles is a management review meeting where the purpose is to make decisions about trade-offs and actions and to spot inconsistencies. The goal is to close gaps between demand, supply and finance plans and deal with allocation conflicts. The issues do not always reach this level but when they do, it means that they could not be resolved lower in the organization. In the meeting, the management makes decisions about changes in the supply chain network. They use pre-prepared scenarios and real time information as support. However, management often faces issues with the quality and availability of data as the tools in use do not meet expectations. Therefore, decision-making and scenario modelling is often a challenge. It is important to note that in the beginning of IBP process implementation, the first meeting can be even chaotic as disconnection are exposed. Over time, the meetings will improve and become more effective, or lose relevance. Thus, the most important KPI for this meeting is executive participation. (Lloyd 2018, 68-69)

It is important that forecasts serve as inputs to the business plan together with financial goals. Forecasts should not be changed because they do not fit to the financial goals, but gap closing strategies should be explored to achieve the financial targets. Forecasts should be kept as realistic as possible, and actions taken based on them. (Moon 2018, 183) Synchronization procedures required need to be determined in order to match supply and demand. It needs cooperation between different functions and will result in a single number and a single plan how to execute the demand for each product group / region / customer. It is also important to consider different scenarios and recognize possible future capacity issues. (Croxtton et al. 2002, 53)

3.2.2 Demand and supply process integration

One of the main elements of integrating processes and decision making in the supply chain is integrating forecasting and demand and supply planning. The integration of supply chain processes also has a positive impact on inventory management. Moreover, demand forecasting is a critical subprocess of the whole business integration of the company. It is an effective way to reduce uncertainty and shorten lead times, which are beneficial for the whole supply chain. Therefore, the process integration for inventory management is primarily explored through the concept of demand management, which naturally combines different demand and supply functions in the supply chain.

The term demand management is used to explain the process of balancing demand and customer requirements with supply capabilities. Its main goal is to predict customer demand and making strategic and operational decisions on how the demand can be synchronized with the capabilities of the supply chain. (Croxtan et al. 2002, 51) Demand management is not only forecasting as it should also include customer and product segmentation and a planning tool such as IBP or integrated S&OP. However, reliable forecasts also decrease uncertainty and contribute to the demand management performance. The aim is to synchronize customer demand with different functions in the supply chain such as purchasing and distribution. Therefore, it is essential to have cross-functional processes in place to ensure alignment and joint decision making in the company. (Rexhausen et al. 2012, 269; 272)

The so called “demand chain” contravenes the traditional concept of supply chain where the focus is more on the “push” of production and purchasing rather than on the “pull” from customer demand. The environment businesses operate in have changed into more unstable, rapidly changing one, and therefore the processes need evolve as well. Christopher and Ryals (2014, 29) argue that supply chains should be designed from customer backward in order to be more responsive and eliminate waste on both demand and supply side. A good demand management process can make a company more proactive, more flexible and have a positive impact on efficiency and profitability. Companies implementing demand management are also experiencing improvement in forecasting, inventory levels and asset utilization. Cross-functional alignment enables the use of unique set of skills and knowledge and therefore organization-wide issues such as inventory and service level can be tackled. Ultimately, with a well-managed demand and supply integration a company can achieve high service levels without carrying excess inventory. (Croxtan et al. 2002, 51; Rexhausen et al. 2012, 272) The effects on economic value are presented in the appendix 1.

Demand management has both strategic and operational elements that are both essential in the execution of the process. The strategic team should consist of managers from different functions and their responsibility is to develop the procedures at a strategic level and ensure that they are implemented. (Croxtan et al. 2002, 53) One of the main ideas of demand chain is to bring together demand creation and demand fulfillment activities. In other words, integrating sales and marketing with supply chain. The objective is to manage processes, not only functions, and create and deliver value through the processes. Demand chain is about alignment of strategy, KPIs and processes across functional boundaries. In traditional model,

demand creation and fulfillment are separate functions with separate processes. Having too many steps in forecasting is linked to lower demand chain efficiency, and therefore there is a need for integration and agile processes. Next phase in integrating the demand chain is limited joint planning and the final stage is demand chain management, which is characterized by accurate demand data, efficient processes, accurate forecasts decrease costs and process waste. (Christopher and Ryals 2014, 30-31) The process change is demonstrated in figure 9.

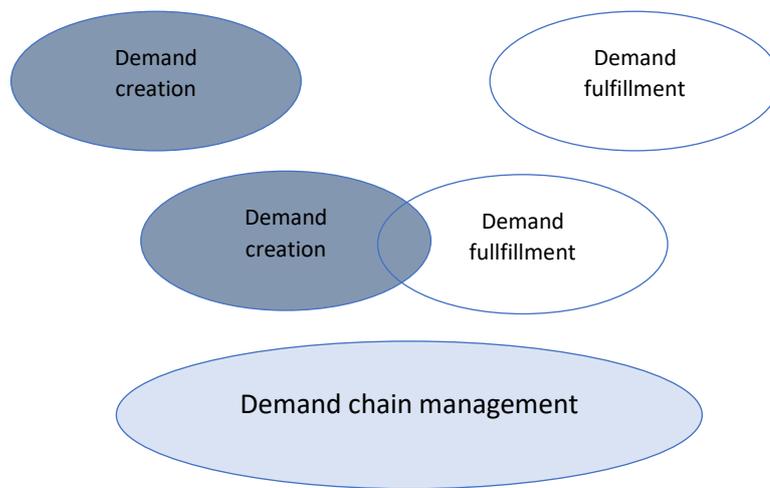


Figure 9. From traditional model to demand chain management. (Modified from Christopher and Ryals 2014, 31)

Demand and customer-oriented processes should extend beyond sales, marketing and the supply chain, by including product management also in the planning process. Moreira et al. (2018, 33) highlight the importance of coordination between new product development and supply chain. New product development (NPD) and supply chain need to be linked and work together in coordination as NPD should be considered a key strategic activity and a short time-to-market a critical element to long-term success. This is enabled by responsive and efficient supply chain. Lack of coordination between NPD and other functions often results in inability to deliver new products in a responsive way, which is essential in mature and highly competitive markets. NPD and supply chain should work together to create consumer-oriented company from the first design phase of a product to the final delivery to the customer.

Various functions need to work together for successful introduction of new products. The functions involved are sourcing, marketing, sales, forecasting and product management. The cooperation ensures also that product portfolio is up to date, product lifecycles are properly

considered, and obsolete products are phased out at the right time. The cross-functionality of new product management allows to react quickly on changes and disruptions in the supply chain which enhances risk and uncertainty management. (Moreira et al. 2018, 45) All of these actions have a direct impact on service level and inventory, and therefore benefit the whole supply chain from sourcing to sales.

Moreover, it is essential to pay attention to the forecasting processes as it enables an effective demand planning process. Moon (2018, 176) introduces four stages of sophistication for functional integration which helps companies to recognize their own strengths and areas of improvement and prioritization. The stages have four dimensions which are demand and supply processes, organization, accountability, relationships between forecasting, planning and goal setting and training. In order to reach well-performing forecasting process, a company should try to move from separated demand and supply processes to a strongly integrated demand and supply process integration both internally and externally. Employees involved in forecasting have a forum to share information and management is present for decision-making. In the ideal situation there is also a recognized demand and supply integration responsibility person to whom employees involved in forecasting can report to. It is beneficial if the responsibility person is at least culturally independent from different functions in order to stay unbiased. (Moon 2018, 80) Vereecke et al. (2018, 1627-1628) agree with Moon as the authors state that best practices for forecasting include full functional integration between different functions involve in the forecasting process and all functions involved must commit to one-number forecast. The authors add that the forecasting process should have clear support from management in forms of formal communication, workforce/manpower and budget. The authors also agree in the importance of having a responsibility person who owns the forecasting process.

Training is provided for everyone involved in the forecasting process as it drives the culture of integration and helps to transition away from the siloed one. Thus, training should be provided at least for sales, marketing and product management in addition to the supply chain function. Only with appropriate training, the people involved can understand the purpose of forecasting and demand planning and the organization as a whole has a chance to move towards a culture of collaboration. (Moon 2018, 184)

3.2.3 Performance management

Effective demand planning requires certain organizational characteristics to be in place. These are functional integration, cross-functional communication and commitment, management support, clear ownership structure and a dedicated team for the process. The communication is enabled by cross-functional meetings, integration roles and a matrix organization. The collaboration between functions should result in a consensus demand forecast that also has cross-functional ownership. However, the highest predictor of a successful implementation of a new model is management's support and therefore it is a critical success factor for the demand and forecasting process. (Vereecke et al. 2018, 1631)

The efforts to integrate and match demand and supply need a degree of cultural change in order to be successful in the long-term. The cultural change can be achieved by having supportive and committed management leading the change. Management's support and the potential lack of it can determine the success of projects and changes in a company. Ultimately, the management is responsible what processes are in place, what is measured, what is rewarded, and how well the strategy is implemented at the operational level. In addition, softer aspects need to be considered as well such as management style and effort of the employees to make the change. (de Leeuw et al 2011, 440) To have a strategy is an important step, but to know how to execute is even more important. Companies that have formal systems for managing the execution of their strategy perform better than those that don't have such systems in place. It has been said that success is 75% execution and only 25% strategy. Therefore, careful consideration of the delivery of the plan is crucial and should be given a lot of weight. (Merchant & Van der Stede 2016, 9)

Management's role becomes evident when addressing the conflicting goals between functions. It is essential to align interest and actions of employees collectively with the organizational strategy, because only then organizations are able to execute their strategies efficiently and successfully and thereby allow the employees to contribute to the organizational value creation as well. This way, employee behavior can be seen as a source of potential strategic advantage. (Colvin & Boswell 2007, 40) De Leeuw et al. (2011, 451) emphasize the importance of incentives that drive inventory operations. Different functions have different incentives that influence inventory levels, and these incentives determine

behavior and decisions made by the actors in the demand and supply chains. The problem of misaligned incentives often manifests between sales and marketing department and the supply chain function. Sales and marketing usually have control over finished good inventory but little to no incentive to keep the inventory levels at minimum. After all, having a good buffer stock and a little extra in the stock ensures good service level and decreases the chance of losing sales. When bonuses are linked to the number of sales, the best way is to ensure that inventories have enough stock to make the deliveries happen. In addition, with larger buffer stocks, the sales team can offer better lead times for customers and boost the sales even more. This puts more pressure to supply chain that is trying to cut down costs and be more efficient. Having opposing targets between functions makes it impossible to achieve company-wide targets and execute the strategy set by management. (de Leeuw et al 2011, 440) Providing appropriate incentive to the employees impacts their level of motivation and interest alignment, which are needed together with assets, capabilities and market position to achieve competitive advantage. None of these aspects alone can perform well and each needs the others to achieve the optimal outcome. Therefore, it is in management's interest to create a motivational working environment for the employees to reach the full potential. (Gottschalg & Zollo 2007, 431)

4 RESEARCH METHODOLOGY AND DATA

The case company is introduced as well as the current processes to provide the reader an understanding of the current situation and its disadvantages. The answers from the semi-structured interviews are presented and they provide the basis for the analysis. The results chapter provides suggestions for the processes based on the theoretical background.

The empirical research for this study has been conducted in a case company that operates in telecommunication and security industry. The company has employees and customers around the world. However, this research concentrates on a business unit that mainly operates in Finland but also has a close link to countries in Europe. The case company doesn't have its own manufacturing and hardware is purchased from suppliers. In addition, warehousing and logistic operations have been outsourced. The research is based on data collected from the mentioned case company and no other sources for the empirical part were

used. The methods and research process are explained in this chapter. In addition, the reliability and validity of the research is discussed.

4.1 Research method and process

The thesis is conducted as a qualitative single case study as the research is limited to only one case company and data is collected through interviews. A case study as a research method offers an opportunity to explore real world examples and best practices. In addition, a case study enables an in-depth analysis of the case and the collected data and therefore provides useful information also to the company. (Kähkönen 2011, 31) By using a case study research method, an understanding of a contemporary phenomenon is gained, and it allows the researcher to look at the phenomenon in context, such as a case company as in this study. Case studies are based on knowledge and therefore involve collection and analysis of data. Moreover, case studies are preferred in situations where questions when, how or why are asked and when the researcher doesn't have control over the events. (Farquhar 2012, 5)

The research process is presented in figure 10. Firstly, theoretical background was composed to construct the conceptual framework for the study. Interview questions were also formed based on the existing theory for the purpose of matching empirical research to the theoretical background. The interviews were conducted one over a with selected employees in the case company. After each interview, the information gathered was analyzed and later on analyzed against the existing theory. Research questions were answered based on the analysis and lastly conclusions were drawn from the research.

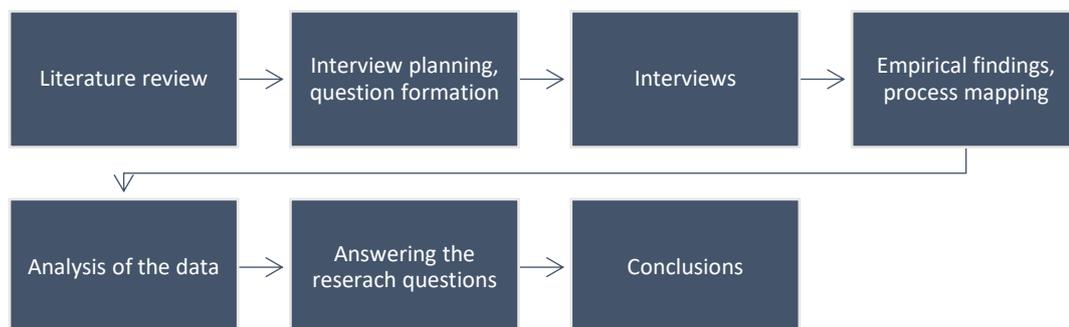


Figure 10. Research process.

4.2 Data collection and analysis

Semi-structured interviews were conducted with employees from supply chain and sales functions. The interviewees were chosen based on their position, work tasks and knowledge of the topics relevant to the research. It was essential to have different points of view of the demand planning and inventory management in order to gather diverse and reliable data. Therefore, not only supply chain personnel were interviewed but also demand creation side of the chain. Moreover, it was beneficial that the interviewees had worked for a long time in the case company and were able to therefore provide comprehensive answers to the interview questions. Due to covid-19 restrictions, all the interviews were conducted remotely using telecommuting tool Webex or email. This did not cause any issues and documents could be easily shared via screen sharing during the interviews.

The semi-structured interview method was chosen because it was important that the interviewees can answer with their own words and the conversation can lead to new questions. The order, amount and precise content of the questions can also differ from interview to interview to best suit the position and knowledge of the interviewee. It is important that the interviews remain flexible in order to ensure a wide understanding of the processes. (Kähkönen 2011, 35) Interview questions are provided in appendix 2. Interviewees received the questions before the interview took place and were therefore able to prepare for it if necessary.

The main objective of the interviews was to gain in-depth knowledge of the processes and practices in the company. Therefore, the interviews were discussion-like and information outside the questions was also obtained. It was also beneficial from the research perspective to hear opinions and interpretations from the interviewees. Therefore, interviewees were let to describe processes freely and spontaneously. In addition, supply chain manager and supply and demand planner provided Power Point slides, process maps and showed Qlik reports during the interviews. Answers were written down during the interview and notes were made continuously either by hand or to a word document. Notes were done in detail to make sure that all the essential information was gathered for the analysis. In addition, analysis was conducted as soon as possible after each interview and thus the discussions were still fresh in the memory. In the end of each interview, it was made sure all the

necessary points were covered and the information needed had been provided. Interviewees, interview dates, durations and methods are displayed in table 2.

Table 2. Interviews.

Title	Date	Duration	Place/method
Supply chain manager	4.2.2021	1 hour 30 minutes	Webex
Supply and demand planner	19.1.2021	1 hour	Webex
Key account manager	3.3.2021	1 hour	Webex
Buyer	9.2.2021	-	Email

The researcher had been part of the case company’s supply chain function for about a year when conducting the research and therefore had gained knowledge prior to the interviews and had been observing practices and processes for a while. The researcher was able to use internal information and documents of the case company and its processes in the study in order to gain deeper understanding of the issues. After the data was collected, the data was analyzed by comparing it to the theoretical background. The objective of the analysis was to discover areas of improvement, best practices and make proposals for the future.

4.3 Reliability and validity of the research

Case study as a research method can be criticized for the lack of rigor and therefore it is important to address the reliability and validity of the research. The previous chapter has already explained thoroughly the choice of research method, the research process, and data collection to ensure structured and transparent research. Process documentation is one of the quality factors for qualitative research, and therefore the study is following a typical research structure and covering all the necessary points. (Seuing 2008, 131) Transparency and replication are also a key to the reliability of a study. Reliability is ultimately the absence of random error and the ability if concluding the same insights if the study would be done again along the same steps. (Gibber et al, 2008, 1468) Reliability of the research is therefore ensured by being transparent in the research process. However, the reliability is affected by the fact the research is conducted only by one person. This might affect the reliability of the

interviews, analysis and interpretations and possibly lead to errors and biases in the results. (Kähkönen 2011, 39) In addition, as the time period of the study is relatively short, long-term impacts cannot be studied.

To further assess the rigor of a case study, internal and external validity are usually evaluated. Validity in general is assessed to make sure that the stated evidence is valid. Internal validity is ensured in the study by having a clear research framework, connecting empirical findings with conclusions established in previous studies and using different sources of data thus verifying findings. (Gibbert et al. 2008, 1466) In addition, multiple people from different functions in the case company are interviewed and different views are considered when analyzing the processes. As a single case study, the research suffers from lack of external validity because it does not offer statistical generalization. A cross-case analysis is not conducted and therefore the study lacks also analytical generalization. (Gibbert et al, 2008, 1468)

5 EMPIRICAL FINDINGS

This chapter presents the empirical findings of the research. The data is based on the interviews conducted as well as on internal documents and researcher's own knowledge and observations while working for the company. Firstly, the current processes and business characteristic related to demand planning and inventory management in the case company are explained. Secondly, the answers of the interviewees are presented and analyzed regarding different themes that rose from the interviews as the main issues in the company. Each section contains answers from different perspectives in order to get a comprehensive view on the issues.

5.1 Current demand planning process and inventory management in the case company

The products and solutions the case company offers to its customers are often customized according to each customer's needs, and can be only produced, purchased, or installed after customer order has been received. In addition, many products and their components have long lead times and therefore the demand needs to be planned well in advance to meet the customers' requirements. Therefore, the case company provides demand forecasts for its

suppliers for them to plan their production capacity and resources. This way, it ensures product availability with shorter lead times, secures on-time deliveries and is able to negotiate prices with suppliers. The importance of forecasting is evident as the difference in lead times for forecasted and unforecasted products is often several months.

The current demand planning process starts with a recognized need for products in different countries and sales regions. Regional managers discuss with the sales team and demand forecasts are entered into a demand planning tool by the sales team. Demand and supply team analyzes and confirms the demand forecast when it is entered in the demand planning tool. The demand plan is regularly updated and new orders and other changes in forecast are considered. Demand planning review meeting takes place once a month and it is organized by the demand and supply team separately with each region. Before the meeting, all the updates should be done to the forecast, because forecast accuracy and probability are discussed in the review meeting.

Masterplan is created based on the demand planning review. When the demand plan is in the masterplan, its correctness is analyzed, and planning items are converted to sales items. In addition, timings and quantities are modified. Statistical demand calculations are carried out and stock quantities are reduced from forecasts. Masterplan analysis is done manually in excel. In the masterplan, final adjustments can be made, and the demand plans are turned into supplier forecasts, which are given to the suppliers every month. Suppliers give feedback on the forecasts if any changes need to be done or if they think they might face any restrictions with their production or delivery capabilities. When the feedback has been received and necessary adjustments are made, the final forecasts are updated into a master plan. The forecasts are updated every month for the upcoming 12 months meaning that the case company operates with a rolling 13-month forecast. The masterplan is also a basis for the buffer stock purchases. The purchased items are not highly customized but have long lead times that are not suitable regarding the service level that the company wants to offer to its customers. The buffer stock usually covers about two-month demand for the purchased products. The process is visualized in figure 11.

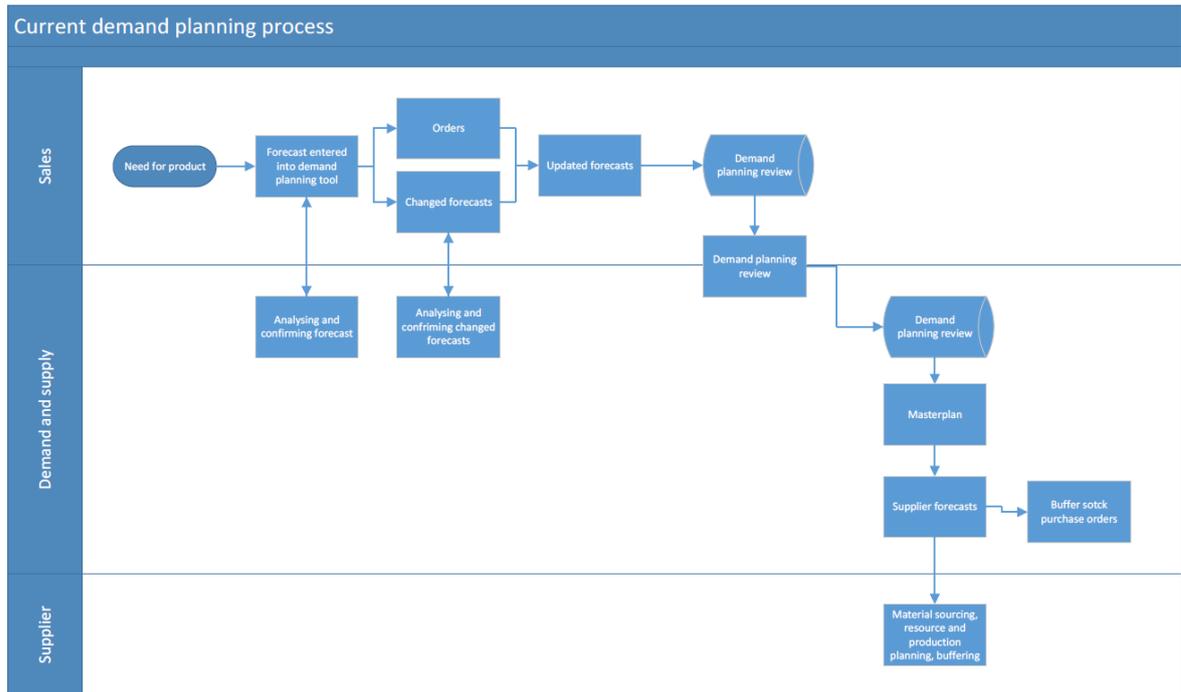


Figure 11. Current demand planning process.

The inventory can be divided into two larger stock areas which can be called “active stock” and “slow-moving stock”. They are about the same size, both close to 50 percent of the total inventory (figure 12). The active stock is driven by the demand plan and customer orders and the slow-moving stock is based on maintenance commitments, product line road maps and procurement contracts.



Figure 12. Inventory value by stock.

Supply chain has the most control of the active stock as it is based on demand forecast, buffer stock purchases, product returns and order cancellations. Sales and customer projects have a big role regarding the development of the stock as well. Some of the stock is due to order and forecast cancellations and these products do not have expected demand anymore. Most of the active stock is based on forecasts and customer orders that have not been delivered yet. The slow-moving stock is driven by product management, which is in charge of end-of-life and other product lifecycle management topics, supplier and maintenance contrast and longer-term business decisions.

5.2 Problem description

Problems in the case company regarding its inventory management were identified through the interviews and discussions. The main issue at the case company is the increased inventory level which negatively affects the cash and working capital management. The inventory levels have increased over the past years and the company is ready to develop new processes and practices to tackle the issue. Based on the interviews the excess inventory is not an isolated problem but rather a tip of an iceberg as it derives from systematic issues in the company.

Because of the nature of the business and the products the case company does business with, the whole demand and supply process suffers from long lead times and demand uncertainty. Some customer projects last many years and therefore decision-making is slower. It is typical that yearly planning is carried out with certain customers instead of monthly or quarterly planning. (Key account manager) There is also a strong yearly seasonality and unevenness of demand throughout the year. Large part of the demand falls on the last quarter of the year and results in an uneven division of demand during the year. There is often idle capacity during the first three quarters of the year and problems with capacity and product availability in the last quarter, which results in indirect costs, price increases, and process waste in all parts of the company. (Supply chain manager)

Integration between functions and planning cycles

There is an overall lack of synchronization between the sales function and the supply chain. The objectives and practices are conflicting in different functions which forms a basis for the inventory management issues. From the supply chain point of view, the demand data received from local sales to regions is too optimistic and leads to unrealistic forecasts. This is problematic, because over-forecasting increases inventory levels, and the supply chain function aims at lowering inventory holding costs.

Sales receives forecasts from customers and therefore forecast are mainly based on the information the customers provide. Customers often turn yearly forecasts to monthly forecasts and update the forecast when necessary. The forecasts are entered in the demand planning tool where the supply and demand specialists are able to see them. Sales team adjust the forecast by assessing possible leads and opportunities in the market. Also new products are discussed and their delivery capabilities and the overall market situation. Probability percentage of planned sales is used to assess what is believed to be able to achieve. Moreover, financial budgets impact the forecasts as sales try to reach the financial goals by adjusting the planned demand. (Key account manager) In other words, forecasted demand is increased to match the budget. When budgets are made based on sales forecasts, there is an incentive to forecast more than the demand might be in reality in order to get a larger budget. In addition, the sales function wants to sell more every year, achieve goals it has set and make sure that the service level remains suitable to support these goals. Optimistic forecasts ensure that there is product in the inventory and the sales team can provide customers with shorter lead times.

In the interview with the key account manager, the challenges related to the tools used in the case company were recognized. According to the interviewee, the tools in use are not sufficiently integrated and therefore the forecasted numbers are often unreliable. Also, the sales team prefers using the probability percentage of forecasted sales to offer more realistic numbers, but the sales planning tool does not support its use. Therefore, there is a risk of confusion between probable and forecasted sales. In addition, forecasts are in products, but financial plans are done in euros. Sales turns the product forecasts to numbers for finance manually in excel. (Key account manager)

Sales and product management work in cooperation regularly and the meetings are a basis for operational planning. Topics related to new product launches are discussed and the sales

function is able to consider the changes in portfolio in their sales planning. The meetings are almost monthly but the pandemic and resulted remote work has disturbed the cooperation. (Key account manager) Cooperation between sales and supply chain is unofficial and unregular. It is based on the fact that employees know each other well and have unofficial conversations in place. Information travels from function to function but the sales acknowledges that official collaboration and more systematic would be beneficial. (Key account manager)

In the interview with the supply chain manager, the issue of unsynchronized planning cycles is raised. The lack of synchronization is a result from the fact that demand planning is done monthly but financial and sales planning is carried out quarterly. Projects in financial planning are not presented correctly in demand planning and demand planning is not presented correctly in financial plans. This is because of the lack of integration in the timings and because in demand planning everything is presented in product quantities and in financial planning in euros. Therefore, the demand planning cannot utilize the data gathered by the financial planning and vice versa, and it is challenging to analyze true economic impacts of the operations. The lack of synchronization between the two planning processes is presented in the figure 13. Moreover, the strategic and operational planning suffers from slow target setting as the targets for the ongoing year are set only at the end of the last quarter. In other words, one quarter of the year has already passed when the year's goals are decided. The slow start with the business planning together with the demand decrease in the beginning of the year, the supply chain manager characterized the first quarter appropriately the 'hibernation' season.

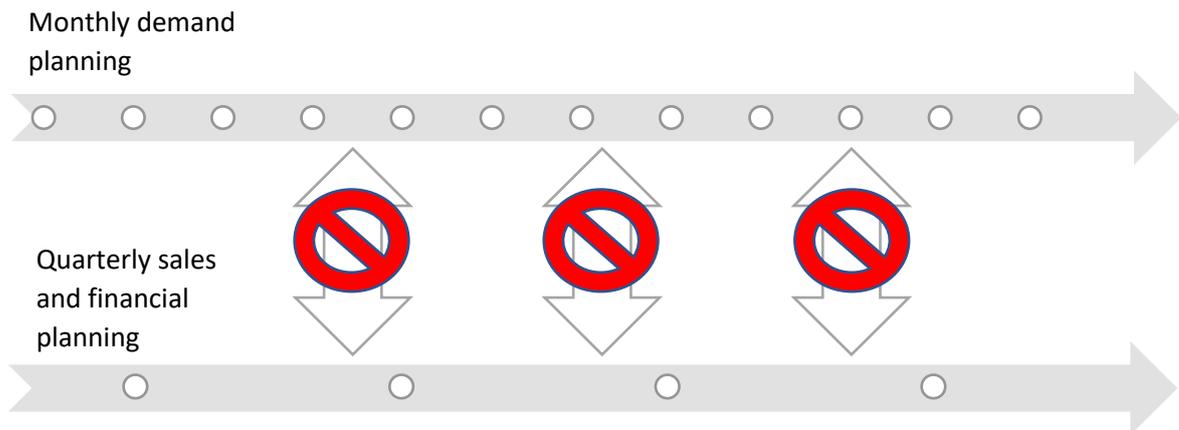


Figure 13. Monthly demand planning vs. quarterly financial planning.

Inventory management

When considering inventory management in the case company, there is evidently a lack of systematic processes and measurements in place to support efficient management of the stocks. The buyer interviewed for the study stated the following:

“We lack structural process to monitor all stocks and as such we only do it when it is required as an ad hoc approach. Inventory management is done on some stocks, but it lacks a systematic approach on a regular basis.”

The unreliable forecasts received from sales are seen as a problem at the operational level because the forecasts need to be filtered and adjusted for more realistic result. If the demand does not realize, the company is left with excess materials in stock. The situation is not balanced as sales regions can forecasts without risk, but the operations need to carry the weight of the results. In addition, the supply chain does not have a clear plan how to deal with the excess stock when demand changes unexpectedly. (Buyer interview)

Sometimes the delivery of the forecasted items gets postponed which decreases inventory turnover rate and weakens the cash flow. In addition, there have been situations where management has had too high expectations about selling a product, which results in items sitting in the inventory for a long time waiting a sale to happen. Ultimately, these items have to be sold with discount or thrown away. All in all, inventory costs increase and revenue decreases. (Supply chain manager interview)

In the interview with the buyer, the topic of product life cycle management is brought up because wrongly forecasted demand results in high scrapping risks and costs when product is changed from a normal sales item to an end of sales-status a few years later. When a newer model is introduced, customers rarely order an older model anymore. The timing of a new product introduction needs to be carefully planned to make sure that old products do not go obsolete in the inventory. The company also has support contracts with customer after sales and therefore some hardware service stock needs to be kept. This is one of the reasons for high slow-moving stocks. (Buyer interview)

Performance measurement

The lack of synchronization between functions is also present in the KPIs that are used in different functions or the lack of them. There are some company-wide goals such as finishing compliance training and customer satisfaction. Only 30% of the employee bonus is based on company result and the rest is based on individual performance. In addition, there is a lack of cross-functionality in the KPI used, which leads to a situation where each function operates almost separately by their own goals and incentives.

In the interview with the supply chain manager, the plan of taking KPIs in use regarding inventory performance was discussed. The company lacks appropriate inventory management KPIs for monitoring its performance. In addition, there are no inventory related KPIs outside of the supply chain function, which relates to the issue of misaligned objectives between different functions. Order intake is the number one KPI for sales. However, revenue is not measured for sales as a part of order intake, which does not encourage focusing on big customer projects. Also, subgoals such as request for quotation is tracked. The whole team's result is important in the performance measurement in the sales function.

The lack of alignment in KPIs across the company shows that operations are not clearly guided by strategic planning and incentives are not sufficiently linked to the strategy. Instead, targets are set for each function separately. The misalignment in performance measurement leads the functions to operate only for their own good, which takes away the foundation from strategic initiatives and an attempt to align the organization.

Table 3. Focus points and challenges of sales and supply chain.

	Sales	Supply chain
Focus	Order intake High service level Rather optimistic forecasts	High inventory turnover Low inventory levels Realistic forecasts
Challenge	Long lead times Supply uncertainty Unregular cooperation with supply chain Unsynchronized planning	Long lead times Unreliable forecasts Unregular cooperation with sales Unsynchronized planning

Based on the interviews the focus points and the biggest challenges of sales and supply chain function are collected in table 3. Even though the focus points are mostly opposite, the biggest challenges are very similar. This indicates that the functions are struggling with the same issues and therefore are likely to benefit from increased cooperation and information sharing. Next chapter will explore and provide the possible solutions for these challenges.

5.3 Results of the research

This chapter introduces the results of the research by making suggestions how the case company could implement IBP concept in its processes. The issues identified from the interviews were divided into three themes according to the theoretical section of the study (strategic planning, internal integration in demand and supply planning and performance management) in order to offer suggestion for improvement. The aim is to make suggestions for the case company by using past research, and the common solutions and patterns that were identified through the literature review.

5.3.1 Strategic planning

One of the main problems in the case company that affects the overall business are the malfunctioning planning cycles. There is a total lack of synchronization between the financial and sales planning and the demand planning as the former is done quarterly and latter monthly. Also, the financial plan is done in euros and demand planning in products. Therefore, the financial figures are represented correctly in the demand planning and vice versa. The desynchronisation of the planning processes makes the overall business planning difficult as the figures are not reliable.

The planning and target setting in the case company is slow and does not help with the seasonality the business suffers from. The targets are set only at the end of the first quarter which prevents the case company from benefiting 25% of the year. The slow start puts pressure on the rest of the year and there is less time to reach the targets. The market that the case company operates in suffers from strong seasonality where most of the demand build ups in the last quarter. In other words, there are idle capacity during the first three quarters and capacity and product availability issues in the last quarter. With the slow target setting and misaligned planning processes, the case company does not have an opportunity to impact the seasonality and the resulted process waste and indirect costs.

Firstly, the case company needs a new proactive system to plan its strategy. Secondly, it needs a new planning processes that able the linkage between the developed strategy and the operations. The case company must start planning the next year well in advance and adjust the targets during the year if needed. The strategy and targets should be fully in action after the first weeks of the year and put more pressure on the first quarters.

To strengthen the strategic focus and decision making in the case company, a systematic process for that is needed. Kaplan and Norton introduced a management system that gives clear guidelines how to develop a strategy efficiently and then link the created strategy to operations. The integrated system has six stages and is shown in figure 14.



Figure 14. Integrated management system: linking strategy to operations (Modified from Kaplan & Norton 2013, 8).

The process of linking strategy to operation starts with developing the strategy. As Jurecka (2013, 30-32) explained, the company needs to be aware of its general strategic focus. Management should think how to achieve sustainable competitive advantage by organizational differentiation. In other words, there should be a consensus about how to use internal resources and capabilities to improve processes and therefore become more efficient. Only by knowing what to focus on and having clear strategic vision, it can be communicated across the organization. Therefore, the executive of the company must firstly clarify the mission, values and vision of the company. Then, a strategic analysis should be conducted by reviewing the business environment the company operates in. Multiple analysis tools can be used, such as PESTEL and SWOT, to assess the external and internal environment. After the comprehensive analysis, the executive team change the current strategy if needed and create a new strategy which addresses the issues of customer value proposition, how to differentiate, what are key processes, capabilities and technologies required. (Kaplan & Norton 2008, 9-10)

Now that the strategic direction set in the step 1 is clarified, it needs to be converted into specific objectives, measures, targets, initiatives, and budgets, which is the focus in step 2. The goal is to turn vague statements into actions, and guide and align the organization for

effective strategy execution. This can be effectively done by using strategy maps, strategic themes and Balanced Scorecard. (Kaplan & Norton 2008, 69) The idea is to visualize strategic dimensions and cluster related objectives across the organization. Thus, management is able to plan key component separately but still have them operate coherently. The objectives are then turned into measures and targets by using a Balanced Scorecard and action plans are implemented, funded and the strategic theme owners are chosen. (Kaplan & Norton 2008, 10-11) The strategy formulated by executives must be linked to the strategies of functional units, and this is done in step 3. Employees across the company must also understand the strategy and be motivated to implement it. To ensure the organisational alignment, the corporate strategy needs to be cascaded to the functions and the functional strategies should be adjusted to be aligned with the corporate strategy. Communicating the strategy to the employees is essential and the use of formal communication program is encouraged. (Kaplan & Norton 2008, 12)

Regarding the strategic inventory management in the case company, certain aspects should be considered. As mentioned in the theoretical section of the study, inventory management and the inventory reduction initiatives benefit from classification of stocks. The case company has classified its stocks to some extent, but it should be a part of strategic decision making as well. It is important to recognize organizational purposes of each stock and calculate separate turnover for each stock. Thus, active and dormant stock can be identified, and decisions about each stock can be made according to the strategy. In addition, continuous monitoring of each stock is required. The active stock of the company can be viewed as the productive stock introduced by Tersine and Tersine (1990, 17-24), and therefore strategies for this stock are simplifying product line by close collaboration between product management, supply chain and the sales function. It is also beneficial to revised service levels regularly, aim at reducing lead times and improve the reliability and quality of supply. Consequently, the slow-moving stock can be treated as the non-productive stock. Preventive actions for this stock are more accurate forecasting, realistic product specifications and improved product line updates. These can be improved by having the product management involved in the demand and supply planning processes. More importantly, these stocks must be monitored at all times. Useful measures are financial turnover ratios and average cycle times. Also a turn and earn- measure (gross profit margin x inventory turnover) can be useful to identify items that do not sell anymore. (Tersine & Tersine 1990, 22)

To ensure seamless information flow from top to bottom and continuous feedback from market and operations all the way to the top management, integrated planning horizons should be considered and implemented. As the case company had issues with synchronizing demand planning with sales and finance planning, the proposal based on the theoretical background is to have cross-functional meetings with different business horizons. It is beneficial to have both horizontal and vertical integration in the planning processes. In other words, cross-functionality should be prioritized together with collaboration between management and employees.

The planning cycle starts with annual strategic planning where top management discusses business development and strategy for the long-term. The strategic planning should be connected yearly to tactical planning and this is recommended to be done around the time when the budget for the year is planned. The annual planning sets the direction for the business and communicates the strategic priorities. There should also be a monthly strategic meeting to be able to react quickly in possible changes and difficult situations in the business environment. The monthly strategic planning is connected monthly to the tactical planning. Tactical meetings focus on issues of the ongoing year and it is led by management. All the managers from different functions should also be present. These monthly processes must communicate to each other continuously. (Kepczynski et al. 2018, 40)

Lastly, at least once a month, operational planning is connected to tactical planning. The operational planning provide input for the tactical planning. The outcome of the operational meeting must be integrated into the tactical planning every month. Therefore, all the decisions are fully transparent between the two planning processes. Operational planning and operational execution are aligned with tactical plans which are approved by top management. Operational planning focuses very short-term decision-making and removes the short-term decisions from tactical planning. (Kepczynski et al. 2018, 41-42)

Operational meetings should be cross-functional with at least supply chain, sales, finance and product management attending. The meetings can be organized monthly but also bi-weekly and weekly is sometimes appropriate.

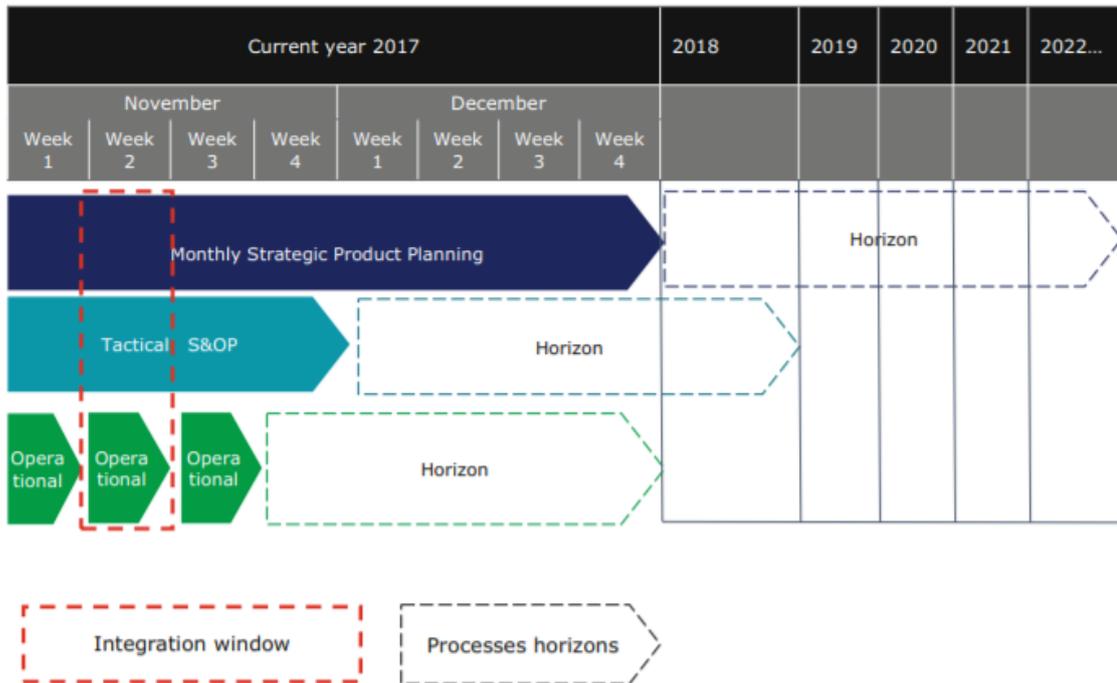


Figure 15. Integrated strategic planning (Kepczynski et al. 2018, 40)

The planning horizons are visualized in figure 15 to give an idea what the planning would look like on an annual and monthly basis. The idea of the integrated planning horizons is to replace the current planning practices in the case company, but the needs of the case company, the industry it operates in and the business environment must be considered when implementing the IBP. In addition, it is not unusual that the planning procedures and integration windows change over-time. In fact, they should evolve to fit better to the company and industry needs. Management should not feel discouraged if the first months or even the first years feel clumsy as everyone is learning new ways of doing business. Finding the appropriate way of implementing the planning processes can take years.

On that note, the culture of continuous improvement and giving feedback should be nurtured on every step of the way. Moon (2018, 31) supports the idea of certain level of discipline when carrying out meetings, where it is ensured that the right people are attending the meeting and the right topics are discussed. In other words, there should always be people in present who have authority to make decisions, agendas must be set before the meeting and

followed during the meeting and the focus should be on future actions. The author suggests completing assessments after meetings to promote the discipline and make the planning effective.

Step 4 in the management system by Kaplan and Norton focuses on business process changes and improvements. This section focuses on the improvement of planning processes in the case company and the next section of internal integration goes through the changes in the demand and supply planning processes. In step 5 of the management system the case company should examine challenges and learn from problems and discuss the findings in management meetings. In step 6 the management should use data gathered from operations and business environment to test and critically analyse the strategy. Then the strategy is adapted, and new loop of strategy development is launched. (Kaplan & Norton 2008, 9)

5.3.2 Internal integration

Based on the interviews, there are conflicting ideologies between functions which are supposed to work seamlessly together, and there is insufficient internal integration in the case company. This results in inadequate information sharing, poor visibility from customer projects to the buyers and increased costs due to process inefficiencies.

As can be seen from the figure 11 and concluded from the interviews, the current demand planning process in the case company is not very cross-functional. The current process is heavily on supply chain's responsibility and therefore does not appropriately include all the necessary parties. Sales is mainly involved in the beginning when providing customer forecasts but has a minimal role from that point forward. Other functions, such as finance, are not involved at all. Moreover, global sales regions don't have to commit to the forecasts and there is little to no incentive to forecast accurately in the sales function. This creates challenges in the demand planning and therefore also in the inventory management as the responsibility for accurate forecasts falls solely on supply chain. The lack of collaboration easily leads to demand distortion such as the bullwhip effect, which results in excessive inventories and increased working capital tied to operations.

In addition, product management is not sufficiently integrated in the demand planning process. Even though sales and product management hold a meeting regularly, there is no

formal portfolio review in the process that would include an analysis of the product life cycles and their impacts on forecasts and inventory management. The impacts of product lifecycles on the forecast are only discussed in the masterplan stage of the demand planning process, but this is also done solely by the people from supply chain.

The case company struggles with the slow-moving stock which is partly comprised of end-of-life stock. The problem can be mitigated by increased cooperation particularly between product management, sales and supply chain to share information about phasing out old products in an agreed timeline and introducing new products only when the timeline of old products is agreed. The cooperation between the mentioned functions ultimately affects the active stock and its scrap stock, which are financial burdens for the company. The products in the scrap stock need to be thrown away or sold for a low price and both decisions create costs. When product lifecycles are planned more carefully throughout the organization, there is decreased risk of products ending up in the scrap stock. There needs to be a discussion on the management level about the impact on maintenance and other contracts' impact on inventory levels. This is a trade-off discussion which needs to be evaluated on a strategic level. Moreover, as the scrapping decision is a financial decision, should the responsibility of the stock be in the finance. Finance function should in general have a bigger role in the demand planning process. Finance is missing from the current process, and therefore there is not opportunities to close gaps between budgets and forecasts.

There is poor visibility from customer projects to buyers at the end of the supply chain, which makes proactivity and planning of purchases difficult. Sales regions, sales team and customer projects should share the sales order information regularly and transparently to all the way to the buyers, so they have chance to plan stock purchases and give back information about possible availability issues.

Therefore, a more integrated demand planning process (figure 16) is proposed for the case company. The demand planning process according to the IBP workflow offered by Lloyd (2018, 63) is fitted to meet the needs of the case company. According to the author, the IBP demand planning process is most often used as a tactical tool that is run monthly and addresses mid to long-term horizon (from 4 to 8 months). However, the frequency and the horizon are subject of a debate, and most importantly it should make sense for the company. For the case company in this study, the proposal is to run the process every month as there

is then enough time to gather data but also opportunities to make changes and take action when needed.

The process starts naturally with the need for product and then the demand forecast is entered into the demand planning tool. Next, product management, sales and supply chain function hold a portfolio review. Members from supply chain should at least consist of supply and demand specialists, buyers and managers to have a holistic view of the operations. As sourcing is in charge of supplier selection and relations, the case company would also benefit having people from the sourcing function attending the portfolio review. The following demand review should have people from sales and supply chain as well. Demand review can be organized separately with each region similarly as it is done in the current demand planning process, but the result needs to be consensual demand forecast for the supply review meeting.

Supply chain then reviews the supply capability according to the information received from suppliers before the demand and supply balance and reconciliation meeting takes place. Supply review should identify short-term constraints in the plan when comparing demand and supply. The reconciliation meeting is one of the most important meetings in the demand planning process and therefore requires careful planning. Attendees should be people from sales, supply chain and finance and preferably from many different positions. Aim is that functions agree on financial targets such as revenue and working capital and therefore reconciliation between financial and operational plan is reached. As Moon (2018, 183) pointed out, forecast should not be changed at this point but gap closing strategies should be developed to meet the financial goals. The case company has a situation where too optimistic demand forecasts seemed to be partly a result of inadequate financial planning practices where forecasts are adjusted to meet the budget. This needs to be changed and forecasts need to be kept realistic. Participants in the reconciliation meeting should fill the gaps by proposing for example appropriate sales and marketing initiatives. Masterplan is the output from the reconciliation meeting. It is the basis for supplier forecasts and buffer stock purchases.

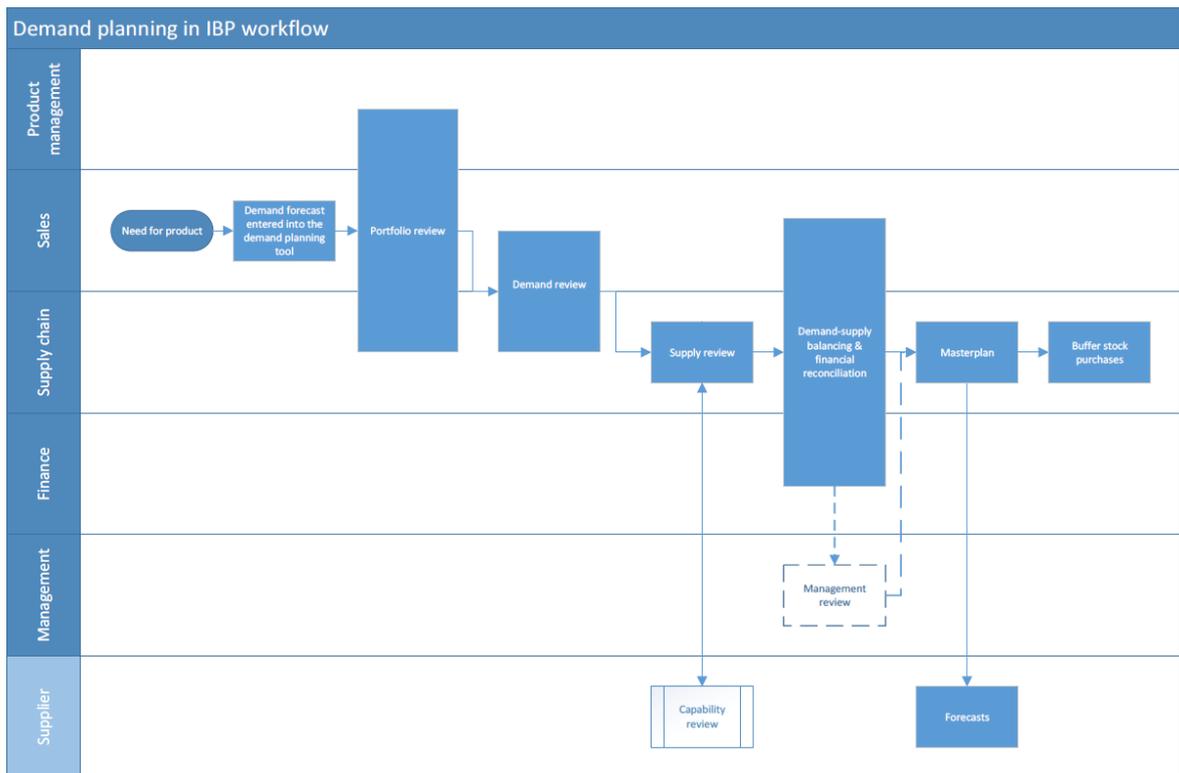


Figure 16. Demand planning in IBP workflow.

The management review is needed in the demand planning if agreement cannot be reached in the reconciliation meeting. Then it is management’s decision how to balance the demand and supply and meet the financial targets. However, even if agreement is reached in the reconciliation meeting, management should receive the information from the meeting and analyze what is happening in the market. The meetings should be forward-looking, and multiple what-if scenarios should be prepared and action plans made for all of them. This improves reactivity and risk management and enhances the management’s knowledge of the market dynamics. The essential content of each meeting has been combined in a table found in appendix 3.

System-wise everything from portfolio planning to masterplan should be done in the same tool in order to have more reliable figures. The integrated planning tool would also benefit the planning cycles as demand and financial figures would be shown correctly and updated in real time. As a result, management would have up-to-date information from the operation available whenever strategic decisions are made.

The covid-19 pandemic has affected the company’s ability to work cross-functionally, communicate effectively and build more personal relationships with co-workers. The case

company has had a strict work from home-policy for a year at the point of the research, and to some extent the remote work is here to stay. Therefore, enforcing cross-functional integration is more important than ever, and it should be increased through both formal and informal methods to ensure trust, openness, and understanding between functions.

Formal methods are often organized and facilitate by the company and the managers. Adequate communication can be formally ensured by providing cross-functional communication infrastructure and information sharing technologies for employees. The infrastructure can consist of intranet or different instant messenger applications that make both ad-hoc and planned communication easier. (Pimenta et al. 2016, 581-582) In the case company, an intranet, SAP and messenger tool Jabber are in use, which help sharing information. However, they are not used very cross-functionally, and people mostly interact within the functions. Formal cross-functional integration can be also increased through cross-functional meetings and discussions where every function's view is considered, and the goal is to reach a consensus on the topic in hand.

The integration requires managerial adoption of joint planning, which is established through cross-functional meetings and teams. (Pimenta et al. 2016, 581) For example, the case company could benefit from establishing a demand planning team that supports the new integrated demand planning process and is responsible for its implementation. The attendees would be from sales, product management, finance and supply chain and the employees would develop the specific structure, agendas and attendee lists of each meeting.

Informal communication, for example coffee break chats, have disappeared almost entirely as a result of remote work, and therefore employees should be encouraged and reminded to organize informal coffee breaks and chat sessions in addition to the formal meetings, and most preferably invite people from different functions to join. The informal ways of communication promote trust, minimize rivalry, and increase the ability to understand objectives and responsibilities of other functions. The informal ways of communicating also increase the overall group spirit in the company and help employees to focus on the big picture. (Pimenta et al. 2016, 581)

The case company is undergoing an office renovation where the office becomes a so called "flex office" where everyone works in the same space. Before the renovation, every employee had their own desk, and the office was split to three floors. In the new office space,

nobody has a signed desk, but employees can freely sit where they want and choose between a quiet area, different meeting rooms and regular work desks. The office is also going to be only in one floor. Having everyone working in the same area promotes informal and formal communication between different functions. When going to the office, it is now more likely to meet people from different functions and have informal chats. Quick meetings to tune short-term process is important in cross-functional integration, and this is facilitated by the new office design. In the previous office setting for example sales and supply chain were in different floors and therefore, the employees might not even use the same coffee break area.

In order to get a good start for the process of increasing internal integration, training should be put in place. The objectives of the trainings should be the development of inter-functional competencies, the importance and influence of increased integration to the business and the increased recognition of interdependence of functions. The trainings also result in conversations and thoughts about the topic and sharing ideas should be heavily encouraged. (Pimenta et al. 2016, 582) Training is also one of the most effective ways of making a cultural change. In the case company, trainings are often carried out online and the pandemic has cancelled trainings that required physical presence. According to Moon (2018, 62), online training is not an effective way when it comes to trainings about integration. Moon argues that the benefits of conducting trainings where people are physically present outweighs the costs. The training should be cross-functional and people from different functions should interact. More importantly, these training needs to be educational. It is not enough to show how to do things, but to explain why they are doing it and why it is important. When the pandemic eases, extensive trainings on internal integration should be held and attendees should equally represent different functions. The trainings are heading to a wrong direction if most of the people in the room are from the supply chain function. (Moon 2018, 61) The overall IBP process development requires a responsibility person who focuses on the IBP process changes and change management. There must a clear ownership of processes and an assigned person who takes questions, forms teams and leads the change. In other words, there should be a nomination for an IBP dedicated person who concentrates solely on the process and cultural change.

5.3.3 Performance management

The KPIs used currently in the case company do not support internal functional integration nor the strategy execution. For example, the case company should consider KPIs that support inventory management improvement project if improvements in the area are wanted. The integrated measurement approach where cross-functional metrics are used should be considered. It focuses on activities that lead to long-term competitive advantage, and separates metrics for strategic, tactical and operational level. All the measures should be drawn from strategy, and therefore the strategy clarified according to the section of strategic planning should be cascaded down the organization by using appropriate KPIs. Similarity between functional objectives with organizational strategy is important because objectives linked to larger targets may reduce inter-functional conflicts.

The focus should be on outcome metrics instead of using only process metrics to guide the strategic decision making. Useful outcome metrics are for example inventory turns, out-of-stock rates, working capital levels, customer satisfaction and customer fill rates. The metrics and objectives must not be conflicting between functions and they should be accepted by everyone. Cross-functional metrics should be taken in use, for example sales becoming accountable for finished goods inventory levels instead of forecast accuracy. (Moon 2018, 206- 207)

The metric tree by Iyengar and Gupta (2013, 15) was introduced in the theoretical section and is beneficial for the case company as well. As shown in table 4, all the important functions are presented on the top row. Product management was added to the table as it is found to be an essential player in the IBP implementation. The last column includes all the functions and represents KPIs that should be used everywhere in the case company regardless of the function. Moreover, the KPIs are divided into three levels which are strategic tactical and operational and therefore can be allocated to employees of certain level of responsibility in the company. This links also the planning horizons to the performance measurement and gives a holistic view of the performance.

Some of the functions have same KPIs such as net working capital for sales, finance and supply chain, and days inventory on hand for sales, supply chain and product management. These cross-functional metrics are critical for the successful implementation of IBP and for the strategy execution. These KPIs push the functions to work together as they make them

dependent on each other. Sales functions cannot hit the net working capital target without the help of finance and supply chain and vice versa. In addition, KPIs set for all functions should reflect the most important targets that require input from everyone and makes functions accountable for the decisions they make. The case company has 30/70 rule in place where 30% of the bonuses is related to company goals and 70% personal goals. However, for the benefit of the company this could be changed to 50/50 in order to have the employees focus more on the cross-functional measures that all support the company's strategy.

Table 4. Metrics for IBP implementation (modified from Iyengar & Gupta 2013, 15)

	Sales	Marketing	Finance	Supply chain	Product Management	All
Strategic	Net working capital	Turn/Earn Index	Net working capital	Forecast variances SC costs (%COGS) Net working capital		ROCE Inventory costs % Achievement of plan X
Tactical	Customer fill rates Days inventory on hand			Days inventory on hand Fill rates Forecast accuracy	Days inventory on hand TTM	
Operational	Customer fill rates Days inventory on hand	Marketing forecast accuracy Promo schedule adherence	Financial forecast accuracy (%) Promo budget adherence	Days inventory on hand Obsolescence cost Fill rates Forecast accuracy	Days inventory on hand Obsolescence cost	NPD Schedule adherence

The KPIs in use can, and should, change when necessary. The management should critically analyze the outcome of each measurement if it is aligned with the strategy and if it promotes the wanted performance and organizational culture. Management is encouraged to discuss openly with employees about the changes. Ideas from employees are essential as they are the main participants of the process and the change. External help, such as consultants, can be utilized but no one knows the company and the business better than the employees. Usually, the improvement suggestions that come from the employees of different functions are practical, realistic, require little to no investment, and multiple perspectives are considered. In addition, listening to the employees increases their motivation to improve their performance and the discussion often leads to improved teamworking. (Iyengar & Gupta 2013, 16)

6 CONCLUSIONS AND DISCUSSION

Based on literature about inventory management and IBP, the case company seems to struggle with common problems. The findings suggest that there are room for improvement in the case company in relation to the inventory management processes, and therefore benefits can be expected when implementing IBP. However, in order to be successful, all the main elements must be covered comprehensively in the implementation.

This final chapter answers to the research questions and further recommendations for the case company are presented. The chapter also discusses the limitations of the study and gives suggestions for further research.

6.1 Answers to the research questions

The main research question: **How could IBP implementation benefit inventory management in the case company?**

As Lloyd (2018, 15) pointed out, various people and activities in a company affect the inventory management. However, inventories are often managed only by the supply chain which then has the responsibility for reaching the service level and cost targets. This is the

case also in the case company where there is a minimum cooperation between functions regarding inventory management and the processes related to it such as demand and supply planning. Therefore, implementing IB P process in the case company starts a positive loop of enhanced internal integration, improved information sharing and therefore decreased uncertainty in the demand planning. Implementing IBP process provides solutions for many of the underlying issues in inventory management. The loop begins with improved strategic planning, clarified strategic focus and enhanced communication of the strategy. The strategy is cascaded down the organization by integrating planning horizons, enforcing cross-functional integration, and using appropriate performance measures. IBP enables executing the case company's strategy also at the operational level. As the strategy is defined more clearly, functions can work towards common goals such as inventory management improvement. Inventory management related performance indicators across the company enable following and monitoring of the progress.

By implementing the integrated planning processes introduced by Kepczynski (2018, 40), the case company can achieve one set of numbers for all functions. There is also an increased knowledge about other functions' activities and thus different functions understand what is important for others, which helps functions to work more collaboratively. To improve inventory management, input from all functions is needed and IBP is one of the ways to get all the functions to work together. The inventory drivers are affected by everything and therefore everyone in the company is needed to decrease the inventory levels and ensure a good service level. The collaboration results in more accurate forecasts, enhanced product lifecycle management and adjusted safety stocks which all ease managing the inventory levels. The final goal is to hit the 'sweet spot' where costs and inventories are minimized, and customer service is maximized. (Moon 2018, 32)

Inventory management is made of many aspects and processes and these are considered more in detail via the sub research questions. The sub questions explore the processes related to inventory management and the two of the main aspects of inventory management: inventory levels and service level. These two aspects are not only inter-related but often conflicting issues in a company as lowering inventory levels can result in decreased service level and increased service level increases inventory costs. Therefore, the both need to be taken into account when discussing inventory management.

Sub-question 1: How the current processes can be improved with internal integration?

In the heart of the IBP implementation is internal integration, both vertical and horizontal. Vertical internal integration can be reached through improved planning processes where strategy is cascaded from top to bottom and market feedback moves from the operations to management. Horizontal integration happens when people from different functions attend the planning meetings. The proposed integrated planning enhances information sharing, strategy alignment and business planning throughout the company. In addition, IBP planning process improvements decrease seasonality and uncertainty as planning becomes more efficient and it is started earlier. Moreover, targets are known from the beginning and demand plan is correctly displayed in the financial plan. Management is able to evaluate the economic impacts of demand forecast more accurately and prepare for different scenarios in the market. Through integrated planning, inventory management is no longer an ad hoc approach, but the impacts of actions are evaluated regularly from multiple perspectives.

Moreover, internal integration can be implemented more precisely in the demand planning processes of the case company. Internal integration in the demand planning decreases uncertainty and process waste all over the company. Integration breaks down the communicational and functional silos and pushes the functions to work closely together. This results in more accurate data which considers perspectives from sales, product management, supply chain and finance and therefore is not biased or fixed to serve one function only.

Implementing IBP in the processes increases internal integration, which is positively associated with improved supply chain risk management capabilities. Improved planning in the case company and therefore also improved information sharing lead to improved reactivity and ability to adapt changes in the business environment. Through IBP implementation supply chain managers can easily spot risks and detect disruptions. (Riley et al. 2016, 953)

The increased integration in the demand planning process brings together demand creation and demand fulfilment activities. This so-called demand chain is studied to be more customer oriented, which serves the whole business. The demand chain improves product availability, reduces storage and handling costs, lower safety stocks and reduces obsolete inventory. (Appendix 1)

Sub question 2: **How can inventory levels be reduced with IBP?**

Excessive inventory is one of the main issues in the case company because it decreases the company's liquidity and competitiveness by tying up large amounts of working capital. IBP process implementation offers improvement solutions for inventory management related processes which have a positive effect on inventory levels. The mentioned improved demand planning process results in more accurate forecasts, which in turn decreases the need for safety stocks. As established before, uncertainty increases the need for safety stocks and therefore also the overall inventory levels. IBP process implementation decreases internal process uncertainty and demand uncertainty through enhanced planning activities and cross-functional integration. Supply uncertainty can be also mitigated in the long run as suppliers receive more accurate forecasts as a result of the improved demand planning.

IBP and the resulted internal integration and information sharing on demand and forecasts reduce the bullwhip effect which in turn decreases the inventory levels. The increased collaboration and trust in the demand planning process decreases demand distortion as operations tend to respond to the demand more appropriately. With an increased visibility from customers to buyers, the buyers can plan stock purchases more precisely. Integrated KPIs across the company support the collaboration and decreases the likelihood of siloed behavior, where for example forecasts are adjusted to match budgets or changed due to lack of trust between functions. Active stock is mostly made of items that are forecasted and therefore more accurate forecasts would have a decreasing effect on the stock.

As product management is included in the demand planning processes, the product lifecycle management is improved as well. When product lifecycles receive more attention, there is lower risk of end-of-life products remaining in the inventory. People from sales and supply chain can plan their operations to match the agreed timelines for introducing new products and phasing out the old one. The inventory costs of scrapping or selling old product for reduced price are thus decreased. This affects positively the inventory management as there are fewer products in stock and scrapping costs are minimized.

Sub question 3: **How can service level be maintained with lower inventory levels?**

It is also important to consider the service level impacts of IBP implementation and not only concentrate on decreasing the inventory levels. Service level is important for a competitive

standpoint and if it is poor, it negatively impacts customer satisfaction and in the long run decreases the ability to compete in the market.

IBP process does not only serve the supply chain function in the company but also brings benefits to the sales function. Through improved forecasting, the whole company is able to offer better service to its customers. The functions are given a chance to collaborate and share information about customer projects, lead times, products and supply capabilities.

As a result, the needed products are more likely in stock and customers receive them with shorter lead times. Enhanced information flow from sales to supply chain gives the buyers a chance to act proactively to make sure the stock situation is good. In addition, KPIs related to customer fill rates and stock outs in the supply chain give the supply chain people an incentive to focus on improving the service level and cooperation with the sales function. As the sales has KPIs related to inventory levels, trust between the functions increases and the sales people do not have a reason to over forecast for their own benefit.

Including product management in the demand planning process improves the understanding of the market and the changes in it. Therefore, there is less demand randomness and decreases demand uncertainty. In addition, integrated product management in the demand planning improves portfolio analysis and leads to fewer stock-outs.

6.2 Managerial implications

IBP as a concept is wide and multidimensional, and therefore can offer benefits for many companies and managers. This study benefits more specifically companies that struggle with demand uncertainty, excess inventory, inaccurate forecast and process inefficiencies. The study offers solutions also for those, who experience problems with siloed decision-making and misaligned plans in their organizations. Moreover, the study offers a comprehensive information about IBP and practical examples of its implementation. Researchers, managers, and consultants getting familiar with the concept can gain a strong background knowledge from the study when starting their IBP journey.

When considering implementing IBP into a company's processes, managers should take into account that the IBP implementation must be carried out as a cross-functional project. At

least supply chain, sales, finance, product management and the top management need to be involved from the beginning. Companies might still think that the IBP concept is solely a S&OP replacing tool and therefore give the full responsibility to the supply chain managers. However, a successful IBP implementation requires input from all the functions.

IBP requires an ability to totally rethink processes and to have courage to make large changes. Therefore, management's participation and support are critical. In addition, employees' ideas should not be disregarded at any point as they are most often the experts of the processes that know where the biggest pitfalls are. IBP is also a cultural change that takes usually up to a few years to be fully implemented. Managers must prepare for a marathon not a sprint, and not feel defeated when facing resistance. Offering training to the employees and having appropriate incentives in place help with the change management. Managers should think what is beneficial in the long run and what affects the behavior of the employees.

The topic of technological change was not studied in this study. However, the systems in use have a vital role in the success of the process change, as they might support the internal integration or make it more challenging. IBP process implementation often goes hand in hand with an implementation of a new IBP tool and this is highly recommended in IBP literature. The other rarely successful without the other.

6.3 Limitations and suggestions for future research

As a qualitative single case study, the research has some limitations. Firstly, the responses to the interview questions always contain a degree of subjectivity. The responses are indicative of the opinions of the interviewees and thus may not be fully objective. The objectivity of the responses could be increased by interviewing multiple people from each function and comparing the responses. Secondly, the analysis of the responses is to subject to a degree of subjectivity as well as the study is conducted only by one person. The researcher's personal opinions and the position and experience when working in the case company may have affected the results. There might be a degree of bias because the researcher works in the supply chain function, and therefore has clearer perspective from the function's point of view in comparison to sales, finance, or product management.

The study explores IBP implementation only for one company, and therefore the generalizability of the study is negatively affected. The study concentrates on specific company processes and characteristics, and the results might not be used as such in a different context. Also, the timeframe of the study is short and therefore long-term results on inventory levels or process efficiencies could not be studied.

Many suggestions for future research arise from this study. IBP implementation in different companies in the long-term would be beneficial in order to study the long-term effects in different company and industry settings. Market forces and characteristics play a big role in what is important for a company and what should be the focus point of the IBP. The impacts of IBP process implementation in the long run would give clearer view on what works, what are the true financial impacts and what is the experience from the employee point of view. It would also give an opportunity to explore more closely the concepts of continuous improvement and change management.

As the study was limited to explore only the implementation of IPB processes, the research on technological change together with a process change is still to be studied. The systems taken in use can either be adjusted to fit to the processes or the processes can be changed to fit the system. The changes can also be done at the same time to match the one to another. The challenges and benefits of ways of implementation could be explored in future research.

A company operates interactively with many stakeholders in the business environment such as customers, suppliers, competitors, and investors. This study concentrates on the integration factors internal to the company but external integration together with internal is another avenue for research. External and internal integration has been studied before, but the IBP perspective is still to be added. Especially, integrating customers to the demand planning process as well as the suppliers would bring further benefits when considering improving inventory management and demand planning in a company.

Moreover, this study offers a starting point for the case company to look into the concept of IBP and the benefits it could bring to the company's operations. The study attempted to introduce the concept and its main elements but also give practical suggestions on how to implement it and what aspects should be considered more in detail.

6.4 Discussion

Inventory management has been studied for decades and is still one of the biggest challenges in companies today as inventories tie large amounts of cash and thus are a financial burden rather than a desirable asset. It has been estimated that the current inventories held by companies globally amounts up to 12 trillion euros with a turnover of six, which means that there are approximately two months of inventory sitting unused around the world at all times. These numbers give a perspective of the size of the problem. Even five percent decrease in inventories globally would have a big impact on companies, people and ultimately whole economies. Therefore, there is a lot of managerial and academic interest in the topic. (Render 2013)

For a long time, S&OP has been discussed as one of the leading ideologies that companies should embrace when improving their inventory related processes. However, now the concept of integrated business planning has brought new points of view and dimensions that fill some of the pitfalls found in S&OP. The big consulting companies, such as Deloitte, PWC and KMPG have recognized the potential of IBP and the impact it can bring to companies in today's complex and volatile markets. Improvements in forecast accuracies, on-time deliveries, operating margin and revenues are reported through the implementation of IBP.

Nevertheless, IBP has not been studied comprehensively yet and a research gap of some sort can be identified. Therefore, this study aims at providing a missing link to the studies around IBP and brings together a comprehensive overlook on the concept. More importantly, it studies the link between IBP and inventory management and gives practical suggestions on how IBP can be implemented into a company's processes. As IBP links inventory management to internal integration and strategic planning, it provides a new way of improving the inventory related processes and also discusses the basis of the processes which emerges from the strategic focus of a company.

This research revealed the multitude of issues inventory management withholds, and how many processes, functions and positions it affects directly or indirectly in a company. The scale of these interrelations forces researches and managers to comprehend a wide phenomenon that impacts not only the company or process in question, but all the related

stakeholders around them. Similarly, IBP as a concept includes multiple of functions and the people in them. It needs to be looked at in the business environment the company operates in and how the business characteristics of the company and the industry affect the implementation. In other words, the concepts should be studied as a part of larger picture to get a proper understanding of them.

As Peterson and Silver discussed already in their book in 1979, the inventory management is greatly affected by the bounded rationality of a human being. In other words, inventory management is a complex issue with many interconnected systems that need to be rationalized, but the human brain is not able to consider all the possible and relevant factors in inventory related decisions. Decision makers are thus forced to ignore some of the aspects and approach the issue with a simplified framework or model. In addition, the decisions are always influenced by the decision maker's personal biases, perceptions and abilities, and the technology available at the moment. This applies to IBP as well, and is important to acknowledge when studying these concepts, and more importantly, when implementing them in real world as reality is always more complex than theory. For these reasons, it was important to clearly define and delimit the aspects in the study. Acknowledging the limitations of the research creates interesting avenues for future research. Hopefully, inventory management is studied in the light of IBP extensively in the future as it has potential to change how inventories are viewed and managed in the future.

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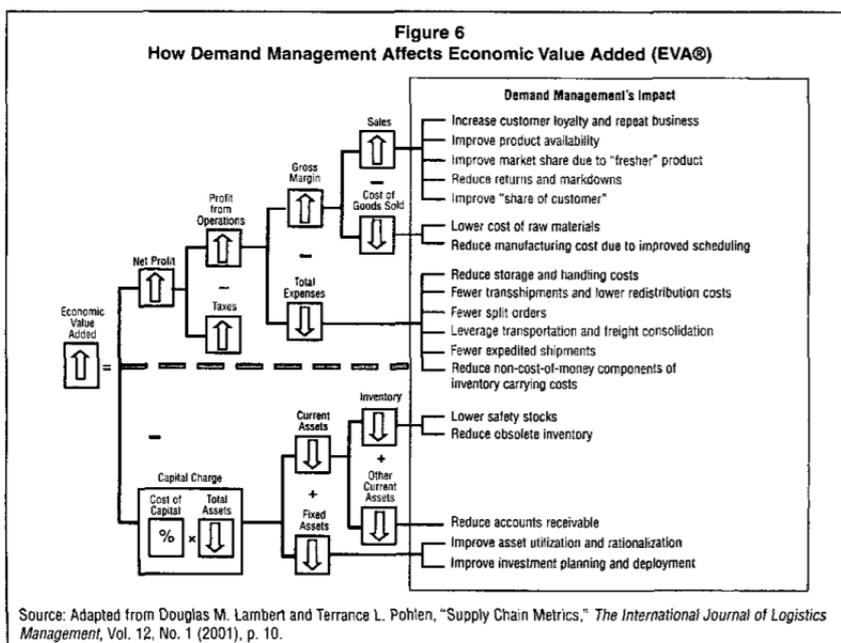
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APPENDICES

Appendix 1. Effect of demand management (Croxtton et al. 2002, 59)



Appendix 2. Interview questions.

Interviewee	Questions
Supply chain manager	<p>Could you describe the inventory management processes in general (stock purchases, why, how often, how much, people involved)?</p> <p>How would you describe the inventory situation at the moment? What is good, what is bad, what are the main goals? What about service level?</p> <p>What are the main reasons for high inventory levels/excess inventory?</p> <p>What KPIs are used in supply chain?</p> <p>How does the new IBP tool change the processes?</p>
Supply and demand specialist	<p>What does the demand planning process look like?</p> <p>Who are involved in demand forecasting? What meetings are in place?</p> <p>What are the challenges regarding the process?</p>
Buyer	<p>How are you involved in inventory and stock management in the case company?</p> <p>What are the biggest challenges in stock management? What works and what doesn't?</p> <p>What is your view on the overall inventory management in the company?</p>
Key account manager	<p>How are sales (demand) planned and forecasted for the following months/for the following year? What does the overall process look like? Who are involved? What meetings are in place? What are the forecasts based on?</p> <p>What tools are used? Hermes? Salesforce? What information is entered and is it in euros or in products?</p> <p>Does the demand planning process work well, are the forecasts reliable, what could be improved?</p> <p>Do product management/new product introduction/product managers and the sales team work together?</p>

	What KPIs (key performance indicators) are used in sales?
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Appendix 3. Meetings in IBP demand planning workflow

Meeting	Portfolio review	Demand review	Supply review	Reconciliation	Management review
Attendees	PM, Sales, SC, Sourcing	Sales, SC	SC	Sales, Finance, SC	Management from SC, Sales, Finance
Inputs	Changes and forces in the market, changes in product portfolios, review of product lifecycles, what products and services will be sold during the next month and the next year.	Customer and project segmentation, forecasting, market and customer analysis	Supply capacity, warehouse capacity, material availability and lead-times.	Information from portfolio, demand and supply reviews	Gaps between demand, supply and finance plans, conflicts, trade-offs, pre-prepared scenarios
Outputs	Updated product masterplan, detailed portfolio analysis	Unconstrained, consensual demand forecast.	Gap closing strategies, plans for special events	Financial plan that matches operational plan. Balance between demand and supply	Decisions on trade-offs, clear plan for different scenarios
KPIs	launches on time, time to market, number of out-of-life products	Forecast accuracy, conformance to meeting protocol, inventory levels	Customer service, stock-outs, inventory days of supply, conformance to plan	Working capital ratios, meeting preparation, attendance	executive participation