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# The implications of Information Technology for Demand Management transitions

*A case study of a consumer electronics supply chain*

Master's Thesis in the Masters' Program
*Supply Chain Management*

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# Abstract

Demand Management is a principle and process with its focus on forecasting, planning, and managing customer demand. This traditional demand management is based upon five pillars: data collection, forecasting, synchronization, increasing flexibility and reducing demand variability and finally, measurements of performance. When performed correctly, demand management has a significant impact upon inventory management, product availability and lastly profitability.

Traditional demand management has been developed when demand was relatively stable and local competition, compared to today's globally competitive and volatile markets. To tackle these market conditions, organizations need to transform their demand management processes into becoming demand-driven. Being demand-driven implies the excellent execution of demand sensing and shaping activities and close supply chain collaboration. In addition to this, supply chain actors need to be thoroughly integrated and synchronized, something the framework of CPFR (Collaboration, Planning, Forecasting and Replenishment) can address.

This paper researches how the actors in a supply chain can transition towards a demand-driven CPFR via a jointly developed IT-platform, thus providing essential knowledge on a subject more relevant than ever. This is conducted through interviews with employees at three different companies acting within the supply chain, which is analyzed based on theories within demand management, CPFR and demand-driven factors.

The findings suggest that the platform has major implications on the demand management process as well as the transition to a demand-driven CPFR. The key implications include the increased information sharing, actor specialization and a more collaborative culture. This drives both the current demand management process, but also the shift to mentioned demand-driven CPFR. However, the actors will still need to actively improve in other areas to truly reap the benefits of the platform, these areas include trust building initiatives, technical integration of different systems and more harmonized and collaborative S&OP functions.



***Keywords:***

*Demand Management, CPFR, Demand-Driven, Organizational Collaboration, Technological Collaboration, Supply Chain Management, Demand Sensing, Demand Shaping.*

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# Terminology

**Demand management**
*Demand management is the principle based on excellent performing of demand sense & shape in order to reduce demand variability & increase supply flexibility. This for reducing overall costs, optimizing inventory levels, meet customer demands and increase customer service.*

**POS data**
*Point-of-sales data, data generated from the end-customer transaction.*

**Demand sensing**
*The coordination of activities to better predict demand, its attributed and the factors behind that affects customer behavior.*

**Demand shaping**
*Activities performed in order to form or nudge demand in order to better fit supply.*

**S&OP**
*S&OP is short for Sales and Operations Planning, meaning the coordination of strategic and operational activities in matching Supply with Demand.*

**CRM**
*CRM stands for Customer Relationship Management, a customer integration technology system with main purpose to improve sales through the observation of, and strategically coordinating activities against, customers.*

**CPFR**
*Short for Collaboration, Planning, Forecasting & Replenishment. A framework for enhancing operations through the establishment of structures enabling information sharing between actors in a Supply Chain.*

**Demand-driven**
*Factors needed for becoming demand-driven, Sensing customer demand in real time and sharing this information with key actors to modify key supply chain processes accordingly.*

**Demand-driven CPFR**
*A framework consisting of CPFR where all ingoing actors are considered as demand-driven.*

# Table of Contents

# List of Figures



# List of Tables

# 1. Introduction

In a post-pandemic world, global companies need to make their supply chains more resilient to sustain competitiveness (Sih, 2020). The role of demand management, in that essence, is vital for companies, foreseeing customer demand but also mitigate and control risks implying the agility and flexibility of a company (Chase, 2016). However, the traditional demand management process consists of several flaws, including limited collaboration in terms of silo structures, slow process feedback, outdated forecasting methods, and data management (Burrows, 2007). These flaws lead to high inventories but still low product availability. This demand management system stems from a time when demand was more stable, both in terms of variation and variability, and companies primarily competed locally. Gollamudi (2013) states that the demand volatility is increasing globally, and therefore the demand management processes need to adapt. To address this, Chase (2016) argues that the new demand management should include factors such as real-time high-quality data sharing, more flexible supply operations, and extensive demand shaping operations. These factors are summarized as being demand-driven.

With the demand-driven factors applied to demand management, the organization can handle demand uncertainty more efficiently (Bozutti & Espôsto, 2018). However, a more holistic view is needed to further enable all the supply chain actors to thrive in the new market conditions. A framework that naturally incorporates all actors in problem-solving and extensive information sharing and a solid trust to key partners and suppliers with a unified vision on future development is needed (Glowacki-Dudka & Murray, 2015). This framework, combined with the demand-driven factors, will create a truly robust and simultaneously flexible supply chain to survive and thrive in today's market conditions.

The combination of the integration of Collaboration, Planning, Forecasting, and Replenishment gives the framework of CPFR a framework that is believed to address the issues that occur in the supply chain (Panahifar et al., 2015). The CPFR builds on a collaborative supply chain, but on its own, it is still focused on being supply-driven, corresponding to the earlier mentioned traditional demand management process. This implies that it is necessary to implement demand-driven perspectives upon the four mentioned CPFR functions within the organizations, hence creating a demand-driven CPFR (Chase, 2016; Vandeursen & Mello, 2014).

Since this subject is more relevant than ever, this thesis circles around how different actors can transition from a traditional demand management process to a demand-driven CPFR. The report focuses on this transition at a company's, called Global-Tech for confidential reasons, supply chain. To understand the transition possibilities, the current demand management process is mapped. This supply chain recently initiated an IT-platform called "Easy-Source," where its implications on the demand management process is analyzed to evaluate the current state of the supply chain. Finally, the current state of the demand management process and the platform's implications on it are analyzed in regards to the shift to a demand-driven CPFR.

## 1.1. Case Background

Today Global-Tech experiences long lead times to customers and overall uncertainty of which geographical markets to allocate their products. This leads to both increased costs in terms of unused stocks in some markets and unstimulated demand in others. Global-Tech has particularly experienced problems regarding these factors in terms of new product launches where demand tends to additionally peak and there is no stock. Global-Tech has, in collaboration with multiple stakeholders, prepared to introduce a platform named Easy-Source to address this situation. Easy-Source is an application that enables Global-Tech to gather data from companies on an individual level.

This portal will then enable the current B2B market to act as a B2C market through decentralization of procurement processes, allocating the purchasing decisions to the individual employee. With this, Global-Tech further believes in the opportunity to stimulate a more significant proportion of product upgrades, achieve that lucrative products are exposed, more frequent purchases, and simulate additional sales for both individual products and complementary ones. Taking this into account, the introduction of Easy-Source at the Swedish consumer electronics B2B market implies a considerable shift in the demand management process for all actors involved in the Supply Chain. Partly from the data collection perspective, where massive amounts of consumer data are made available, which will aid the understanding of the true demand of products. However, equally important is the communication perspective, where Easy-Source will enable new ways of communicating with customers and other actors in the supply chain. This implies several possibilities of value creation at every level of the supply chain the entire way from Global-Tech to the final customer.

# 2. Aim & Research Questions

This master thesis investigates how actors in a supply chain can transition from supply-driven traditional demand management processes to a demand-driven CPFR via the implementation of Easy-Source. This aim is answered via a theoretical framework that explains the shift. This framework is later applied to Global-Tech's supply chain to understand what implications the platform Easy Source might have on the relevant actors and the supply chain. More specifically, the demand management process is studied and is sought to be understood before and after the initiation. A thorough understanding of the demand management processes for all actors is necessary before conducting the final segment, which investigates how Easy-Source will affect a transition towards a demand-driven CPFR. This thesis aim is concretized in the following research questions:

- RQ1: What implications will the Easy-Source portal have on the Producer's, Distributor's and Reseller's Operational Demand Management process?
- RQ2: How can the mentioned actors transition from their current demand management processes to a demand-driven CPFR with the implementation of Easy-Source?

## 2.1. Delimitations

While the Supply Chain for Global-Tech to the end-consumer is exceptionally complex, this report only treats three actors. These three actors are Global-Tech, Global-Dist, Regional Res. Hence the supply chain starts with Global-Tech and finishes with the regional reseller. Furthermore, this implies that only the Swedish market is studied, and only the B2B part of it since Easy-Source does not treat the B2C market. Furthermore, since the roll-out of the portal has just been initiated, the mere usage of it has only been based on beta levels and test phases; hence the actual result and performance of it are still unknown. Finally, the report only focuses on the operational part of the different actors' demand management process.

This report has its delimitations in its short time frame of Easy-Source since it not handles the actual daily operational issues related to it and what happens during technological breakdowns. Collective responsible can easily become no one's responsibility and therefore, it can arise issues in the operations of the actual platform. An essential part of the supply chain is the production, where this research starts with the finished goods and the component supplying and production activities have not been treated; hence no conclusion can be drawn on demand-driven factors within this field.

# 3. Methodology

The methodology was based upon four main steps that followed a chronological order, but a certain amount of iteration occurred due to new findings, theoretical as well as empirical.

## 3.1. Research Strategy

According to Bryman & Bell (2015), a research strategy is of utmost importance to conduct efficient research. The first order of business is to choose a high-level structure of the report, establishing whether it should adopt a qualitative or quantitative nature. A quantitative approach emphasizes the use of numerical data and seeks to draw a conclusion based on what the quantitative data can measure and should be used when such data exists and is needed to conduct a conclusion. The other strategy is the qualitative approach, where the underlying data is qualitative, meaning that an analysis of words is conducted. This method is to prefer when analyzing perceptions, uncovering strategic directions or to find the motives behind different phenomena (Bryman & Bell, 2015).

This research employed a qualitative research strategy since the aim was to understand the implications of a new strategic direction and the motives behind the choice of launching a specific tool. Moreover, since it has not been fully launched yet, the data availability is scarce, and the aim was to develop more profound knowledge on several layers needed to conduct a thorough analysis of its implications.

## 3.2. Research Approach

The research approach concerns the use of existing theoretical knowledge in the report and two clear approaches can be defined: deductive or inductive (Bryman & Bell, 2015). The inductive approach seeks to generate new theory according to the findings in the data collection, which should be used when previous studies within the area is limited or don't exist at all. The deductive approach is based upon testing existing theory where the purpose is to form a hypothesis based on existing theory and later test it on the data collected in the study. (Dudovskiy, 2016) introduces another research approach, the abductive. The abductive research approach is based upon understanding incomplete observations to predict what a conclusion might look like. The abductive approach seeks the best explanation based upon several different alternatives to explain problems. The approach suits settings when the data collection, due to certain restraints, cannot be fully completed and conclusions need to be based on incomplete data.

This research employed a deductive and an abductive research approach. The reason behind the deductive choice was that some theoretical knowledge was needed in order to start the research and construct the general analytical framework. Moreover, the purpose of the deductive research was to construct a theoretical framework based on earlier research and later apply this to the empirical findings instead of utilizing the empirical findings to create a framework due to lack of data availability. The reason behind the abductive approach was that the case companies could not provide all the data needed to derive a general conclusion of the

problem at hand. Moreover, the data collection and the theoretical research will be intertwined and iterative to create the best conclusion with the data and literature available.

Conducting two different research approaches in this thesis might lead to dissonance in terms of practicalities since the two suggest different methods for problem-solving. However, since this study was often affected by the unplanned and sudden generation of additional information, translating into new knowledge, the addition of the abductive approach was necessary, and the deductive approach supplied a theoretical starting point. This further affected the results since applying only a deductive approach would have generated straighter answers, but the abductive approach provided a more holistic view of the problem.

## 3.3. Research Process

This chapter will concretize how the study was conducted and since the abductive and deductive approach was chosen, the qualitive research strategy was a clear follow-up. The steps follow below:

*Step 1: Creating an initial theoretical framework*
The first step was to combine literature from academic fields such as demand management, customer relationship management, organizational and technical collaboration, forecasting, demand-driven philosophy, etcetera. The primary literature concerns demand management, more specifically the operational part. These areas were combined to create a general framework to analyze later empirical findings. In addition to this, best practices within the subject are consulted and concern both technological and organizational aspects. Finally, since Easy-Source unofficially will shift the current B2B-market to a B2C-market, the different aspects of those two markets will be researched as a separate part of the theoretical studies.

Since the report adopts a qualitative approach, the framework will try to answer questions and support analyzes of such type. The reason is that several of the research questions trusted qualitative data, or a trusted quantitative reasoning approach is lackluster (Bryman & Bell, 2015). Since the report also adopted an abductive approach, there were numerous iterations between the empirical findings and this framework. The framework constructed in this step serves as an initial structure for the first interviews.

*Step 2: Mapping Current Demand Management Processes*
In this step, the mapping of the current demand management process of the actors in the supply chain occurred. The primary data sources were based on empirical findings from the researched companies. Hence, several interviews with employees were the primary source of information. Since a qualitative approach was employed, the interviews were semi-structured for driving discussion and understanding the open-ended research questions. However, the choice behind the semi-structured interviews also enabled the same base questions to several different employees to drive some standardization and comparable data (Bryman & Bell, 2015).

This step provided the empirical foundation for the rest of the project and the contextual factors where the new platform Easy Source will be placed. These contextual factors aided in

understanding the demand management processes before and after Easy Source's introduction. Being a study of abductive character, the framework was altered after this step. The reason for the alteration is that Easy-Source is relatively new, and the framework was thoroughly discussed with the main stakeholders. The main goal of this step was to map the contextual factors on which further analysis could be applied.

*Step 3: Mapping of the Supply Chain actors' organizational & technical collaboration*
The third step analyzed the current collaboration between the actors. Both in terms of organizational factors, which included processes, structure and the culture but also technical collaboration which included data collection & analysis, information sharing and business integration. The empirical data was gathered through in-depth interviews with key stakeholders at the different companies.

*Step 4: Analysis of Easy-Source's implementation in the current supply chain*
This step applied Smart Portal to the contextual factors found in steps 2 and 3, thus analyzing the implications of Smart Portal in this supply chain. The framework developed in step 1 was (after some iteration) applied to the empirical findings in steps 2 and 3 to analyze the implications of Easy-Source.

Since the interviews were semi-structured, and the study is qualitative, the data analysis is rather complex and not very standardized. Hence, the analysis will be done in three steps: preparation, familiarity, and interpretation (Denscombe, 2009). This means that first, the interviews will be transcribed to prepare the data and increase its familiarity. Second, the most important quotes and answers will be highlighted for each interview question to classify the answers. This step aims to map the potential of Smart Portal from a demand management perspective for the three actors for the first research question. Based upon the collaboration factors between the actors in the chain, different scenarios for the implications were built.

*Step 5: Analysis of how Easy-Source will facilitate a shift to CPFR*
During this step, the possibilities of shifting the traditional demand management to a demand-driven CPFR were analyzed. This step analyzed what factors Easy-Source will affect and what factors it will not. Depending on what factors it will affect, a comprehensive analysis was made on how much it will influence the shift to a demand-driven CPFR.

## 3.4.Data Collection

Empirical first-hand data collection can be conducted via either observations or interviews, where three main methods when conducting interviews: structured, semi-structured and unstructured (Bryman & Bell, 2015). Structured interviews are best suited when conducting a quantitative strategy and this structure is also well-suited for questionnaires. Additionally, structured interviews risk limiting the conversation with the interviewee hence the opinions and motives might not be discovered. Unstructured interviews are the polar counterpart to structured, where the interviewee is barely introduced to the subject and will later speak at will and without hinders about the subject of interest; no formal goals are established in these

interviews. Finally, the semi-structured interview is a mix of the extremes, where questions exist as guidance through the interview process. However, much room is given for follow-up questions and general discussion to discover interesting thoughts (Bryman & Bell, 2015).

Since this report utilized the abductive and deductive research approach, semi-structured interviews were chosen, but the interview basis remained the same. Furthermore, they were chosen in order to be able to capture some comparisons between the interviewees' answers. However, the interviews still allowed for freedom when conducting them due to the complex research questions at hand and in line with the abductive research. The focus of the interviews was three main areas: current demand management process, organizational collaboration and technical collaboration. Three actors in the supply chain were interviewed, where the bigger actors had two employees and the smaller only one. In addition to the supply chain actors, the IT-developer was also interviewed to gather in-depth knowledge of the platform. The interviews with Global-Tech were also conducted several times to gather more profound knowledge within the subject. Due to the ongoing pandemic, all interviews were conducted over video conference software (Zoom / Webex).

*Table 1: List of conducted interviews*

| No | Role | Company | Time (min) |
|---|---|---|---|
| 1 | Senior Business Developer | Global-Tech | 58 |
| 2 | Senior Business Developer | Global-Tech | 54 |
| 3 | Senior Business Developer | Global-Tech | 52 |
| 4 | Finance Engineer Manager | Global-Tech | 59 |
| 5 | Product Lifecycle Manager | Global-Dist | 62 |
| 6 | Head of Business Development & Marketing | Local-Res | 58 |
| 7 | Managing Director | IT-Developer | 48 |

## 3.5. Data Analysis

Being of a qualitative and semi-structured nature, the collected interview data was relatively multifaceted. Denscombe (2009) describes an analysis based on three steps when working with this type of data. The first step included the transcription of the recorded interviews, which fulfilled two purposes: the familiarity of the data and its preparation for further analysis. When all data was written, the quotes referring to the essential parts of the question were chosen and extracted and codified according to Denscombe (2009). Finally, the codes were categorified according to characteristics related to each other. These categories later constructed the basis of analysis.

## 3.6. Quality of Research

Regarding the quality of research, the first subject to consider is repeatability. Since the method is qualitative and implies certain subjective analyses of the empirical data from the semi-structured interviews, this might not enable the same answers. However, to increase the objectivity of the research and hence increase the likelihood of the same conclusion when

conducted by other researchers, several interviews will be done and the theory behind the initial framework will be triangulated. Finally, the interview questions are attached in the appendices to further show transparency of the work, hence allowing the experiment to be reproduced with the same result and conclusions (Bryman & Bell, 2015).

Regarding the data collection, the majority stemmed from Global-Tech, which might skew the results slightly. Four interviews with two different employees were conducted with Global-Tech in comparison with only one each for Global-Dist and Local-Res. Since Global-Tech was the main initiator behind this platform, the benefits might have been exaggerated and therefore the analysis too positive to Easy-Source regarding its abilities. However, the interviews with Global-Dist and Local-Res also included critical questions regarding Easy-Source, and therefore the bias was at least tried to be mitigated. Also, both the authors of this report were a part of all interviews and the data analysis on the transcription meaning that two people interpreted all of the data instead of one, which doubled the number of insights and mitigated personal biases or subjectivity.

Finally, since all actors involved were involved in the initiation and development of Easy-Source, they might incline to exaggerate the potential benefits and opportunities of the platform. However, the questions were of an objective character that did not focus on these potential benefits but rather its technical specification, which is harder to exaggerate. The IT-developer was also interviewed to triangulate this data. While they also might have a positive bias, they could provide the report with hands-on information regarding the function.

# 4. Theoretical Framework

This chapter describes the current research within demand management, organizational & technical collaboration, demand-driven factors and CPFR, and is structured accordingly. Also, the distinguishment of a B2B market from a B2C is further described for providing deeper understanding of the implications from the IT-platforms potential market shift. The result of this chapter is a theoretical framework used for addressing the research questions.

## 4.1. Demand Management

Chase (2016) defines demand management as "a methodology to forecast, plan for and manage demand." Hence demand management has three main factors, which all are intertwined. Even if all of these objectives are important for the organization to master, the main goal of demand management is to foster sales growth. Since higher requirements on product availability and cost increase due to a more competitive business landscape, demand management receives more and more acknowledgment. The reason is that demand management, when performed well, can enable substantial improvements in product availability without increasing the stock levels and therefore lead to higher sales without raising the costs of an increasing stock (Chase, 2016). Even though demand management entails strategic and operational processes, this report will focus solely on the operational process.

## 4.2. Operational Demand Management

The operational demand management process will execute the procedures determined from the strategic process. This process is constructed of five sub-processes (figure 1) where it's ingoing activities will, in this chapter, be further discussed.

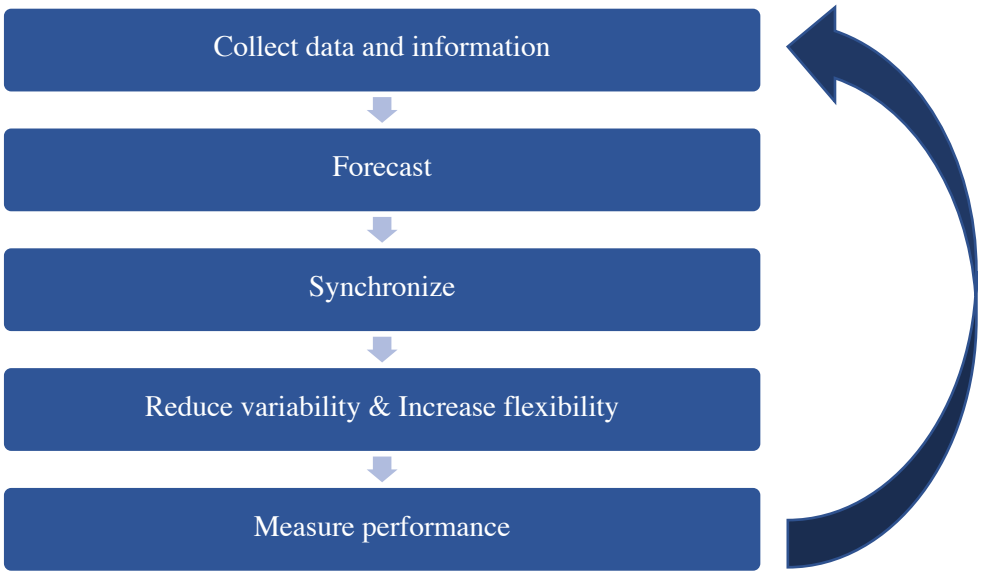


*Figure 1: The Operational Demand Management Process*

### 4.2.1. Collect Data and Information

The first step of the operational demand management process is to collect the necessary data and information for the forecasting process. In order to gather this, there is a need for cross-

functional collaboration over the organization where units such as marketing, order fulfillment, product development and more need to collaborate (Croxton et al., 2002). The data used should reflect the actual demand as close as possible. This implies that the organization cannot build its forecasts on invoices or shipments since this only reflects the supply needed from their customer. Efficient forecasting methods include returns and downstream data at the consumer level, reflecting the true, actual product demand (Chase, 2016).

### 4.2.2. Forecast

The following operational sub-process is to conduct the forecast for a time period. The forecasting method has been decided at a strategic level, but it is vital to measure and track the errors from the final demand on an operational level to understand the accuracy level and enable improvements. When analyzing the forecasting errors, it is crucial to understand and treat the error's root cause, not the symptom (Croxton et al., 2002).

The number of techniques and ways of conducting forecasting is multiple and the complexity of them is endless. With that in mind, Vereecke et al., (2018) do not argue that the most mature organization is the one that uses the most advanced and complex forecasting methods. Instead, mature organizations implement effective usage of advanced statistical forecasting techniques and models, complemented by human judgment where manual adjustments are noted, and the methods of choice are rational. With that said, the organization considers the elements of various products, potentially segmenting their forecasts. However, when human judgment gets mixed with forecasting methods, the risk of errors can be raised (Chase, 2014), whereas Fildes and Goodwin (2007) argue that if human adjustments are logged, it will facilitate rational decisions, thus benefitting the forecast.

As in line with Chase (2016), shared information is critical to cultivating efficiency, where Vereecke et al., (2018) support that by arguing that mature organizations are based on established structures where information can move freely. These structures evolve around ecosystems consisting of synergies where forecasting systems are connected with multiple other systems internally and with external customer or suppliers' systems. This means that forecasting reports are consistently generated, updated and accessible for internal and external stakeholders (Vereecke et al., 2018).

### 4.2.3. Synchronize

The forecasting provides the demand input of operations planning and, in this step, the demand forecast is turned into a demand execution plan. This step accounts for the supply chain capacity constraints such as manufacturing possibility, inventory positioning and transportation. These constraints should be known for the key supply chain partners and not only for the company itself; when the constraints are figured out, the company can work out possible solutions for the identified bottlenecks (Croxton et al., 2002).

Most forecasts are providing a point indication without any confidence intervals. While this is the and most precise method, an interval could provide valuable information for the

synchronization step. This confidence interval can provide material for analyzing the service level for different actors in the supply chain, depending on strategic goals or the stock-keeping costs of certain products. The output of this step is a demand execution plan that includes production plans, inventory positioning and transportation plans (Croxton et al., 2002).

#### 4.2.3.1. Sales & Operations Planning

Croxton et al., (2002) state that the third step of the demand management process, the synchronization, corresponds to Sales and Operations Planning, S&OP. S&OP's primary goal is to synchronize demand with supply. There are several definitions of S&OP, where The American Production and Inventory Control (APICS) defines Sales & Operations Planning (S&OP) as: (Shedlawski, 2017). This definition will be used in this report.

*"A process to develop tactical plans that provide management the ability to strategically direct its businesses to achieve competitive advantage continuously by integrating customer-focused marketing plans for new and existing products with the management of the supply chain. The process brings together all the plans for the business (sales, marketing, development, manufacturing, sourcing, and financial) into one integrated set of plans."*

When conducted correctly, S&OP increases the firm's ability to adapt to unplanned events and better plan foreseeable events (Ávila et al., 2019). The reported benefits of S&OP are numerous and include higher customer satisfaction, lower and more balanced inventory, lower lead times, more stable production rates, more cooperation across the entire operation, better forecasting, more efficient decisions making and a greater focus on the long-term horizon (Goh & Eldridge, 2019). However, the ability to realize these benefits vary significantly between companies (Lapide, 2005). Kaipia et al. (2017) argue that information sharing in this process is one of the most valuable but most difficult to realize. The S&OP-process has five main steps as follows (Grimson & Pyke, 2007).

In the first step, a demand forecast without regard to supply is created by the sales team. This unconstrainted forecast is the basis of the S&OP-process and focuses solely on what the customers want to buy. The second step is conducted when the unconstrainted demand is known. The operations team then analyses the supply possibilities of the firm, looking at factors such as manufacturing, inventory levels, transportation and supply chain capabilities. In the third step, these two teams, combined with other units such as finance and marketing, discuss the final plan to match demand with supply. The fourth step executes said plan and the fifth step measure and evaluates it (Grimson & Pyke, 2007).

Also, S&OP contains Sales & Operations Execution content, where S&OE can be seen as a complement to S&OP. However, they should still be considered as separate processes (Pukkila, 2019). S&OE focuses on much closer, short-term planning horizons than S&OP (Ostdick, 2017) and can be a preferred process for addressing today's shifting demand variability (Lima de Caravalho, 2018). This is due to weekly processes, based on tuning and analysis for seeking

further improvement, thus enhancing the organization's performance within short-term planning, often between 0-12 weeks (Pukkila 2019; Pukkila, 2016).

### 4.2.4. Reduce Variability and Increase Flexibility

Demand variability is often considered a negative factor for demand management. No matter the industry, organizations will always handle specific demand variations. There are two different ways to handle this phenomenon; the company can either reduce the impact of demand variability or increase the flexibility to react to it, where companies often try to do both things (Croxton et al., 2002).

The variability should be reduced first since increasing flexibility is often a more costly strategy. Examples of actions to reduce the variability include customer relationship management, where the company can work together with their distributors to better plan promotions, smoothen demand by scheduling new product launches (Croxton et al., 2002). If reducing the demand variability is too difficult, an increase in flexibility to meet these demand variations is the solution. Examples of flexibility are, for instance, rapid responsiveness towards the target market as well as postponement in the manufacturing process, the multisource of different components, or increasing capacity at bottlenecks (Hadaya & Cassivi, 2007; Croxton et.al, 2002). The problem with these actions is that all are rather costly, meaning that a thorough analysis is needed to provide information regarding how flexibility is needed and that these changes are made throughout the supply chain. Otherwise, the bottlenecks or flexibility issues will just be pushed upon another actor in the chain (Croxton el al., 2002).

#### 4.2.4.1. Customer Relationship Management (CRM)

CRM, or Customer Relationship Management, is a concept and practice widely known as a customer integration technology system (Kumar & Reinartz 2012). CRM orientates itself around the interaction with and identifying strategies to grasp customer preferences, thus strengthening the relationship between organization and customer for improving financial metrics and growing the overall business. However, to improve financial metrics, such as increasing revenue or ROI, is one thing, but to keep it consistent is something else, whereas Kumar & Reinartz (2012) argues that the answer to that question is to seize customer value through CRM. By identifying and optimizing customer value, the organization can transition from only maximizing financials, mostly grounded on short time horizons and transactions, to maximize the customer value with a long-time horizon (Kumar & Reinartz, 2012).

CRM is more important than ever due to the ever-changing business climate, competitive landscape, volatile economies and demand that the consumer-electronics environment offer (Kumar & Reinartz 2012), where CRM enables an organization to address those issues, giving them better insights to predict customer preferences and actions (HOTT Guide 2001). All of this also changes rapidly due to digitalization, challenging the old status-quos of traditional CRM. Furthermore, Kumar & Reinartz (2012) mentions that customer service today is heavily challenged in both B2B and B2C segments with increased costs, raised volumes and raised service expectations, but also negatively correlated with that customer service departments are

being unprioritized in terms of budget allocations. Also, Kumar & Reinartz (2012) further elaborates that the future of CRM is the possibility of being proactive and identifying and addressing customers' situations before they are even raised. In order to do so, companies need to invest in digital systems that are constantly challenging traditional ways of conducting CRM and connect people, analytics, systems, and departments to holistically and collaboratively address issues and customer's needs (Kumar & Reinartz, 2012). Furthermore, in a demand management context, the CRM's relation to the demand management process is to provide structures in how relationships with customers are shaped and handled and establish PSA's (product & service agreements) (Croxton et al., 2002).

#### 4.2.4.1. Customer Service Management (CSM)

Customer Service Management is related to the demand management process by acting as the front face for the customer, managing the established PSAs and creating a single hub of customer information (Croxton et al., 2002). Since the customer service management, CSM, represents the organization's face to the customer, the activity needs frequent real-time updates to quickly react to customer inquiries (Bolumole et al., 2003). The necessity for excellent CSM is crucial since, in today's competitive landscape, an inadequate customer experience concerning what the customer expects will lead to loss of income (Bolumole et al., 2003; Kumar & Reinartz, 2012). As mentioned previously, CSM activities rely on the streamlining of information between systems and customers. If this is excellently managed, CSM facilitates organizations to react proactively instead of reactively towards inquiries since the unification of information flows facilitates operational excellence (Bolumole et al., 2003).

### 4.2.5. Measure Performance

The last sub-process is to measure the performance of the operational demand management process. If the results are too far away from the goal, it is a strategic decision to undertake, but operational improvements can be found if the results are smaller. These results need to be communicated to key suppliers and customers (Croxton et al., 2002).

The measurement facilitates process improvements on quantifiable; these approaches should be uniform for the entire firm and, if possible, for the key actors of the supply chain. In order to construct reliable metrics, the management teams need to understand how demand management affects the *EVA* (economic value added) and what factors are affected. The EVA model shows how demand management affects the financial aspects of the firm and is based upon four base pillars described below (Croxton et al., 2002).

1. *Increased sales*

Since product availability will increase, the demand management metrics need to be related to this, meaning more content customers and therefore customer loyalty and repeat business will increase. Moreover, increased customer information and more vital CRM abilities will lead to an improved market share.

2. *Reduced Cost of goods sold*

If the products can be at the right place at the right time, the transshipment and redistribution costs will decrease, as well as the cost of raw materials if the products can be constructed with the same raw materials due to smarter product configuration, resulting in economies of scale. Finally, the split orders will reduce, once again, the product availability.

3. *Reduced inventory costs*

With increased demand information and true demand possibility, the safety stock can be reduced, lowering the total costs of inventory. Lastly, a lower inventory will lead to less obsolete inventory and reduced storage and handling costs.

4. *Reduced asset costs*

The asset costs will be reduced as well, primarily due to the accounts receivable being fewer, and the asset utilization will be improved thanks to the general optimization. Finally, the investment decisions will be improved because of the better knowledge of true demand and therefore the cost will decrease in this department as well.

These financial metrics need to be linked to process improvements to understand how the companies can actively work towards a more substantial financial result. These metrics should be applied to the supply chain as a whole since one firm might change their processes for short-term financial improvements, but it might affect the other actors of the supply chain; hence they will perform worse in the long term (Croxton et al., 2002).

## 4.3. Demand-Driven Factors

For businesses to coherently become more demand-driven, it is vital to seize control over the data maintained and the internally managed knowledge to turn the data into actionable insights (Chase, 2016). This can be translated upon a company's need to facilitate the core mechanisms that speed the processes of becoming more demand-driven. However, this might impose necessary and radical changes on the corporate culture, the employees and their skills, and horizontal processes, predictive analytics, and scalable technology (Chase, 2016). All of this can be summarized in four different mechanisms that need to be considered if companies thrive to enhance their demand management, namely People, Processes, Analytics, and Technology, which this chapter is dedicated to describing (Chase, 2016).

### 4.3.1. People

To leverage corporations' resources, with aspects to demand management, technology, and smart solutions are naturally needed. However, it is critical to focus on the employees and the procedures needed to bring the best from the technology, thus making the organization more independent from technology solely (Croxton et al., 2002; Chase, 2016). Due to ineffectiveness and lackluster capabilities, Demand Planners tend to spend a significant amount of their working hours on sorting, cleansing, and maintaining raw data instead of applying advanced analytics and forecasting methods to improve operations (Chase 2016). This does not solely occur for Demand Planners, but also on higher management levels where Alicke et al., (2016)

support Chase (2016), stating that there is often a competence gap between Supply Managers and Data Scientists where managers lack vision in seeing the possibilities with big data.

The most important aspect is the lack of competence and understanding of the possibilities in expanding the scope for demand management and shifting the focus from a supply perspective (Chase, 2016). This mitigates the inefficient working hours for planners. Hence, companies need to invest further in their employees, integrating both demand analysts in the organization as well as expand the capabilities of the planners & management teams, involving predictive analysis, statistical forecasting methods, to combine the analysis of both upstream and downstream data in the Demand Management processes (Chase, 2016). The training of employees must foster analytical and cross-communication skills (Vereecke et al., 2018).

### 4.3.2. Process

To foster the growth of employees and the expansion of core competencies within the firm, the right processes need to be at place to ensure that the employees can thrive and conduct Demand Management in an organic and empowering way. Processes are then essential for organizations to reach a Demand-Driven Demand Management through the promotion of horizontal collaboration, integrating an atmosphere that ensures information sharing across departments into corporate strategies (Chase 2016). This to both ensure that data is available for usage across the organization but also between firms throughout the Supply Chain (Croxton et al., 2002).

This imposes organizational challenges that do not change rapidly, and corporations must figure out *how* these transitions will be conducted. However, many corporations mitigate the opportunities to fully grasp the potential of being demand-driven and the value from big data due to a lack of structure of how corporations explore and capture big data (Alicke et al., 2016). Thus, the highlighting of the importance of establishing structures and processes to capture the value and transition itself in being more demand-driven (Alicke et al., 2016).

A supply-driven organization is recognized by having the operating structures on an inside-out basis, only grasping the information regarding supply form inside the organization where communications are stepwise between departments, ignoring external factors. Moreover, simple statistical forecasting methods are used to analyze demand on an assumed stable basis, which results in high forecasting errors, making the supply chain actors vulnerable to variability.

Demand management conducted in a supply-driven culture, focusing on supply-planning in organizational silos, risks ignoring relevant information from other departments. This may hinder organizations from transitioning from being supply-driven to become demand-driven (Chase 2016). With that being said, many companies are not positioning themselves fully silo-oriented, performing their demand management accordingly, but not optimally, since no pure outside-in perspective is adopted. Hence, supply-driven operations may be achieved with efficiency and low silo-structures but still lack from the downfalls of not being externally focused (Chase, 2016).

However, transitioning to a resilient demand-driven organization requires further investments in building more collaborative environments and structures where sales and marketing become two significant components in demand planning (Chase 2016). S&OP is a core component and a foundational pillar for a demand-driven organization (Vereecke et al., 2018), were to be fully functional, the process needs to be in sync with marketing, production, sourcing, logistics, and finance functions, amongst others (Croxton et al., 2002). Integrating those functions in demand management and S&OP processes calls for organizational change. Coherency amongst departments is necessary for preventing isolated decision-making. Moreover, it is important to standardize and formalize the current state of the demand planning processes to maintain horizontal collaboration. Thus, secure that best practices are conducted throughout the entire Supply Chain, involving multiple corporate functions in the chain. This further translates to the process of promoting that forecasting is practiced with a holistic approach (Chase, 2016).

### 4.3.3. Analytics

Business models and strategies consistently need to adapt and change to keep up with the ever-changing customer demands, patterns, and business climate. The level of needed analytics depends heavily on the industry where an industry with stable demand does not have the exact analytical needs as an industry with volatile demand (Chiang & Feng, 2007).

One of the most significant risks related to demand in volatile markets is the possible change of consumer preferences due to their perception of products' attributes, knowing whether consumers will purchase a specific product or not (Jahanbin 2015). It is a significant task for companies to address and understand these changes in attribute-weights (Jahanbin 2015), where Big Data and analytics entail companies to do so, enabling the conducting of forecasting and planning with better accuracy (Chase 2016). To predict market fluctuations and address supply and overall corporate strategies accordingly is the goal for demand management analytics, thereby going from reactive to proactive (Chase 2016). Several industries are now struggling with short PLCs and increased customer demands regarding delivery times. To cope with that, advanced analytics are used for improving last-mile deliveries, optimizing the assortment of products stored at warehouses, and direct deliveries matched with calculated demand. There is also a focus on risk assessments, using analytics to predict potential supply chain failures, enhancing the supply chain's resilience (Andries & Simchi-Levi, 2017). This means applying and facilitating advanced analytics methods to create holistic models that utilize the combination of downstream & upstream data gathered cross-departments (Chase, 2016).

The key takeaway is not what forecasting model firms are supposed to address in their business strategies for enhancing their Demand Management processes. Instead, the central part to consider is that organizations need to expand their scope where analytics are applied to capture the whole perspective of the supply chain customers (Vereecke et al., 2018).

### 4.3.4. Technology

In a successful demand-driven organization, the three driving sub-processes of people, processes & analytics require cutting-edge technology to cope with the challenges the environment brings (Chase 2016). Cutting-edge technology that is able to communicate across the organization, to interact with other systems within the organization, for enhancing the perspective and broaden the scope for tech-utilization (Vereecke et al., 2018).

The technology needs to be scalable and handle massive amounts of data, not only historical sales data but also other external factors such as GDP growth and competitor movement (Chase, 2016). The technology needs to be flexible and dynamic, with adjustments from both internal and external factors (Vereecke et al., 2018). Moreover, Vereecke et al., (2018) further advocate for the technology to interact with human judgment. The technology in the demand management process serves three primary purposes; improved efficiency in the data collection, which lays the foundation for the analytics; improved efficiency in the communication and information sharing for all partners and finally, integration for all business processes within the company, both in terms strategy, KPI and information streamlining (Chase, 2016).

The main goal is to unite an organization's capability in nurturing and reaping the benefits of being demand-driven. Technology is one of those four pillars and arguably one of the most powerful since the latter three all are dependent and relate to technology more than technology relates to them (Chase, 2016). Thus, it is essential that the technology implemented can be balanced between the three mechanisms, so the transition towards demand-driven structures is conducted and that its output is grasped.

## 4.4. Demand-Driven Factors applied on Demand Management

Chapter 4.3 handled general demand-driven factors, where this chapter treats how the five-step demand management process can become demand-driven. “Demand-driven Forecasting” will serve as a proxy for data collection, forecasting and reduction of variability (Kumar et al., 2019, Chase, 2013). “Demand-driven S&OP” will serve as a proxy for synchronizing supply with demand and the increase in flexibility (Croxton et al., 2002). Finally, the “demand-driven performance measurements” correspond to performance measurement.

Being demand-driven implies that organizations can quickly react to customer needs (Mendes et al., 2016). To effectively manage ever-increasing volatility in demand, companies need to adopt demand-driven supply networks utilizing “pull” of customer demand rather than the “push” of available supply to meet customer service requirements while still managing an efficient supply network (Mendes, 2011). The drive to become demand-driven is based upon five global trends; markets are increasingly volatile, demand fluctuations, products are specialized, products have are increasingly variating, there is a need for low-cost facilities and an increasingly external focus (Gollamudi 2013).

### 4.4.1. Demand-Driven Forecasting

Demand-driven forecasting aims to sense demand signals and shape future customer demands.

The method uses closely connected supply networks to ensure a constant connection with demand planning and forecasting (Kumar et al., 2019). All supply chains will have a certain amount of demand variability and to improve the forecast and thereby the demand management as a whole, a holistic and collaborative demand-driven forecast needs to be in place. A collaborative approach to forecasting will generate considerate benefits to the process and flexible planning and supply chains in general, together with advanced demand information, will provide a high-performing demand management process. Moreover, the joint strength between several actors depends on what each actor will bring to the table regarding information, general people forecasting capabilities, and technological solutions (Aviv, 2001). Bursa (2011) states that including key partners in the forecasting process using the same POS-data will significantly increase the accuracy.

Demand-driven forecasting recognizes that no single forecast can provide a perfect answer to the demand uncertainty and hence uses several methods, through collaborative inputs from internal as well as external forecasting stakeholders, that will be able to answer the demand better. Moreover, the forecasts should constantly be renewed based on new information (Mendes, 2011). Demand-driven forecasting is based upon five steps, demand translation, sensing, shaping, shifting and finally orchestration where this report will focus on the sensing, shaping and shifting. (Chase, 2013).

*Demand Sensing*

Demand sensing is the translation of data to understand what is being sold. This data includes what is being sold, who is buying the product and how the product is impacting demand (Chase, 2014). Demand sensing is a concept where the true demand is analyzed using downstream data as close as possible to the end-consumer. POS (point-of-sale) data is an excellent example of close-to-end-consumer data, where the actual purchase is used as an indicator of consumption instead of invoices or total shipments (Chase, 2014). Bursa (2008) supports Chase (2014) by stating that POS data is the most efficient data to understand true demand, thus getting closer to the actual customer behavior since POS data is not affected by factors such as batch sizing, shipping quantities, and lead times.

The most significant difference between demand sensing and traditional time series analysis is that demand sensing provides information regarding the true demand in real-time. In contrast, classic time series analysis provides information on a decided time interval, for example, after a week or a month. This is, by definition, an error rate with a time lag; hence the decisions can only be reactive and never proactive (Chase, 2014). Demand sensing allows for predictive analysis due to real-time predictive data at POS-level (Bryne, 2012). The implications of not using demand sensing but a classic data collection ahead of a period is that even if the most advanced method is used (triple exponential smoothing, autoregressive moving average, or similarly), the sales data just isn't enough and factors can change during the time the analysis is made or from the data has been collected (Bryne, 2012). Demand sensing takes several departments into account, where biases are removed. It combines advanced analytics, technology and human judgment based on external factors Crum & Bota, 2013).

In a traditional demand management process, the information flows in the opposite direction of the flow of products, while in a demand-driven environment, demand sensing enables real-time information for all actors (Mendes, 2011). In addition to providing demand analysis with significantly reduced latency, demand sensing allows for a thorough understanding of demand shaping activities (Chase, 2014). By that, organizations may predict the potential outcome from certain demand shaping activities, and therefore understanding the effects of their sales and marketing orientated activities better and with lower latency (Chase, 2016). Bursa (2008) states that demand sensing could reduce the stock where the safety stock levels will only handle short-term crises and can also be reduced. However, demand sensing can only provide value to the organization if the supply chain can react to this new information, meaning that the flexibility of the demand planning periods on the supply chain increases (Bursa, 2008).

Sensing further allows organizations to expand their data collection, which, combined with earlier historical data, allows for forecasting methods such as regression or multi-linear models, providing more accurate forecasts (Chase, 2016).

*Demand Shaping*

Dietrich et al., (2012) define demand shaping as the capability of a company to grasp fluctuating demand patterns and analyze those patterns for acting accordingly by optimizing supply strategies to match the current customer demand. To best match the demand, the organization can shape the market via demand shaping activities to fit better the customized supply strategy (Dietrich et al., 2012). Dietrich et al., (2012) states that three well-executed capabilities within an organization need to be in place, namely;

1. The identification and analysis of customer patterns and demand
2. Holistic structures that enhance the supply chain competencies through the offering of transparent visibility for sales & marketing regarding inventory and plans
3. Demand shaping activities performed that support sales functions by estimating propensities of customers to purchase alternate products

However, demand shaping should be conducted more and more in symbiosis with the supply department to synchronize with inventory levels. This change will allow for an increase in revenue and profitability (Lapide, 2013). Activities that are included in demand shaping are price, promotions, marketing events, changes in product mix, new product introductions, to name a few (Chase, 2016). These activities increase the demand elasticity and, commonly, companies shape demand via these activities when they are just moving demand between periods, often at a lower margin (Chase, 2014). To use these activities in a value-adding manner, companies will have to merge them with demand sensing to truly understand demand over the entire supply chain (Chase, 2014). Mendes (2011) argues that demand-driven networks differentiate being market-driven from being marketing-driven, implying that marketing processes are built outside-in and that the shaping is built on customer information before being pushed.

*Demand Shifting*

This step translates to the ability to "promote another product as a substitute if the product originally demanded was not available. It is advantageous if demand patterns or supply capacity changes to steer customers from product A to product B" (Chase, 2013, p.46). There are two types of demand shifting; where the first is at the point of sales, where an alternative purchase is incentivized. The other is at the point of supply, where the manufacturer negotiates with the sales team to shift future demand due to capacity constraints (Kumar et al., 2019). Best practices within demand shifting include daily inventory and promotion management. This means that supply managers need to meet daily with marketing managers to synchronize the inventory with the promotional schedule. If a specific SKU is high on inventory, it needs to be promoted, and if another one has a low inventory, it needs to be demoted. In this way, companies can shape demand without lowering prices and reduce stock (Lapide, 2013).

### 4.4.2. Demand-Driven Sales & Operations Planning

The demand-driven approach to S&OP differs from the more traditional definition, where the most significant difference is the shift from reacting to the market to proactively plan and manage the market (Lapide, 2009). To complete this shift and remain competitive to the customers, the companies must reduce lead times, reduce working-in-process (WIP), and reduce the cost of goods sold, etcetera (Miclo et al., 2016).

In addition, to manage the demand, companies need to increase flexibility to have a demand-driven S&OP where Hadaya & Cassivi (2007) considers the five following flexibility factors;

1. Volume – adjusting production capacity
2. Launch – efficient introduction of new products
3. Access – covering the distribution network
4. Product – production with different characteristics
5. Responsiveness to the target market(s) – responding to the current needs of the market

Budd et al., (2012) argue for the importance of real-time information flow for supply chain actors, an essential factor for demand-driven S&OP. This depends significantly on information technology and organizational collaborations. The informational and organizational aspects will be covered separately. However, the central value of these aspects is to quickly react to unexpected changes and foresee the changes as much as possible (Budd et al., 2012). Thus, the call for further demand-driven activities translated upon S&OE processes.

Bozutti & Espôsto (2018) argue that the demand-driven S&OP is more detail-oriented because more departments and processes are involved and the collaboration between these departments. Demand-driven S&OP and S&OE handle unpredicted demand and product variety way more efficiently via flexible arrangements. Addtionally, the demand-driven S&OP involves more complex customer preferences and circles around the value proposition. Generally, it can be stated that demand-driven S&OP is more collaborative, proactive, and flexible (Bozutti & Espôsto, 2018). Finally, the supply chain needs to be geographically close to the customer to comply with sudden disruptions (Burrows, 2007).

Burrows (2007) discusses five fundamentals of the demand-driven sales and operations planning area. The first area is defining the value spaces. Value spaces are well-defined customer groups that are not based upon classic demographic segmentation but on how they create value in the marketplace. Value creation is defined by how the customer uses the product/service and creates value with it. The second fundamental is customer-centricity, where the value spaces are transformed into operating goals and solutions. The focal company will then focus on how the different value customer groups are using their products. The third fundamental is the customer value communicated by families of products and means the value spaces subdivision into families that are defined by commonality of markets, manufacturing processes and/or materials. Fundamental number four is the throughput and is defined in demand-based supply as using capacity now to make only what the customer is presently demanding, nor more and no less. The Pareto rule (80/20) is removed in the demand-driven S&OP and replaced by predictability measures and manufacturing constraint management. Compared to a classic ABC production to "A" products in demand-driven, S&OP represents the most predictable units rather than the units with the most volume. The fifth and final fundamental is the rates of demand improving planning accuracy, indicating that demand-driven S&OP manufactures to an order rate rather than an order. Hence, simulation facilitates the production and builds the production plan rather than reacting to certain orders.

Burrows' (2012) approach considers the same areas as the traditional approach but has a high collaboration. It involves cross-functional coordination of product families, allowing for a new understanding of how to group products. Through data management and collaboration, it handles unpredictable demand and a high product variety while focusing on the value proposals of the customers and not their demographic considerations. The model focuses on working with proactive operations management to get ahead of the demand fluctuations. In addition to this, Burrows (2012) stresses the importance of education for a successful S&OP and further constructs the demand-driven process through people and does not implement it as a package from the senior management. The other aspect that is hugely important is to design the S&OP to run the business, not be a complementary part. The last important factor is customer centricity, the central part of truly demand-driven sales and operations planning.

### 4.4.3. Demand-Driven Performance Measurements

The final step of the demand management process is the measuring of it. The demand-driven way of measuring performance connects to the return on investment constantly (Smith, 2014). Hence the traditional way of measuring, being Profit and Loss, P&L, is replaced with flow-centric measurements. This is because one hour saved in a specific process does not, by definition, imply a reduction by one hour of the global operation (Smith, 2014). Hence, being demand-driven means that the chain as a whole is treated as one unit, thus; flow-centric measurements. The measurements are based upon Plossl's first law of manufacturing to connect the flow rate of materials and information directly to ROI. This will drive the reporting and measures to synchronize demand and supply signals between defined critical points in the flow, prioritize improvement efforts based on identifying and removing whatever blocks the

flow, and finally quantifying the results of the two described processes by the net change in the revenue and costs side as well as the delta net investment to measure ROI (Smith, 2014).

## 4.5. Organizational Collaboration

For an organization to become demand-driven, a high amount of collaboration is essential, both internally between departments and externally between actors in a supply chain (Crum & Boca, 2003). Collaboration comes in many forms and is based on several components that enable a collaborative environment. In this chapter, the organizational collaboration will be discussed and presented with processes and structures, both internal and external.

### 4.5.1. Collaborative Demand Management

The potential of a collaborative demand management environment is substantial, but it is not easy to achieve. This is mainly technical integration errors, adopting new organizational ways of doing business, cultural trust between partners, a desire to partner but not committing to the execution process (Crum & Boca, 2003). The most profound advantage for the supply chain when adopting a collaborative demand management process is the reduction of the bullwhip effect. Bullwhip effects occur when orders placed to the suppliers tend to be variable, in large terms, and have a more considerable variability than the sales for the buyer (Gang et al., 2017). This demand variance moves upstream, away from the final customer, in an amplified form, causing more prominent and more significant impacts (Gang et al., 2017). The bullwhip effect becomes more substantial by every actor in the supply chain, to the "final supplier," but affects the retailer due to shortages during specific demand peaks (Crum & Boca, 2003). However, the most significant disadvantage happens further up the chain, and retailers gain more power relative to their suppliers (Crum & Boca, 2003).

Sharing demand data is often the first step in a generally more collaborative relationship. The demand sharing empowers communication which further facilitates mutual demand shaping. Hence, they can jointly create marketing and sales plan with more information and resources to drive collective and individual growth (Crum & Boca, 2003). The sharing of demand data should not be taken as-is from the supplier but analyzed and scrutinized. The important part is to leave the demand-sharing communication process with a joint plan that several departments from each company contribute to and discusses, allowing for both inter and intra collaboration for the demand plan (Crum & Boca, 2003).

### 4.5.2. Processes & Communication

The communication of demand throughout the supply chain enables the knowledge of true demand rather than invoices or shipments. This enables all supply chain actors to reduce their inventory while still increasing their service level to customers due to more accurate forecasting; hence, the profit margin will increase (Crum & Boca, 2003). Lots of companies struggle to achieve efficient communication due to the following factors (Crum & Bota, 2013).

1. A company needs to adopt a structured communication process that conveys and assimilates information as well as provide structured feedback loops.

2. There is a considerable difference between communicating and transmitting demand data, but most companies treat them equally.
3. Interpersonal relations and emotions can stymie communication since most people fear conveying bad news and negative information.

The information to be communicated needs to be relevant and motivated. There is a risk of both communicating an overflow of information and an insufficient amount (Crum & Bota, 2013). Individuals often deliver too little information that just states a number, without explanation nor a confidence interval of the demand. This is very complicated for the receiver to interpret, and demand is nuanced, not absolute. The other end of the spectra is not either very efficient. When providing too much information, the processing time is too long and no thorough analysis can be made of the information (Crum & Bota, 2013).

The joint view of the demand forecast requires continuous communication between the partners and the retailer needs to stick to the forecast over the demand horizon to profit all partners. This is the stability for which the supplier increases its financial performance (Crum & Boca, 2003). A solution to this is to incorporate more updates of the demand plan, a start is to update it quarterly and with the development of the relationship, the more often the plan is updated where a real mature relationship has a joint demand plan that is updated daily (Crum & Boca, 2003). These updates should, of course, be integrated with the entire organization. Crum & Bota (2013) presents a demand management communication process that is based upon the five following steps; conveying demand information, assimilating the information, discussion, decision, and feedback. These five steps all include collaboration and will result in a holistic demand management decision that factors in all relevant departments and will later provide feedback to the process and how improvements can be made (Crum & Bota, 2013).

### 4.5.3. Structure

The organization needs to develop frameworks that facilitate value internally for the organizational structure, hence intraorganizational structures. The organizations also need to focus on external factors, generating interorganizational structures. These structures will, as a result of this, be presented in this chapter.

#### 4.5.3.1. Intraorganizational Structure

Collaborative structures are needed to lay the foundation of collaborative processes. Contractionary to an organizational collaboration structure is the “silo structures,” meaning that organizational departments and business units work isolated from each other with minimum communication and collaboration (Gleeson, 2013). Breaking down those structures that develop silo characteristics is vital for an organization to become more collaborative (Ashkenas, 2015). Gleeson (2013) breaks down the needs for going towards a non-silo culture into 5-steps; (1) create a unified vision, (2) Work towards achieving a common goal, (3) motivate and incentivize, (4) execute and measure, (5) collaborate and create.

The idea for these five steps is to, through the implementation of a shared goal, enable that teams can unify towards that specific goal. Most of the barriers that silo structures create are broken down through those two steps where it is essential to stimulate the organization so that this occurs continuously, hence the need for incentivizing and the execution, including evaluation in the correct manner (Gleeson, 2013). When a non-silo-based organization, further development is to establish a highly collaborative mindset. Gleeson's (2013) 5-step approach for silo breakdown can be assisted by Adler's et al., (2011) 4-step approach on creating a collaborative organization. It revolves around the importance of incorporating shared purposes and goals as well as the establishment of structures for contribution and collaboration, something that should also be valued and rewarded.

#### 4.5.3.2. Interorganizational Structure

Since there is a global supply chain trend that companies are constantly outsourcing more of their activities, the importance of collaboration increases (Neubert et al., 2004). This collaboration includes both inter and intra organizational aspects where the inter-collaboration takes the intra collaboration into account. This implies that a modern collaboration is not a sales team for one organization that works closely with the procurement team of another; it is instead entire organizations working together (Neubert et al., 2004).

Interorganizational partnerships are more complex than intraorganizational collaboration. They act as quintessential political processes and require the actors to balance themselves and dynamically relate to the complex power of collaboration (Glowacki-Dudka & Murray, 2015). To establish a sustainable interorganizational collaboration, the first factor needs to structure a common frame of restrictions and references for unifying the actors into having the same goal (Glowacki-Dudka & Murray, 2015). Gary (2004) further mentions that many issues that arise from interorganizational collaboration arise from the fact that the different actors in the relationship observe the joint project from different perspectives grounded on different references and structures, thus directly facilitating an environment of conflict and inefficiency. Glowacki-Dudka (2015) presents ten strategies for creating a collaborative structure amongst an interorganizational relationship. Compared to Adlet. et al.'s (2011) intraorganizational strategies for obtaining them, the interorganizational structures are much more reliant upon trust since external partnerships need to be created (Glowacki-Dudka & Murray, 2015). Furthermore, interorganizational collaboration further circles around, according to Glowacki-Dudka & Murray's (2015) ten-step strategy; active collaboration, defined rules and agreements, clear goals and visions, cross-border decision making and frequent partnership evaluations.

### 4.5.4. Culture & Trust

In order to accomplish organizational collaboration across a Supply Chain requires trust within both the organization and between the addressed actors throughout the Supply Chain (Kwon & Suh 2005). In line with the stated above, Abdullah & Musa (2013) presents their proposal of relationship commitment between companies in a Supply Chain as the relation between Trust & Information Sharing, where Morgan & Hunt (1994) defines relationship commitment as the willingness of partners to invest resources in a relationship. The trust issue is a constant

obstacle for companies to reap the benefits of demand management, where lots of companies today share numbers with their partners and not any explanation behind them, reducing the credibility of the numbers. Furthermore, promotions are not often shared, which diminishes the credibility of the demand forecast (Crum & Boca, 2003). Villasalero (2017) argues that the usage of information sharing IT-system between actors facilitates the building of trust between partners, something that Liou et al., (2015) supports by stating that the more sensitive information that is shared, the more conflict of interests and issues with lackluster engagement is mitigated. Additionally, in terms of organizational changes, where the integration of an IT system is plausible, Ahmad & Huvila (2019) show that if the change is seen as positive by actors and employees, trust and information sharing are then facilitated, and vice-versa.

#### 4.5.4.1. Culture & Trust in IT-projects

Organizational culture can also have a significant impact on changes, especially in the context to IT integration and its success (Hussein & Hafseld 2013). Mardiana et al., (2018) supports that and found that in companies, culture has a significant effect upon the level of attitude and behavior that employees have against IT projects, thus deeply affecting the success of them.

Reyes (1997) sees organizational culture as the definitive factor in how the organization deals with uncertainty, hindering and fostering IT projects. However, it is seldom that the technology is the erroring part; instead, Reyes (1997) states that it is people's inability to change that limits the power of an IT system. The organization needs to deal with risk and uncertainty since it is more likely that an IT project is accepted if it is less risky (Reyes 1997). This aligns with Godé (2006), who states that organizational culture evokes the level of interaction the employees have with IT, which is becoming more frequent. Thus, it is a prerequisite for companies to achieve continuous learning and development in both technology and management. With that said, the level of output of IT projects depends on the level of competence embedded in the corporation (Chase 2016). Also, Hussein & Hafseld (2013) found that corporate cultures orchestrated in functional structures, or "silos," are explicitly inefficient when conducting cross-department-based projects since the level of self-interest lies within departments, not fostering the broad perspective needed when conducting IT projects.

## 4.6. Technical Collaboration

Many companies are adopting more advanced technology and while this is generally a sound investment, it is only helpful if it supports an already robust process (Partida, 2020). New, advanced technology does not have an intrinsic value but is only applicable provided that several departments are invested in the process and provides the new technology solution with valuable data from the respective viewpoints (Partida, 2020).

Sophisticated information technology solutions, if used correctly, provide several substantial benefits to the demand management process (Hoque & Mohammadi, 2019). According to Sinchi-Levi et al. (2014), technology is supposed to help the organization's strategic, tactical, and operational levels. At all three levels, IT facilitates three main subjects; data collection & analysis, information sharing and business integration (Neubert et al., 2004). Additionally, IT

has a substantial potential level in new product launches. Since the product needs to be integrated with customer demands, supplier possibilities and resist competition, the data from all these sources need to be integrated in a communicative manner (Neubert et al., 2004).

There is a difference between inter & intrarelationships information technologies (Zhang et al., 2016). Interorganizational IT solutions enable more supply chain integration which then improves general supply chain improvement. Intraorganizational IT solutions improve the information quality and hence serves as a condition for effective supply chain integration (Zhang et al., 2016). Even if intraorganizational, technical collaboration improves specific KPIs for the focal company, such as overall costs, product quality and innovation, the results on the entire supply performance are hard to measure (Cagliano et al., 2006). However, interorganizational IT solutions directly improve supply chain performance for involved partners (Vickery et al., 2003). Interorganizational IT mainly helps with two aspects of supply chain integration: information sharing and cooperative relationships (Van der Vaart & Van Donk, 2008). These factors increase the capability to respond to changing market requirements for actors in the supply chain (Howard & Squire, 2017).

### 4.6.1. Data Collection & Analysis

The forecasting teams constantly handle more and more data. Most forecasts base their analysis primarily on sales data. According to Partida (2020), the forecasts should also involve competitor movement, real-time supplier updates, inventory information, marketing data and much more. This implies the higher importance of technological solutions (Partida, 2020). The new aspects of data collection and analysis include two other highly relevant topics: the velocity of data and its granularity. The Data velocity includes the shift from getting reports once a month to getting access to the data in real-time, constantly (Marr, 2015). The implications of this are that new decisions can be taken based on what the data analysis shows instantly, instead of waiting a month (or more) and therefore losing out on opportunities. The other factor being the granularity of the data, includes the accuracy and level of detail that the data is based upon. A very detailed (consumer level) data allows for a much more precise forecast and supply synchronization (Marr, 2015).

Data used for analysis can be divided into three main groups. The first type is structured data, structured in a table with clear indicators that fit this group. It is straightforward to analyze and process and is easy to handle (Marr, 2015). The second group is the unstructured/semi-structured, which cannot be easily inserted into rows and columns where the semi-structured is more accessible than the unstructured. Furthermore, data is divided into internal and external data. When adding all of these together and using intelligent data analysis, the data hierarchy is 1. Internal structured data 2. Internal Semi-structured 3. Internal unstructured 4. External structured 5. External unstructured. This hierarchy explains where the data analysis should start since the internal data is generally cheaper to acquire and more accessible and the structured data is easier to handle (Marr, 2015).

### 4.6.2. Information Sharing

Information sharing relates to the sharing of data regarding, for example, inventory levels, forecasts and future plans (Mentzer et al., 2001). Even though information sharing has constantly been advocated as a robust way of creating competitive supply chain advantages, many companies are reluctant to share their data due to the risk of the supplier, customer, or competitor gaining an unfair advantage (Zhao et al., 2002). Holweg et al., (2005) state that unpredictable and non-transparent demand information cause artificial demand amplification, leading to poor service level, high inventories and frequent stock-outs. The information-sharing part of technical collaboration heavily depends on that a comprehensive data collection and analysis has been conducted prior to and during the information sharing (Marr, 2015). Besides that, it is of utmost importance that all of this granular data is divided between the interested actors who use it. Especially if the data is structured and internal for one actor but external and unstructured for another, then the actors can acquire complex value-adding for a low price with technical collaboration (Marr, 2015).

Ryu et al. (2009) describe three types of demand information; realized demand, planned demand and expected demand. These three types of demand information are realized into two different information sharing methods; the planned demand transferring method (PDTM) and the forecasted demand distributing method (FDDM). PTDM implies that the retailer creates a procurement plan based upon demand and internal inventory levels and then sends the procurement plan to the supplier. FDDM, on the other hand, refers to when a third party organization considers each actor's inventory, lead time and then distributes the information to all actors involved in the supply chain. Ryu et al. (2009) found that the FDDM-method generally performed better in terms of service levels and inventory levels. However, when the demand variability is low PTDM shows the highest performance.

Supply chain learning, the process of a focal firm acquiring, assimilating and exploiting knowledge across its internal functions, major customers, and suppliers, can create competitiveness (Flint et al., 2008). In order to learn from both internal and external partners, companies need to share their information more frequently (Şahin & Topal, 2019). The profit of the entire supply chain might increase by sharing supply and demand information. However, the profits of all individual members might not increase (Huang et al. 2016). Huang et al. (2016) continues this argument with that the retailer in particular may take the risk of information leaking, hence the supplier may need to offer a discount in order to acquire specific and granular information. The cost of gathering and sharing data gets more and more substantial with the detail level, meaning that there is an optimal trade-off between detailed data and the profit of lowering stocks and increasing product availability (Cachon, 2003).

### 4.6.3. Business Integration

IT enables supply chain integration and is defined as "the degree to which a core manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra and interorganizational processes" (Flynn et al., 2010, p59). The integration is three-dimensional and depends on the supplier, customer and internal integration (Devaraj et al., 2007). Business

integration is the next step of information sharing and includes both an intra - and an interorganizational perspective. Business integration implies that organizations can move from active information sharing to a real-time passive update between actors (Frazelle, 2018).

A major mistake firm and, therefore, supply chains are making is the internal unit optimization, which might hurt the supply chain as a whole and therefore the own "optimized" company. The answer to this issue is supply chain integration (Frazelle, 2018). Integration partly relies on an organizational collaboration, but equally important, on information technology that provides the right tools (Frazelle, 2018). Integration of IT in a Supply Chain enhances the opportunity for partners to share information, enabling quicker response against changes in demand, enhancing overall business performance (Simatupang et al., 2004).

Yu et al. (2020) state that the logical process is as follows: Intraorganizational IT promotes supplier - and customer process integration (hence supply chain integration), enhancing operational performance, affecting financial performance. This process is further developed by switching from linear supply chains to dynamic supply networks (Yu et al., 2020). As stated earlier, IT lays the foundation for a data-driven environment that is becoming more and more adopted by supply networks globally. Therefore, it is essential to allow IT to drive integration of the supply chain (Devaraj et al., 2007).

## 4.7.CPFR

CPFR, short for "Collaborative planning, forecasting, and replenishment," is a practice to enhance supply chain integration and reduce inventory costs while improving customer experience (Panahifar et al., 2015). The practice aims to promote information sharing between actors in a Supply Chain to better plan and manage demand (Panahifar et al., 2015).

Chase (2016) states that to transition towards becoming a demand-driven organization, reducing variability and increasing flexibility is key, where the coordination of forecasting and promotional events is one way of addressing those issues (Vandeursen & Mello 2014). Issues that arose from lackluster initiatives on becoming more flexible and able to reduce variability can, in many cases, lead to bullwhip effects (Vandeursen & Mello 2014). As mentioned earlier, bullwhip effects implies that the an artificial demand is amplified higher up the supply chain (Gang et al., 2017). Vandeursen & Mello (2014) argue that the root problem for causing bullwhip effects is simply the lack of information sharing in a supply chain and the coordination of it, where CPFR is an effective way of addressing that. Lastly, the benefits of CPFR vary depending on the context of the Supply Chain, but, as described by Panahifar et al., (2015), there are some long-term benefits independent of the context. The benefits can be divided into three main category benefits; information-based, service & functional and financial (Panahifar et al., 2015) and are summarized below:

*Table 2: Benefits of CPFR (Panahifar et.al, 2015)*

| **Criteria** | ***Benefits*** |
|---|---|
| *Information* | • Improvement of forecasting accuracy<br>• Improved quality of exchanged information<br>• Reduced bullwhip effect |
| *Service & Functional* | • Increase responsiveness<br>• Enhance customer service quality<br>• Improved inventory management & product offering<br>• Operational efficiency<br>• Product availability assurance<br>• Improving design process<br>• Stronger relationship between partners<br>• Decreasing supply chain cycle time<br>• Increase customization capability<br>• Replenishment cycle time reduction<br>• Promotional planning improvement |
| *Financial* | • Increase margins<br>• Increasing economic value added<br>• Increasing shareholder wealth<br>• Decreasing cost of production,<br>• planning and deployment<br>• Economic incentives<br>• Decrease working capital<br>• Improving design process<br>• Stronger relationship between partners<br>• Decreasing supply chain cycle time<br>• Increase customization capability<br>• Replenishment cycle time reduction<br>• Promotional planning improvement |

To achieve CPFR, Vandeursen & Mello (2014) presents an implementation roadmap for organizations to integrate CPFR in their Supply Chain and own organizational structures.

*Define Partnership Opportunities*

- Identify potential partners
- Highlight the opportunities to grasp engagement

*Understand Business Drivers*

- A clear understanding of partners business drivers and determine future expenses
- For the CPFR to successfully be implemented, every partner must commit to investing in shared forecasts.

*Integrate with S&OP and Other Business Processes*

- Partners' incorporation of their Supply Chain Organization into cross-organizational functions such as S&OP and budgeting processes

*Define Success Metrics*

- Set, align and identify metrics in order to measure performance
    - Service levels, Variance, Production plans, Inventory levels, etc.
- Implement dashboard for viewing ownership, improvements and updates
- Establish performance bands that balance benefit across the chain
- Clearly defined escalation points

*Benefits Reconciliation*

- Document individual and collective benefits in order to drive commitment

*Define Ground Rules*

- Transform and nudge organizations scope from being individual to act collectively
- Foster organizations to challenge traditional supply chain process in order to nurture cross-collaboration

*Determine Data Sets for Collaboration*

- Define data needed from companies that will form common frameworks and models

*Select a Flexible yet Secure Platform*

- Source a platform that meets the requirements of the CPFR

*Engage in Implementation and Rollout*

- Equal engagement across the chain with expertise to secure that the platform operates with efficiency.

*Ensure Room for Expansion*

- Further evolving the CPFR processes to ensure future success and integrate further processes for collaboration.

Panahifar et al., (2015) state that the first two initial steps of CPFR are to determine front-end agreements and joint business plans, which corresponds to the first step of the Vandeursen & Mello (2014) roadmap. Thus, establishing a sense of collaboration as well as initiatives and terms for facilitating it. Panahifar et al., (2015) highlight the importance of a high-level IT infrastructure integrated within the chain for making Collaborative Planning thrive. However, Panahifar et al. (2015) highlight the need to not solely rely on IT structure since it cannot operate without social integration, supported by Croxton et al., (2002). With that said, to enhance the collaborative planning and secure its performance, Monczka et al., (1998) argue for the importance of a well-established trust between the actors in the chain.

If companies across a Supply Chain are capable of implementing a culture and relation that enhances Collaborative Planning, then, Collaborative Forecasting is accordingly facilitated. Collaborative Forecasting can also act as a facilitator for Collaborative Planning since planning decisions may be taken upon data available from performed forecasts (Panahifar et al., 2015). However, it is stated that Collaborative Forecasting can significantly impact the Supply Chain actor's opportunity to conduct their forecasting with much better accuracy through the synchronization of forecasting data via strong, established relations (Panahifar et al., 2015).

For the Collaborative Replenishment stage, where the main goal is to spread replenishment activities over the Supply Chain to optimize collaborative inventory management operations. Simply, match the orders accordingly with the sales figure that are provided by the forecasting departments (Panahifar et al., 2015). The output of the Collaborative Replenishment stage is translated into enhanced levels in customer service, order accuracy, and optimized inventory levels, whereas this further leads to significant economic impact upon the Supply Chain and its actors (Panahifar et al., 2015). The role of information sharing and integration of a well-established IT structure is important Collaborative Planning & Forecasting, and also to Collaborative Replenishment, where visibility, and continuous sharing of information, is enabled across the chain and actors may take fact-based decision based upon, i.e., the inventory level for another actor (Panahifar et al., 2015).

### 4.8. The transition to a Demand-Driven CPFR

The literature framework provides a model of how actors can transition from demand management processes to a demand-driven CPFR. Due to the benefits described by Panahifar et al. (2015) & Chase (2016), demand-driven CPFR is a superior model when addressing today's supply chain demand volatility challenges. The model is summarized below (figure 2):

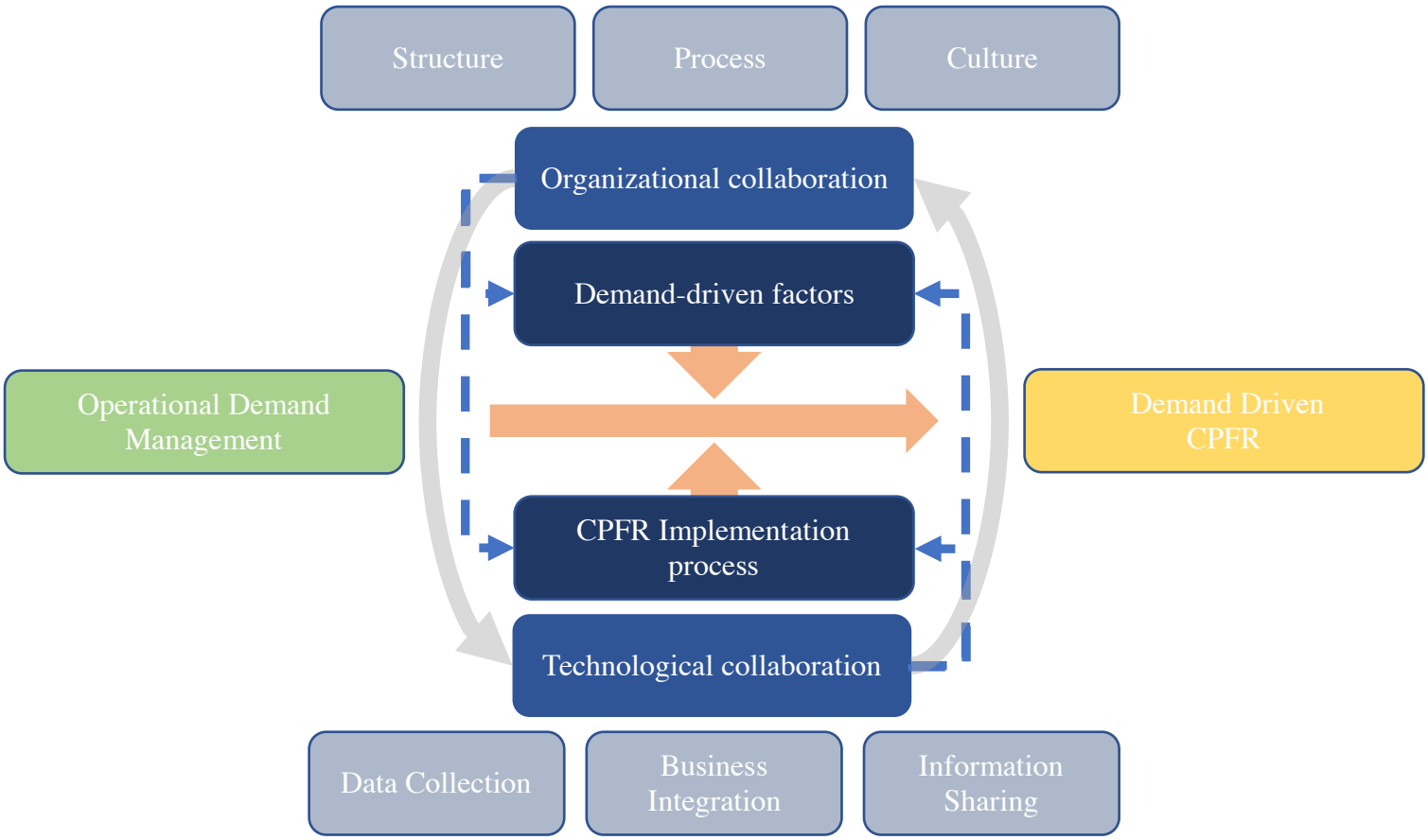


*Figure 2: Literature framework model; The transition to a demand-driven CPFR*

The first step is to define the internal operational demand management via the five-step model developed by Croxton et al. (2002). Then the actors need to develop both organizational and technological collaboration. (Crum & Boca, 2003; Zhao et al., 2016). Organizational

collaboration depends on both intra and interorganizational aspects and is applied to the structure, processes as well as culture and trust for all the organizations affected (Gleeson, 2013; Glowacki-Dudka & Murray, 2015). The technical collaboration depends on the information sharing, data collection, and finally, the business integration and once again depends on both inter and intraorganizational aspects (Neubert et al., 2004; Cagliano et al., 2006; Vickery et al., 2003). The developed collaboration facilitates the implementation of demand-driven factors for the involved organizations (Chase, 2016; Chase, 2013; Lapide, 2009; Smith, 2014). Furthermore, the collaboration facilitates the CPFR-implementation described by Vandeursen & Mello (2014). When combining the CPFR-implementation with established demand-driven demand management processes, the result will be a demand-driven CPFR, which will reap enormous benefits compared to the traditional internal demand management process (Chase, 2016; Panahifar et al. 2015; Vandeursen & Mello, 2014).

## 4.9.Differences B2B/B2C market

Transitioning from a B2B to a B2C market brings multiple changes. From a marketing perspective, the B2B market has previously been approached through resellers or designated business units where the insights of the product or service stop at the purchase (Saggitarius, 2019). Since the value in a product or service, in B2B, is often functionally and economically viewed, guided by rationale criteria (Mencarelli & Riviére, 2014). This leaves minimum room for emotional value interpretation Saggitarius (2019). Lilien (2016) supports this by arguing that the B2B market comes with significant challenges regarding collecting data compared to the B2C market, whereas if data gathering would be of preference, high investments in relationships, building costs are needed. In addition to that, higher-order values are significant for a B2B-market (Reklaitis & Pileliene, 2019). Lastly, Reklaitis & Pileliene (2019) are supported by Chopra et al. (2001) regarding high sales volumes from B2B markets, stating that a B2B environment often correlates with bullwhip effects.

B2C has a much larger market size, targeting the end-user where the decisions are mostly based on emotion and short purchasing processes (Reklaitis & Pileliene, 2019). Therefore, the B2C market is rather complex in its predictability (Groom, 2010) since purchases are irrational (Reklaitis & Pileliene, 2019) and can heavily fluctuate in its demand variability, making it a contributor to bullwhip effects (Xiao & Peng, 2013). However, bullwhip can be mitigated by customer knowledge through the use of customized analytics (Magids, Zorfas & Leemon 2015). Applying those analytics might be more flexible to conduct upon a B2C rather than a B2B due to corporate policies, confidentiality and bureaucracy (Lilien 2016). Furthermore, shifting from a B2B to a B2C market enables a wider audience for providing more detailed sales marketing operations upon (Harper, 2019). However, with broader target groups, sellers will only grasp a small proportion of the total market since the B2C market is larger than the B2B market, making it essential to personalize product offerings against customers (Harper, 2019). The importance of personalizing product offering for the B2C market is not only due to the larger market size, but also since a B2C market is significant with customers highlighting emotional factors in their purchasing decision, hence more decision criteria, rather than budgets and rationality (Reklaitis & Pileliene, 2019). With that, Jahanbin (2015) discusses attribute-

weights as vital factors that affect a customer's choice when purchasing products. Where, customer choice depends on cognitive biases and limitations, changing the familiarity and knowledge of products, to mention a few.

Yan (2019) supports Jahanbin (2015) when discussing perceived value in a B2C context by further emphasizing that two factors in customer perceived value are essential to understand; the trade-off between perceived benefits, costs and the psychological effects that are created. The value that a particular brand gives to a customer is based not only on physical properties but also on psychological effects that can significantly impact a brand's perceived value (Yan, 2019). He further elaborates on brand equity's role on customer perceived value where significant correlations between emotional and functional value and brand equity can be found. Hence, the more substantial brand equity, the more emotional and functional value the customer perceives (Yan 2019).

# 5. Case Description

This chapter introduces the case behind the Easy-Source initiative on the specific supply chain. Since Easy-Source is implemented for several actors, their supply chain relation will be described as well, which includes Global-Tech, the manufacturer, Global-Dist the distributor and Local-Res, the reseller.

## 5.1. Supply Chain

Global-Tech's products are sold in the B2C and B2B markets, but since this report only focuses on the B2B-market, the B2C-market will not be covered. Global-Tech has no direct sales themselves in the Swedish market and reaches their end customers via different channel partners, where this report focuses on the channel via Global-Dist through Local-Res to the end-consumer. Global-Tech's Supply Chain activities in the Swedish market, as of the current situation, are outsourced upon distributors and resellers capabilities. Information is upstream, coming from the customer moving through the resellers, distributor until reaching Global-Tech, in the opposite direction to the physical flow of products.

Formally, orders from SME's, Small Medium Enterprises, are placed on Resellers. The resellers products are supplied from different distributors who receive their products from Global-Tech's European central stock. If no stock is available at the reseller, a request for a product quota is placed on the distributor, whose primary responsibility is to secure the delivery of products to the Resellers. Depending on the distributor's stock level, products are immediately sent to the reseller, or that orders are placed on Global-Tech, the producer, to provide more inventory to the distributor.

As mentioned in the previous segments, the current state of the supply chain leads to a upstream information flow and an downstream product flow. The supply chain is visualized in figure 3.


*Figure 3: The case companies supply chain*

Today, the supply chain mostly suffers from heavy stock-outs concerning both daily operations but mostly during new product launches where the demand is hard to predict and satisfy. Many customers experience long lead times on ordered products, especially on new product launches.

## 5.2. Easy Source

Easy Source is a new initiative from Global-Tech, Global-Dist and an IT-Developer. Its purpose is to decentralize the purchase of primarily hardware products but also software in the

B2B-market. As of current situation, the platform has only been implemented on a beta-level, meaning that it is in a test-phase. The platforms ingoing activities are visualized in figure 4:

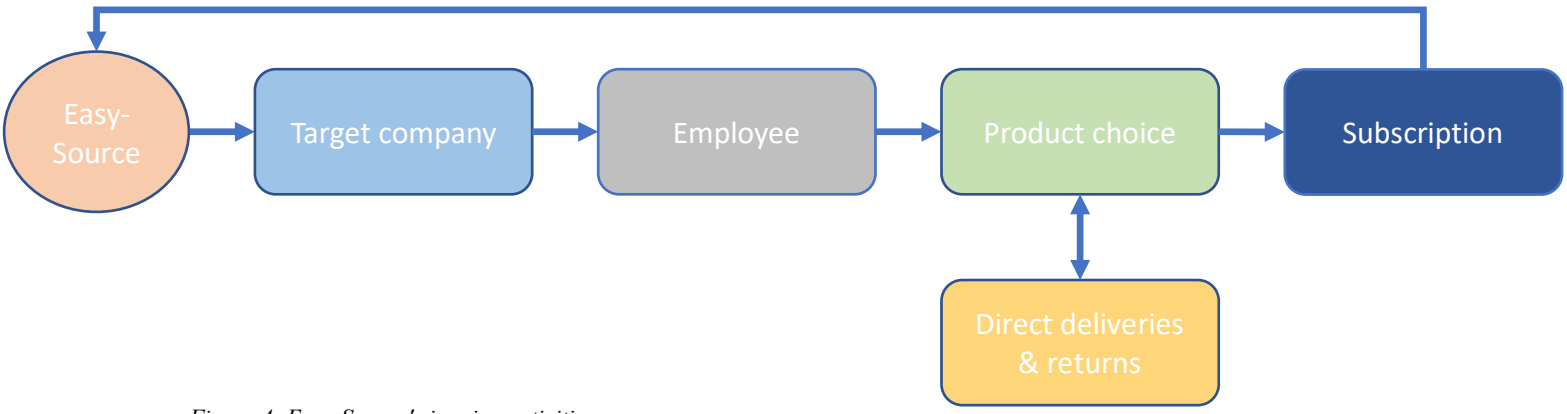


*Figure 4: Easy-Source's ingoing activities*

With Easy Source, every employee can acquire the hardware of their choice by themselves via the platform. The employees at the target company then usually pay via a monthly subscription model where each employee has a specific budget, and if the employee buys a product over the budget, they just subtract the remaining from their paycheck. The platform has a wide range of products, including computers, smartphones, smartwatches, earphones, etcetera from different producers and not only Global-Tech. Before Easy Source, companies usually had one responsible employee for the procurement of all hardware. This employee bought all hardware for all employees at a one-time purchase per period.

The data collection can now, through the platform, be performed on an individual consumer level instead of a company level and Easy-Source provides data of all employees' subscription levels. This data can then be shared in real-time through a dashboard function connecting the chain actors, enabling communication. This means that the supply chain actors can get a real-time update of the current hardware landscape for the connected companies, how many units are in the system, how many individuals are soon running out of their subscription, etcetera. Instead of pushing step by step, the platform creates an interface from the producer to the reseller, giving the producer a direct connection to the end-consumer. All of the actors in the supply chain will be connected to the platform, meaning that all actors can receive the same information.

Easy-Source will move the shipment to the end-customer to Global-Dist instead of Local-Res. Local-Res will, therefore, primarily handle the customer contact and development, where Global-Dist will handle more of the inventory management. Global-Tech will still supply products to Global-Dist from their European inventory.

This platform then means that hardware purchases will become spread out over the year and not have the same bulk purchases as before for the companies that choose to acquire this platform. Finally, since the purchasing decision is decentralized to the individual employee, the purchase factors will change. However, it is essential to mention that the target group is

still businesses, but the purchasing choice is now based on an individual level within the business, hence the evolvement of B2C characteristics.

## 5.3.Empirical analysis of Case Actors

This section will cover a brief description of each actor followed by the interview data from the actors regarding their demand management process, their organizational and technical collaboration.

### 5.3.1. Global-Tech

Global-Tech is a global producer of consumer electronics with its headquarters in the US, but the Swedish branch will be referred to as Global-Tech. It is one of the biggest consumer electronics producers globally and is much stronger in the consumer market compared with the business market. It prides itself on producing premium products, and its brand is seen as one of the most successful in the world. They don't have any production nor stock in Sweden, where the production is conducted overseas, and the stock is outsourced to Global-Dist.

#### 5.3.1.1. Global-Tech's Demand Management Process

Data is provided through weekly reports from distributors and resellers regarding their current stock and sales levels. When new products are launched, the frequency of data collection is increased to an hourly basis to receive the data as closely as possible from a real-time perspective. The level of data collection from each actor depends on whether the actor is an authorized partner or a part of the DPP (Distribution Partner Program). The authorized resellers provide data regarding inventory levels and sales, whereas the DPP actors are sales offices that are licensed to sell Global-Tech's products. Global-Dist is an authorized partner, and Local-Res is a part of the DPP.

All of the forecasting operations are conducted by their appointed European HQ, situated in London, which the Swedish branch is passing information forward to. Hence, for the second step of the demand management process, the forecasting, none is conducted in Sweden. Instead, data is sent to the central unit that conducts the forecasting quarterly. However, even though the forecasting is conducted centrally, Global-Tech still configures and performs inputs to the forecast, based on qualitative factors, human evaluation and local knowledge, challenging it from a Swedish market perspective to give the forecast an additional iteration. This challenge is done from a single unit at the Swedish office.

Regarding the synchronization between demand and supply, for day to day activities of existing products, Global-Tech sends the earlier mentioned weekly reports to their forecasting HQ, which after that allocates the products accordingly. This leads to a forecast and allocation assumption generated centrally for Europe. That assumption contains what products and to what companies these will be allocated for each country. Global-Tech challenges this allocation with regards to local partner knowledge. By that, the demand and supply can be in synch since Global-Tech knows where to allocate certain products for reaping the most benefits. Finally, the production is constantly operating at full capacity.

Additionally, Global-Tech also experiences some issues that affect the synchronization between supply and demand. These issues are correlated with the supply constraints that the Swedish branch is exposed to, together with the inability to exactly know the company's production levels. Broadly, there are two different scenarios for when Global-Tech synchronizes their demand with their supply, one for the new product launches and one for the daily operations of existing products. Global-Tech has supply constraints primarily with new product launches.

For the new product launches, Global-Tech records the number of connected devices against networks as well as partner's sales and stock levels at an hourly level. Connected devices mean that when a sold device from the reseller, is activated by the customer, Global-Tech can identify where and on what network those devices are activated, by the end-user, and by that receive an indication for what country and what reseller to allocate. With this information, Global-Tech is able to optimize the distribution.

Global-Tech frequently shapes demand by offering price reductions and promotions against partners. Demand sensing is addressed by frequent observation of partner's performance. Global-Tech is not currently working to reduce the demand variability on the B2B market. Regarding the flexibility, they are not strictly performing any activities in terms of direct logistics capabilities. However, the allocation is constantly measured and developed between different time periods that vary to better fit the demand of different countries and actors.

Lastly, the performances of Global-Tech's branches are continuously reviewed and measured, both department-wise but also individually. For the B2B sales department, the performances are reviewed in different categories such as sales, collaboration and innovation. These measurements are often correlated with strategic initiatives for departments to succeed in, called MBO's (Management By Objectives). Also, one major important KPI is the time of purchase, where this largely affects the perceived customer satisfaction of the product.

#### 5.3.1.2. Global-Tech's Organizational Collaboration

Global-Tech's intraorganizational structure can be characterized as an organization with silo-structure tendencies. The intraorganizational insights are limited, where the Swedish branch seldom gains insights higher up the organization. Even though they do perform several activities across functional borders there is no defined integration between business units; instead, the units are functionally divided. Information sharing is not naturally shared between departments, nor to their external partners; however, it can be on request.

Regarding organizational processes, Global-Tech states that they do work very collaboratively with overall aligned KPI's between departments. However, even though they are measured on collaboration and mutual innovation, they are still not very familiar with other departments' specific operations, goals, or general procedures, further exemplifying the silo-structures' tendencies mentioned. Moreover, Global-Tech is unaware of other key channel partners or resellers' operations and goals, even if they are measured on collaboration and perceive that

they are working closely together. Global-Tech's products come with small margins, making partners seldom profiting from a single sold unit. However, since the demand from the consumer market is constantly high, together with a strong correlation between a single purchase and consuming additional services, it ties partners to collaborate with Global-Tech.

Collaboration is measured as a KPI, thus collaboration is not only facilitated but constantly pushed for within the organization, leading to that the company has built a collaborative culture, both locally and globally as well as inter and intra. Hence Global-Tech has a more collaborative culture than their structure. Global-Tech has established a well-grounded base of trust to their key partners in the Supply Chain, sharing sales data and other relevant information. Regarding daily activities, and depending on the nature of the information, Global-Tech do trust their partners with some sensitive information. However, a majority of the information is restricted and if some of that information would be considered to be shared, this will need to be authorized from significant higher hierarchical positions. With new product launches in mind, information is highly confidential and never shared outside the organization, and not even within, where only the headquarters know the design of the new product.

Additionally, since Global-Tech B2B channel strategies are to support and develop the resellers' sales performances, Global-Tech is highly dependent on a constant collaborative environment between actors in the Supply Chain, whereas their operations would not function without it. Within the B2B sales, those collaborations come in different forms where Global-Tech works tightly together with authorized resellers, AR's, as well as in DPP's, Distributor Partner Programs, whereas the core function of the B2B channel strategies lies within DPP activities. However, Global-Tech states that in some cases, more dedication and also technological advancement would be of preference for some actors in the chain due to different levels of ambition between said partners creating a conflict, not of what to pursue but how hard to pursue specific KPIs such as sales or customer satisfaction. Also, Global-Tech suffers from many administrative issues for the B2B and SME market since there are multiple smaller customers with varying needs, making it complicated and time-consuming to monitor.

Global-Tech is very keen and restrictive in choosing partners to collaborate due to their high demands. Furthermore, Global-Tech has good experience in working with channel-partners and have helped their business being more digital-driven and improved their sales, leading to that Global-Tech not only possess great bargain and decision power in the Supply Chain, but also that they possess power related to knowledge and competence.

#### 5.3.1.3. Global-Tech's Technical Collaboration

Global-Tech's internal technical collaboration is based on a single system integration where internal branches are connected, and information can be shared upon request. Regarding the data collection, Global-Tech Sweden only provides their headquarters with sales data and stock levels, where the sales data is the POS-data generated from the resellers in different markets. They are also collecting product experience data from the end-customer, which they can analyze later and use to form improvements in correlated activities. The information flow generally moves in the opposite direction from the POS, hence from the reseller to the

distributor to Global-Tech. As mentioned, the information regarding sales stops at the distributor, meaning that Global-Tech has limited knowledge of the final sales situation.

Between actors, there is also a form of system integration where Global-Tech can see recorded POS's. However, those system integrations are for the B2B branch selling for authorized resellers and not Channel-Partners. These authorized resellers distribute their sales data through EDI's (Electronic Data Interchange), goes to Global-Tech's integrated internal system for further analytics & forecasting purposes. With that said, there is a lack of visibility for deeper insights into the non-authorized partner market performance and state.

### 5.3.2. Global-Dist

The distributor of Global-Tech's products is a US-based distributor of IT products and services with operations globally. The distributor was founded in 1972 and is today one of the largest market players within their field. As a distributor, the actor secures the chain of products to the end-customer and to resellers of consumer electronics products. Notable is, given the distributors' magnitude in providing logistical solutions for producers, this has led to partnerships with both Global-Tech and other key competitors in the consumer electrics industry. Moreover, the initiative of Easy Source is partly coming from Global-Dist**.**

Global-Dist's empirical analysis will be based in a similar way as Global-Tech but with the natural differences between a producer and a distributor. For example, the procurement process will be treated, as it wasn't for Global-Tech. Furthermore, only the B2B-market is handled even though they also conduct B2C-sales, just as with Global-Tech.

#### 5.3.2.1. Global-Dist's Demand Management Process

Starting with the first step of the demand management process, the data collection. Global-Dist captures all of their data for which they plan supply and forecast from the invoices from their resellers' orders. They do not capture the stock levels from the resellers; however, they know the stock levels of Global-Tech at their central European inventory.

Regarding the forecasting process, Global-Dist conducts short-term and long-term forecasting on the above-mentioned data collection. Its three business lines construct and own all of their forecasts as well as businesses in general. Since only one of the business lines is working with distribution, this is the business line that forecasts the actual products going in and out of the warehouse. Other business units forecast the different services such as configuration and repairments needed based on the distribution's overall product forecast. Distribution's forecast is based upon earlier mentioned data collection. Moreover, Global-Dist further states that due to market volatility on the smartphone market, most forecasts are reactive instead of proactive, making them frequently short on supply.

For the synchronization part of the demand management process, Global-Dist's procurement department provides the respective manufacturers' global headquarters with their forecasts for the year and then weekly updates throughout the year. Even though Global-Dist only sell to companies, their customers can be divided into B2B/B2C based on their customers' customer.

For the B2B-customers, they go through a long process when procuring large amounts of hardware which facilitates the procurement and planning process for Global-Dist, since it is easier to forecast due to extensive bureaucracy. Where on the other hand the B2C-resellers tend to plan less ahead, leading to shorter procurement planning periods and rupturing the inventory levels of Global-Dist, hence they are more difficult to plan for due to consumers more volatile demand compared to companies. They procure based upon automatic recommendation with regards to stock levels and sales but also manually adjust it with qualitative factors.

Global-Dist is currently not working with reducing the fluctuating demand over the year regarding the reduction of variability. However, the manufacturers do try to shape the demand by offering discounts on the fronting of certain products. Hence the manufacturers are creating incentives for their specific products. It should be stated that Global-Dist doesn't have specific processes themselves to reduce the demand fluctuations. To be more flexible, Global-Dist aims to be more proactive against customer demand, whereas much flexibility lies within the resellers' competence and how they interact with their customers. Global-Tech and Global-Dist both aim to support and evolve their clients' operations, whereas many initiatives in being more flexible lie within increasing clients competence and sales capabilities to bridge knowledge gaps and make information flows more responsive.

Global-Dist measures several KPIs regarding the demand management process. Primarily they are measuring revenues and costs on the profit and loss side, but also the working capital with their operating expenses. Being a distributor with high stock levels, they also focus on their capital invested into stocks, both as a KPI but also due to credit limits. Also, one final KPI is the measurement of lead times to customers. Those are the primary KPIs used at Global-Dist regarding the demand management process.

#### 5.3.2.2. Global-Dist's Organizational Collaboration

Global-Dist's internal structure is silo-based, where all three business lines (distribution, services, financing) have their own internal KPIs and processes that are not very integrated in terms of organizational functions such as collaboration, communication, and sharing goals. However, the different functions support each other since the customers need a holistic offering from Global-Dist. Often in terms of all three lines of businesses. Demand shaping activities such as promotional campaigns are done separately per line of business but might sometimes occur with critical suppliers or customers.

Global-Dist does, however, trust the different business lines with sensitive information and data, which is also true for the external actors in the supply chain. Information such as prices, inventory, and sales are frequently shared with the different key external and internal actors to drive the collaborative processes as well as possible and for benchmarking and comparison between product groups. Even though there exist three main lines of businesses, these lines of businesses span over several different products, resulting in collaboration over the product lines rather than the service lines. Since both distribution, services and financing all can be seen as services, Global-Dist is working in service silos, and these services is further based upon the division B2B/B2C, but all of the silos are active in all of the product groups.

As mentioned, the manufacturers of the consumer electronics hardware forecast how many products they can supply to Global-Dist, not the other way around. The collaboration is deep, but the power balance favors the manufacturer due to the high demand for their products. Even though Global-Dist themselves occupy around 50% of the market, they are still highly dependent on getting as many products as possible when new product launches are conducted. The power balance between Global-Dist and the manufacturer is further exemplified by the fact that Global-Dist is highly reliant on stock levels and price, where a proven tendency of sensitivity can be found amongst customers. The perceived trust amongst suppliers, Global-Dist and customers are, however, well-established. Global-Dist frequently works to optimize their clients' operations since they are not conducting the final sales to the end-customers themselves; they need their first-level clients to conduct these sales operations.

#### 5.3.2.3. Global-Dist's Technical Collaboration

The first part of technical collaboration, being data collection and analysis, is conducted at a first-hand level. This implies that Global-Dist primarily gathers sales data from their sales invoices which are sent to the customers and not the true demand. Global-Dist does stress this as an issue, both regarding understanding true demand on which they can base their forecasts and procurements on, but also regarding customer service during the entire product ownership period. Global-Dist clearly states their desire to gain more insights into customer journeys, behaviors and patterns at the end customer level. Global-Dist is only in contact with end-customer regarding returns, reparations and aftermarket services.

Regarding the technical part of the information sharing Global-Dist, as mentioned earlier, does share large quantities of data both internally and externally, even though the internal stakeholders both receive more data and more often. Most of the information sharing is done via active communication, mainly via telephone or email. However, critical information such as inventory levels is constantly displayed, giving information in real-time.

For the business integration, Global-Dist do have system challenges internally. Global-Dist had previously errors regarding the usage of several different systems that were not integrated, whereas communication issues and misunderstandings arose. One singular system is implemented for all divisions and lines of businesses where follow-ups and performance analytics are conducted holistically and jointly. However, after the purchase, further integration and follow-up are missing with the end customers, even though extensive sales integrations exist with the reseller, hence their first level customer. Moreover, systems as CRM are used, which allows for further firsthand integration.

### 5.3.3. Local-Res

Local-Res is a Swedish-based actor with headquarters in Stockholm, established in 1995. They are focused on delivering IT solutions, products and services, but also work with connected vehicles. The relation with Global-Tech is based on that products are provided between the distributor and reseller for further distribution and enhanced range to B2B customers. Reclamation and aftermarket services such as IT support or reparation are further covered by the reseller. They have sales offices that cover entire Sweden, and some of these have their own stock. They are a franchise-based company where most of the offices are owned by the management of that specific office.

#### 5.3.3.1. Local-Res' Demand Management Process

For Local-Res' initial demand management process, the data collection, Local-Res frequently keeps track of data from both ways in the supply chain. This means that Local-Res not only tracks customer data, such as current subscriptions and estimated time to service/upgrading together with general sales activity but also data from distributors' current stock levels and other necessary information. The forecasting is then conducted upon the performed data collection, giving Local-Res multiple data points and material for forecasting and analyzing both customer prognoses as well as estimated delivery processes. The process differs from office to office, where some offices, often the bigger in terms of revenue conduct their own forecasts and supply from the distributor. The smaller offices work based upon the forecast conducted from the central office.

The demand is synched with supply through conducted analytics and forecasts, both upstream and downstream. Local-Res uses a customized IT-system, a procurement portal that adjusts itself in coordination with Local-Res's stock levels and against distributor's levels. This system is then integrated with a CRM system for each office as well as the central. As mentioned, the product flow varies, where some offices have their own inventory, which they are in charge of and others rely on the central stock. Their supply is based upon the mentioned allocation from Global-Tech and their respective competitors at new product launches.

To reduce variability, Local-Res continuously keeps track of customer data, patterns and behavior to predict and know when customers perform purchases and what their needs are. Depending on the nature of the product, different activities are conducted for smoothing out the variability and shaping the demand. For instance, these activities could be price promotions, digital launches towards a client's IP address, or simple phone or mail pushes. These activities are coordinated by a central unit that works collaboratively through the allocation of processes between different business units, where trend-scouting is conducted to offer the right product and promotion at the right time. Despite their franchise-based company structure, it is always the headquarters determining the overall promotions and demand shaping activities.

The flexibility of Local-Res is based on the current synchronization between supply and demand where the jointly coordinated trend-scouting, sales activities and aftermarket services are used for quickly solving customers' issues. However, Local-Res sense that even though today's demand variability is greatly correlated with bulk purchases, those purchases have been

smoothening out to smaller and more frequent bulk purchases during the years. Instead, the more problematic and error-causing purchases or changes in customer behavior are the ones conducted randomly. The largest problem Local-Res currently faces is the lack of supply amongst the distributors where shortages arise in their part of the chain, simply leading to supply constraints for Local-Res, which mitigates its flexibility.

Regarding the last part of the demand management process for Local-Res 1, performance measurement, frequent measurements are conducted upon the organization, both internally and externally in both soft and hard factors. A hard KPI such as sales is measured between the local offices which also goes for the soft factors, such as customer satisfaction.

#### 5.3.3.2. Local-Res's Organizational Collaboration

Local-Res has adopted a franchise structure with several local offices in the name of the mother office. While differing a little bit regarding their structure, these offices act as more or less separate companies. Even though the mother company supports them regarding promotions, branding, etcetera, they are responsible for their financial result and several are responsible for their inventory as well. The local offices are located at different geographical locations all over Sweden and own their own customer data and associated information. The mother office is structured according to silos, even though they are measured on their internal collaboration and the employees are encouraged to work collaboratively.

The process for Local-Res is quite similar for all the different franchises where for example, the communication is harmonized for all offices with the suppliers and their end customers. When ordering products, they very seldom order from each other, and in the large majority of the cases, they order from the distributor since they do not want to adopt that role. When the distributor cannot supply the needed products, Local-Res sometimes needs to act as a distributor and order from the distributor's distributor or supplier. This is very disruptive for the daily operations and something they want to avoid as much as possible. Today they have lots of distributors to be able to bargain and negotiate the price for as many transactions as possible and no extensive deep collaboration with any distributor. While the communication works well internally, the process down to the end-user is extensive and is often the biggest bottleneck during daily operations. Local-Res experiences that their most significant issues concern external processes and operations that they are not themselves responsible for. This includes supply shortages at the distributor and delivery from a third-party delivery firm. They have recently hired an employee dedicated to only conducting deliveries in the Stockholm region since Local-Res can monitor in-house resources better than external resources.

The trust regarding sharing demand data and other information is a sensitive issue for the company and especially for the franchises. Since the franchises are separate units, they are indirect competitors, especially if they act within the same geographical region. In addition to this, the respondent highlights the company started in the 90s and several owners of different franchise units are still the same as they were when they started. Hence, they have a long tradition of conducting their operations and are therefore somewhat reluctant to adopt new ways of conducting the processes, whereas one of these is a collaborative approach to

information and data sharing. This is especially true for the demand and customer data, being more sensitive information and less true for inventory levels. There is generally no drive to change the information sharing and work collaboratively at several franchises due to the cultural setting and mindset. On the same theme, there is a fear that new technology will render your current position useless, and therefore, certain employees try to either fight against change or make their case for a position that isn't needed in the long term.

From a franchise owner's perspective, the most trust is gathered to the mother company, then to the other franchise owners, and lastly to completely external actors. The firm is very concerned regarding GDPR, and since they don't have this competence, it is considered as a significant hinder for further improvement. With all this being said, the mother company does understand the clear value of information sharing, both between the franchise offices and with external partners. Regarding the power dynamic, Local-Res considers themselves to own very valuable data due to customer information and insights. Even though they understand the value of sharing the data, they also comprehend their leverage. Therefore, they can have high demands on the supplier product availability, price and overall collaboration considerations.

#### 5.3.3.3. Local-Res's Technical Collaboration

The data collection is primarily based upon sales orders from respective customers regarding the demand data. However, as mentioned earlier, they acquire supply data from different sources to create such a holistic view as possible. This information then can be shared efficiently via communication tools such as yammer or SharePoint. However, there is not an easy way to acquire information without asking the responsible person. For example, the inventory levels of different franchises cannot be acquired directly via any software. This is also true for other relevant information such as general sales statistics or predicted future demand. They strive to be as data-driven as possible where the collected data is incorporated in decisions concerning marketing or push-sales, where the consumer information is shared within a specific franchise to drive local sales.

For the business integration, they have created internal software for which the distributor needs to include themselves when offering their distribution services to Local-Res. This enables Local-Res to constantly monitor their distributors and facilitates bargaining between different distributors' price offerings. The software that has been customized to their needs can be integrated with new software products. New technology can be integrated with the current procurement platform to incorporate services such as drop-shipment or similar demand management services. While it is of a high standard, the current CRM-system has issues regarding customer handling due to an increasing number of customers that place smaller and more frequent orders. Since the current CRM-system isn't automated, the manual work required related to administrating the sales and consumer information is substantial.

Local-Res has a requirement on new distributors to integrate themselves into the customized procurement platform to create optimized operations. This platform gathers data from Global-Dist and their franchises in order to calculate the optimized real-time inventory and procurement. They have another customized platform for their customers. This allows the

customer to understand when they can buy a product and what delivery time to expect. Due to the daily difference in the price on the product procured for Local-Res and the underlying assets price changes (e.g., the price of metal), the data and prices need to be updated in real-time. Otherwise, Local-Res will take a massive hit on their gross margin for said product.

### 5.3.4. Summary of Empirical Analysis

The following segment is aimed to summarize the empirical analysis. For the operational demand management process, the key activities from each partner in relation to each step of the process is briefly described. For the supply chain actors' level of collaboration within organizational and technological collaboration, the actors have been graded as High, Medium and Low. For organizational collaboration High corresponds to an open culture, with minimal-silo structures. Low corresponds to a closed culture and less collaborative organization with more significant silo-structures. The medium level contains elements of both. For technical collaboration High corresponds a highly integrated systems function, low for non-function information sharing systems and medium a mix of the two. For each segment of the organizational and technological collaborations, the grading has been divided into both intra and inter collaborative factors. All of this can be summarized in table 3.

*Table 3: Summarization of empirical analysis*

| | Global-Tech | Global-Dist | Local-Res |
|---|---|---|---|
| **Demand Management** | | | |
| **Collect Data** | Weekly sales and stock level reports from authorized partners. | Reseller sales invoices and producer's stock. | Mainly use POS, supplier and customer insight data |
| **Forecast** | European unit conducts it, where the Swedish unit challenges it. | One responsible forecasting unit shares this with the company. | Most offices responsible for their own. For the smaller the central unit conducts the forecasts |
| **Synchronize** | Product allocation based on partners performance. | Automatic procurement with human tunings. | A customized IT-system that uses internal stock levels and forecasts |
| **Reduce variability & Increase flexibility** | Promotional offerings to reduce demand. Flexibility through data analysis and allocation. | Mainly using promotional discounts. No real flexibility improvements. | Reducing variability is managed via central unit. Flexibility is mainly based on suppliers. |
| **Measurement** | KPIs concern innovation, collaboration and general sales. | Capital tied into inventory and product availability. | Soft and hard factors on both internal and external levels |
| **Organizational Collaboration in a Demand Management Context** | | | |
| **Structure**<br>**Intra:**<br>**Inter:** | <br>Low<br>High | <br>Low<br>Medium | <br>Medium<br>Medium |
| **Process**<br>**Intra:**<br>**Inter:** | <br>High<br>High | <br>Medium<br>High | <br>Low<br>Low |
| **Culture**<br>**Intra:**<br>**Inter:** | <br>High<br>Medium | <br>Medium<br>High | <br>Low<br>Low |
| **Technical Collaboration in a Demand Management Context** | | | |
| **Data Collection**<br>**Intra:**<br>**Inter:** | <br>Medium<br>Medium | <br>High<br>Medium | <br>High<br>Medium |
| **Information Sharing**<br>**Intra:**<br>**Inter:** | <br>Medium<br>Medium | <br>High<br>Medium | <br>Low<br>Low |
| **Business Integration**<br>**Intra:**<br>**Inter:** | <br>High<br>High | <br>High<br>Medium | <br>Low<br>High |

# 6. Analysis & Discussion

The analysis is structured into four main areas, one for each actor namely Global-Tech (the Producer), Global-Dist (the distributor) and finally Local-Res (the reseller). For these actors, the implications of Easy-Source on the demand management process will be analyzed. In order to understand the implication, the organizational and technical collaboration factors will be taken into account. The implications for all actors will be summarized in one section, visualizing the relations between the implications and Easy-Source. The transition from current demand management processes to a demand-driven CPFR is also analyzed through the current states of the demand management processes, organizational and technical collaboration and what effects Easy-Source will imply on these.

## 6.1. Analysis of Easy-Source's effects on Global-Tech

The effects that Easy-Source will cause upon Global-Tech's Demand Management process begins with the first step, the data collection (Croxton et al., 2002). With Easy-Source, Global-Tech can now acquire POS-data as well as subscription with minimal effort and visualize it in real-time, which generates a more true view of demand (Chase, 2014; Marr, 2015). Easy-Source will enable Global-Tech to monitor individual consumer subscription data, making Global-Tech able to transition from reactive to proactive (Chase, 2014). Easy-Source affects Global-Tech's data collection by leveraging data from the other actors in the supply chain. However in order to acquire this data, increased collaboration is needed. In relation to that, Easy-Source may not only call for collaboration but also facilitate it. This, since that information sharing IT-systems promote trust-building in business relationships (Villasalero, 2017) and enhance engagement as well as commitment. Both of these factors strengthen interorganizational collaboration (Liou et.al 2015). Finally, Easy-Source can visualize the demand data in real-time and passively collect the data, but further technical collaboration development is needed to integrate this for all actors in the chain.

Since Easy-Source implies that data can be gathered on a real-time POS consumer-level, the data will represent more of the true demand of the end-consumer (Chase, 2014). In addition to this, it will show the future demand via subscription levels in real-time, which allows for more vital demand sensing capabilities, leading to higher data quality (Bryne, 2012). Further evidence for the shift to demand sensing rather than a traditional time-series analysis is due to Easy-Source's dashboard, which is enabled via technical collaboration. The information flows are transitioning from a traditional linear process and become available for all actors in the supply chain via the cloud rather than only first-level actors (Mendes, 2011).

Since the contract currently lies between the reseller and the consultancy firm that has developed Easy-Source, the data isn't shared with Global-Tech without new collaboration initiatives. To reap the true benefits of Easy-Source's data collection, extensive organizational collaboration and technical collaboration need to be implemented, which can be challenging to realize (Zhao et al., 2002). However, Villasalero (2017) emphasizes that collaborative IT-systems can be a facilitator to drive trust. Since certain data is considered sensitive for the reseller, trust is important to reap Easy-Source's data collection benefits.

According to Partida (2020), the forecasts should be based on more data points than only sales data, especially not invoices. The data analytics should be predictive, not reactive (Bursa, 2008). Easy-Source aids with this since it monitors all of the consumers currently using the products and how long they have left on their subscription of a specific product, and therefore, it can provide new valuable data points to the forecasting process.

The new improved data points from the resellers' end-consumer give the forecasting unit deeper insights into the B2B channel partner's sales activities for the long-tail perspective. This makes the Global-Tech forecasting team in London to perform more accurate forecasts (Chase, 2014). Vereecke et al., (2018) state that information needs to move freely to enable accurate forecast, both from internal and external partners. Which, according to (Villasalero, 2017) Easy-Source will as well facilitate. Moreover, thanks to the mentioned subscription data, Global-Tech can complement the current sales data, enabling a better forecasting challenging (Chase, 2014).

Ryu et al. (2009) state that the FDDM (Forecasted Demand Distribution Method) creates the lowest total inventory levels with the highest service levels and implies that a third partner should take all actors' inventory levels and sales into consideration conducting the forecast in a high-volatility market. This implies that Global-Tech, with no internal sales offices in Sweden, can act as a third-partner and be responsible for all the forecasting instead of all individual actors conducting their forecasts according to FDDM (Ryu et al., 2009). Easy-Source further strengthens this by more enhanced data and information sharing for all partners. While Global-Tech already conducts this for their first-level partners via their product allocation, Easy-Source would facilitate the shift to a holistic product allocation (and therefore FDDM) for their long-tail operations, hence increasing total supply chain forecasting accuracy.

When assessing organizations in context to their Demand Management processes, Vereecke et al., (2018) emphasize the need for human adjustments that complement advanced forecasting results. Even though Global-Tech Sweden is already fulfilling that those forecasting assumptions and adjustments can now be performed in more detailed manner. This, since both the central and Swedish unit of Global-Tech has more detailed data regarding resellers' activities through the implementation of the Easy Source platform. All of this also benefits Global-Techs operations regarding new product launches, which constantly relies upon detailed and real-time updates of customer demand (Neubert et al., 2004).

Moreover, as Vandeursen & Mello (2014) state, one of the most significant reasons for developing the bullwhip effect is the lack of information sharing in supply chains. When the information chain stops at the distributor, a risk for increased bullwhip effects is created (Panahifar et al., 2015). Through Easy-Source the data collection can be conducted with minimal administrative activates from more actors that has not been available before. Hence, the opportunity for Global-Tech to collect data on a much more detailed scale within their B2B channel partner segment further facilitating actor collaboration, thus reducing the risks of costs such as bullwhip effects and inefficient product allocation (Vandeursen & Mello, 2014).

The reduction of variability calls for close customer relationship management and a well-established relationship with distributors (Croxton et al., 2002). Furthermore, long distances between producer and customer negatively affects the effort, making the reduction hard to achieve (Burrows, 2007). Easy-Source allows for closer end-customer contact, which leads to improved sales operations when pushing specific products and suggesting product alternatives to the end-customer when the desired product is out of stock (Dietrich et al., 2012). However there is still a problem with the production being located far away.

Reducing variability can be hard to achieve since it often demands actions to nudge consumer behavior to fit better with the organization's strategy (Croxton et al., 2002). Furthermore, depending on the context of the product or the nature of the customers in mind, those behaviors that an organization wants to address to reduce demand variability can differ heavily (Reklaitis & Pileliene 2019). When acting on a B2C market, these behaviors fluctuate even more due to a more diverse market.

In Easy-Source's case, the customers interacting at the platform are now *consumers* instead of *businesses* leading to a shift in customer behavior. When the purchasing decision is moved from a business to a consumer, more room for emotional factors in the decision making is given, instead of that the purchasing solely is decided upon rational decisions, as it often is for businesses (Mencarelli & Riviére, 2014; Reklaitis & Pileliene, 2019). When a shift from interacting with costumers on a B2B to B2C level occurs, organizations have the opportunity to perform sales and marketing activities in a much more detailed manner which allows for increased sales (Saggitarius, 2019). Additionally, Yan (2019) states that more substantial brand equity leads to more functional and emotional value on B2C-market. Since Global-Tech's products are perceived to have very strong brand equity, they will trigger these values at the B2C-market. This will provide Global-Tech a competitive advantage at Easy-Source and foster sales growth which Chase (2014) states is the overall goal of demand management.

With Easy-Source, Global-Tech can get closer to the customer and perform more detailed customer activities. For instance, Croxton et al., (2002) mention promotions as one tool for reducing variability, which Global-Tech now can perform on a consumer level, with close contact and interaction with the end-consumers of Global-Tech products with much less effort than before. With a closer connection to consumers, the organization can reap benefits from identifying the emotional factors and attribute-weights (Magids et al., 2015; Jahanbin, 2015). Moreover, they can develop CRM and CSM capabilities by building closer communication channels towards end-consumer. This will maximize customer value and enable Global-Tech to act proactively against customers issues, needs and propensities as well as suggesting alternative products, which increases sales (Kumar & Reinartz, 2012).

The proactive activities can be found within that the portal allows Global-Tech to track consumers' product choices, subscription levels, and the amount of time that products have been active. Thus Global-Tech can better anticipate when a specific customer is more open to new products and upgrades or potentially reluctant against approaches. All this increases their demand shaping capabilities (Chase, 2014).

Being proactive, also means being flexible where Hadaya & Cassivi (2007) identifies five flexibility factors To respond to market needs quickly and to cover the distribution network are two of Hadaya & Cassivi's (2007) factors for flexibility where Easy-Source can support Global-Tech through:

1. Quicker response according to market needs, enabled by real-time insights from POS-data
2. Better allocation of products to their distributors, hence facilitating better coverage of the distribution network
3. Efficiently introduce new products due to more detailed consumer data

The enabling of an integrated supply chain will lead to improvements in information quality, leading to an optimized and effective supply chain (Zhang et al., 2016). This means that Global-Tech can now take decisions with better knowledge of the partners' current situation in terms of stock levels and sales data. Since the data is mutually shared, cooperative relationships can also be built with the capability to respond against changing market requirements (Howard & Squire, 2017). Even though mutual IT-projects generally tie actors closer together, an internal will to collaborate and share this data is needed, something that isn't entirely in place between the reseller and Global-Tech today. Hence, further actions are also needed (Zhao et al., 2002).

Moving to the last step in demand management, being the measurement of performance (Croxton et al., 2002). Easy-Source may further facilitate how KPIs can be measured. For instance, leveraging more detailed data can further give Global-Tech deeper insight into sales performance, due to that the data is now real-time updated (Lapide, 2015). This leads to that Global-Tech can measure sales with better accuracy and conduct measurement against a channel that was not measured before. Moreover, with some further development they can integrate their KPIs with key partners more efficiently and increase the value of measuring collective goals (Mentzer, 1999).

Summarized, Global-Tech will gain deeper insights into a market that was too time-consuming to administrate before, giving the company more detailed data. This enables the opportunity to allocate products with better accuracy, benefiting day-to-day activities and new product launches. Moreover, sales activities might also change since there is a shift by the end-consumer from acting as a B2B sale to, through Easy-Source, a B2C. With that said, since the portal opens up the opportunity to sell products against a market with different characteristics than before, new ways are also enabled for shaping the demand towards the individual consumers at client companies. These key implications for each step of the demand management process is summarized in table 4 with organizational and technical collaboration needed to amplify this key implication:

*Table 4:Key implications and actions needed for Global-Tech*

| Demand Management process step | Key implication | Organizational collaboration Needed | Technical collaboration needed |
|---|---|---|---|
| **Collect data** | Long-tail POS and subscription data points enabled | Establish information sharing trust with Local-Res | Integrate Easy-Source's data with Global-Tech's main system |
| **Forecast** | Challenging HQ with better insights | Synchronize forecasts to implement FDDM | Share Easy-Source's data with London HQ |
| **Synchronize** | Better product allocation to sales channel partners | Jointly integrate S&OP with European HQ and Global-Dist | Integrate stock levels at all channel partners with Easy-Source |
| **Reduce variability & Increase flexibility** | Reaching individual end-consumers via all long-tail resellers | Nudge Local-Res to prioritize their products via other incentives | Allow Global-Tech to, without Local-Res admin, individualize marketing |
| **Measure performance** | Improved understanding of POS for customer satisfaction | Trust building, sharing KPIs externally and integrated them internally | Enable KPI sharing and further integration |

## 6.2. Analysis of Easy-Source's effects on Global-Dist

For the first step of the demand management process according to Croxton et al., (2002), being the data collection Global-Dist can reap the same benefits as Global-Tech in terms of data quality and information sharing. They also experience the same challenges with Local-Res regarding the information sharing and therefore collaborative initiatives and technical integration are required. Since the contract agreements lie between the reseller and the IT-Developer that produces Easy-Source, they are under no obligation to share the data with Global-Dist. Hence this needs to be developed into a more trust-based and collaborative relationship, not only for the data management but their business development in general (Kwon & Suh, 2005).

Several implications regarding forecasting are also the same as for Global-Tech. The relation between Global-Dist and Global-Tech implies that Global-Tech allocates products to Global-Dist, hence if Global-Tech's forecasting accuracy is improved, Global-Dist will experience lower inventory levels while increase product availability (Goh & Eldridge, 2009). Easy-Source will enable a shift towards stronger demand sensing capabilities since it can measure true demand in real-time and due to the increasing amount of data points in terms of a more profound and more diverse collection (Bryne, 2012). These factors allow for strong benefits on both inventory and sales and enable Global-Dist to move from a reactive demand managing to a proactive managing (Lapide, 2009).

Aviv (2001) argues for the importance of a collaborative forecasting procedure since diversified opinions and insights are needed to perform an accurate forecast. Easy-Source's

implementation provide all departments with demand information which enhances forecasting accuracy. This depends on that external partners and internal business lines are willing to share information efficiently. Internally this is enabled via breaking down current silo structures and incentivizing cross-functional collaboration over the business lines (Bryne, 2012; Gleeson, 2013). This improvement will affect the distribution business line but also the service business line regarding how many products will need to be serviced and configured. (Chase, 2014).

Easy-Source will not help with the supply shortage issue by itself. However if Global-Dist can sell more of the products via an efficient and developed demand management, which is the goal of said process (Chase, 2014), then they can acquire more products due to their increase in market share and hence mitigate their supply shortage problem. However, more demand implies that Global-Dist needs more products, resulting in shortage problems once again. Hence Easy-Source will primarily foster sales in this aspect.

The problem with not measuring true demand is that it creates a bullwhip effect throughout the supply chain, resulting in higher stock levels but not higher product availability to the end-consumer (Vandeursen & Mello, 2014). Chiang & Feng (2007) describes how lack of information sharing can lead to an inefficient synchronization in inventory levels. Easy-Source's new data points will create a much better view of the true demand, providing much more accurate manual procurement in addition to the improved allocation from Global-Tech. These two factor converge to an overall improved synchronization (Chase, 2014). However, as earlier mentioned this depends on that the resellers are willing to share their data to Global-Dist and further integrate their S&OP processes, organizationally and technically to achieve this (Aviv, 2002).

In order to manage the market more efficiently, several units are needed to jointly construct the forecast (Bursa, 2008). For Global-Dist, the distribution business line is clearly in charge of the forecasting and the procurement processes where other business units are merely receiving mentioned forecast. However, configuration services are gaining more importance for the overall revenue. Because of this, the department in charge of these value-added services needs to have a more prominent role in the forecasting process (Burrows, 2007). Global-Dist do need to actively change their intraorganizational collaboration to include more departments in the synchronization process where these departments need to have access to the same demand-data. This will reap the true benefits of Easy-Source on the synchronization process such as reduction of inventory and improved flexibility (Bozutti & Espôsto, 2018; Budd et al., 2012).

For the reducing of demand variability and increasing of flexibillity, Global-Dist increases the flexibility in their supply chain by analyzing their stock levels and sales. Based on this data Global-Dist constantly adjusts their procurement volumes hence increasing the flexibility (Hadaya & Cassivi, 2007). To gain more flexibility, Global-Dist is reliant upon the information sharing from the other actors in the form of being a distributor (Bozutti & Espôsto, 2018). Easy-Source will allow for better planning for Global-Dist, ultimately resulting in better flexibility (Burrows, 2007). The better relation and trust between Global-Dist and their resellers, the more information can be shared and therefore the more flexibility can be created.

Since Global-Dist plans their stock on sold orders to resellers, who usually also use a safety stock, it creates a bullwhip effect with too high inventory levels (Kumar et al., 2019). Too high stocks means that the warehouse spaces are not enough to cover all of the products needed to have a satisfactory product availability, but also that their credit limit will be reached earlier. These factors constraints them from ordering new, better selling products and hence reducing the flexibility of their supply chain related operations (Bursa, 2008). With Easy-Source, they can apply predictive analytics based on the new data points which will decrease inventory and increase flexibility, hence reducing costs (Chase, 2014). A final flexibility increase is that Global-Dist will handle a substantial amount of Local-Res's shipments to end-consumer and therefore stock. This decreases the total lead-times to end-consumer, reduces the total inventory levels, which improves the covering distribution network and allows a for more responsive organization, where all of these factors increases flexibility (Hadaya & Cassivi, 2007). However this once again call for an increased business integration (Bozutti & Espôsto, 2018).

The demand shaping is generally based on the supply levels of different products, where price reductions are conducted to drive demand. This can be an efficient way of reducing inventory, it isn't truly a way of shaping demand since Global-Dist is just selling products that would have been sold either way. Even though they are selling these products earlier, which reduces the working capital, they sell them at a lower price, hence lowering gross margins (Chase, 2014). This further implies that Global-Tech is not driven by demand, but rather by supply since their primary current activities focus on selling available supply rather than adjusting their supply to the demand, leading to bullwhip effects and inefficient sales operations (Lapide, 2013).

Since Easy-Source allow for POS-level consumer communication, it can communicate other alternatives that fulfill the same value and the delivery time as a wanted product, if it is out of stock. In addition to this Global-Dist will be handling an increasing amount of deliveries via Easy-Source, which results in the end-consumer demand data will be further internalized for Global-Dist, which enables better demand data and, therefore, better demand shaping capabilities, which increases sales (Marr, 2015). These orders will then more easily be measured and evaluated for future analytics and therefore contribute to the continuous improvement of the forecasting and inventory management (Chase, 2014; Croxton et al., 2002).

Another innate ability that Easy-Source will contribute is that the purchases are decentralized hence the procurement decision is moved from one responsible to all the employees at the end-company. This further indicates that the purchases of IT-hardware will be out spread over one year, instead of a one-time purchase of all computers for the company. Even though a B2C generally implies higher volatility than the B2B-market (Reklaitis & Pileliene 2019) this will not be the case here since Global-Dist won't need to cover for unplanned large purchases from individual companies but rather handle more individual buyers. Moreover, they will provide flexibility due to a higher amount as well as more specific deliveries to the end-customer, being a very important part of the demand management process (Croxton et al., 2002). One contradicting approach is that several of the larger companies are processing larger procurements during a longer time, meaning that Global-Dist has a long time to plan ahead,

however, this isn't always the case and even if this occurs, it has been difficult for Global-Dist to allocate thousands of computers for a one-time purchase, hence Easy-Source's ability to allocate the purchases over a longer time frame is alluring.

Since Easy-Source allows for stronger demand sensing capabilities, it enables a more vital understanding of demand shaping competencies (Chase, 2014). According to Lapide (2013), best practices within this field involve daily inventory and promotion management, where Easy-Source will facilitate the promotion management activities, but not the inventory management. However, if the promotions are solemnly based upon stock levels, the company is supply-driven which raises several negative effects (Chase, 2014). Hence the promotional activities must be based upon customer-specific requirements to be truly demand-driven, which Easy-Source will enable, improving the demand shaping capabilities.

For the final step of the demand management process, the measuring of performance (Croxton et al., 2002) Global-Dist as mentioned measure on the traditional distributor KPIs such as total capital tied and product availability, which according to Chase (2014) are relevant KPIs. However, Chase (2014) stresses the importance of measuring not only the right KPIs but also the right way. Currently, they measure their KPIs based upon availability to their resellers, but the more exciting and essential KPI is the availability to the end company, which they can now measure via Easy-Source. Moreover, the completed sales and product availability can, via further technical development be integrated with their inventory system which allows a more thorough understanding of how to improve these KPIs (Burrows, 2007).

In summary, the effects of Easy-Source on Global-Dist's demand management process relies heavily on improvements in their organizational collaboration, while the technical collaboration is generally satisfactory enough to withstand this change. With the current organizational collaboration, the most considerable benefits Easy-Source will bring to Global-Dist is increased sales and more stable demand. To further increase these benefits, Global-Dist will need to develop their relationships with their key resellers. Since developing relationships is a costly activity, Global-Dist needs to consider what resellers are vital for developing the potential of Easy-Source and share the right amount and type of data not to get overwhelmed and for the operations to not cost more than they create (Morgan & Hunt, 1994). These key implications for each step of the demand management process is summarized in table 5 with organizational and technical collaboration needed to amplify this key implication:

*Table 5: Key implications and actions needed for Global-Dist*

| Demand Management process step | Key implication | Organizational collaboration Needed | Technical collaboration needed |
|---|---|---|---|
| **Collect data** | End-consumer POS and subscription data points enabled | Establish information sharing trust with Local-Res | Integrate current system and with Easy-Source's data |
| **Forecast** | Increased harmonization of internal forecasts | Break down silo structure and incentivize cross-collaboration | Cross-business line technical integration |
| **Synchronize** | Better allocation from Global-Tech and enhanced procurement accuracy | Jointly integrate S&OP with Global-Tech and Local-Res | Allow inventory system to be integrated with Easy-Source and Global-Tech procurement |
| **Reduce variability & Increase flexibility** | Lower inventory and increased market responsiveness | Enhanced collaboration with Global-Tech and Local-Res | Integrate end-consumer orders with inventory management |
| **Measure performance** | Measure true implication of their KPIs | Internally unified over the business lines | Internally synchronized across business lines |

## 6.3. Analysis of Easy-Source's effects on Local-Res

For the data collection step Local-Res currently have access to the POS-data due to the fact that they are the reseller and they automatically gather the data at this level (Croxton et al., 2002, Chase, 2014). However, they do miss some insights during the customer journey, where Easy-Source can aid and therefore advance their data collection. Since the contract for Easy-Source is between Local-Res and the IT-developer, they will collect this data without any difficulties regarding the interorganizational collaboration. The only factor to consider is their franchise structure, where the management of each franchise differ a lot regarding data sharing principles. This cultural change has a lot to do with tradition, making it challenging to implement new ways of thinking (Zhao et al., 2002; Reyes, 1997). However, with specific activities from the management board, they might share the data and work collaboratively; even though the management cannot force a data-sharing culture, official guidelines are a start (Şahin & Topal, 2019). For the technical collaboration, they might be able to integrate it with their current IT-system, which would create significant benefits for overall performance (Frazelle, 2018). Due to inventory visualizing issues at different local offices and Global-Dist, the collaboration needs to develop when implementing Easy-Source to reap the full benefits.

Since the current forecasting is based on historical sales it won't generate a predictive analysis (Chase, 2014). Similarly with Global-Tech and Global-Dist, Easy-Source will allow Local-Res to actively follow their customers along their subscription time and hence facilitate the move from descriptive to predictive analysis, creating substantial value for the forecasting accuracy (Marr, 2015). The main issue to consider is if the local offices should conduct their own forecast or if it should be conducted on a national level. Since Local-Res is franchise-based, the forecasting is currently conducted per franchise; however, considerable benefits can be

achieved if the forecasting is done centrally and then communicated and discussed with local offices, even though that will demand a considerable effort to implement (Ryu et al., 2009; Zhao et al., 2002). Finally, since Local-Res does not have strong internal forecasting knowledge and advanced analytics due to size and budget constraints, they would benefit from using Global-Tech's employees if they were to forecast together with them. However, this change would need considerable organizational collaboration (Chase, 2014; Zhao et al., 2002).

Regarding the synchronization of supply with demand, considerable benefits can be achieved Local-Res is willing to share their demand data with Global-Dist. Global-Dist can then with more accuracy acquire the products from the manufacturer, which helps Local-Res in terms of product availability and reduced inventory, which leads to increased sales and profitability (Crum & Boca, 2003). However, sharing this data might be initially challenging due to relational uncertainty (Zhao et al., 2002). Easy-Source will facilitate the data sharing since it demands a higher collaboration between the actors due to the products being shipped directly from Global-Dist to the end-consumer. This formal relationship, if successful, will over time develop a stronger trust between the partners, which leads to substantial benefits (Luz et al., 2018). Villasalero (2017) also argues that the usage of mutual IT-systems provides stronger trust between the actors. A collaborative structure with high trust between the partners can co-create more substantial value with more resources than the individual firm, hence Easy-Source will advance other processes more than the inventory levels (Ahmad et al., 2016).

Easy-Source will according to its innate ability help with reducing demand variability, due to the decentralized purchases which spreads the purchases over a more extended time period for each company. It also allows for Local-Res to actively push the different customers when their subscription time is about to end and therefore the ability to both predict more accurately and actively sell more increases which are both in line with the overall goals of demand management (Chase, 2014). Even though demand variability is generally hurting a business due to uncertainty in planning and inventory level fluctuations, this is an ongoing process in most industries (Burrow, 2007). This means that even though Easy-Source allows for certain variability reduction, a company must constantly develop its abilities to handle this variation via more accurate forecasts and increased flexibility (Burrows, 2012).

For the increase of flexibility, Local-Res's biggest concern is their distributor product availability. This problem will partly be solved by Easy-Source, since more and more products will go directly from their distributor to the end-customer where Local-Res merely will act as true middleman and agent for the transaction. The reduced inventory will lead to less monitoring and decreased costs (Aviv, 2001). Furthermore, Easy-Source accomplishes reduced lead times by reducing intermediaries and allowing Local-Res to act as an agent, which increases the flexibility (Lapide, 2009). However, this depends heavily on the possibility on the information sharing from Local-Res and that they are able to handle this communication smoothly with the distributor (Ryu et al., 2009). If the current CRM system can be integrated with both Easy-Source and Global-Dist's internal system it aid the general supply chain operations, hence further increase the flexibility (Zhang et al., 2016).

Easy-Source allows the customer to be grouped based on their behavior and preferences rather than first-level demographics, which implies a more true view of customer demand over time. While Easy-Source has this possibility, actions are still needed on both a technical and an organizational level in order to specify product offerings to better match the information that Easy-Source supplies (Burrows, 2007). These product offerings need to act in general day to day operations but also when there is a shortage of a certain product Easy-Source can offer an alternative product at the POS, increasing demand shaping (Chase, 2014). Since Easy-Source will enable these value spaces, they can develop their CRM-system, partly for the segmentation but also for customer service and contact (Kumar & Reinartz 2012). This combination of value spaces and CRM can create excellent customer relationships that enable a more clear process to develop customers relationships and increase the demand shaping capabilities, therefore sales (Kumar & Reinartz 2012). The CSM capabilities follow an improved CRM-process where Easy-Source will allow for an enhanced information flow in real-time, creating stronger capabilities to handle customer demands and inquires, hence increasing sales (Bolumole et al., 2003).

The final part of the demand management process is the measuring of the process's performance. They are currently both measuring internal and external KPIs, where the external will be mostly affected by the implementation of Easy-Source. Since Easy-Source allows for system integration, external KPIs will be easier to measure and follow up on (Frazelle, 2018). Moreover, Easy-Source will allow for a better understanding of end-consumer usage which is an important KPI for Local-Res.

In summary, Easy-Source will allow Local-Res to handle an ever-increasing demand variation both via increased forecasting accuracy, demand shaping and increased supply chain flexibility in terms of outsourced logistics to Global-Dist consisting of warehousing and product shipments. However, as for earlier actors, its success depends heavily on increased collaboration and sharing of information. This collaboration will partly be derived from the implementation of Easy-Source but also demands active participation from the actors in the chain. The key implications for each step of the demand management process are summarized in table 6 with organizational and technical collaboration needed to amplify this key implication:

*Table 6: Key implications and actions needed for Local-Res*

| Demand Management process step | Key implication | Organizational collaboration needed | Technical collaboration needed |
|---|---|---|---|
| **Collect data** | Complement existing POS with subscription | Internal sharing of data between franchises and HQ | Integrate current systems with Easy-Source |
| **Forecast** | Higher accuracy due to improved data | Franchises need to let the HQ handle the main forecasts | Improve current internal data sharing technology |
| **Synchronize** | Better product allocation from Global-Tech | External information sharing to both Global-Dist and Global-Tech | Enhanced real-time data sharing to Global-Dist & Global-Tech |
| **Reduce variability & Increase flexibility** | Improved shaping activities, outsourced logistics to Global-Dist | Improved communication and overall collaboration with Global-Dist | Integrate customized consumer ordering system with Global-Dist |
| **Measure performance** | Enabled tracking of end-consumer usage | Internally harmonized KPIs between the franchises | Integrate internal measurement systems |

## 6.4. Summary of Easy-Source's implication on the Demand Management Processes

Table 7 summarizes Easy-Source's possible implication on each actor's demand management process. Furthermore, the key actions that are needed for the entire chain to reap the implications are also identified. The possible implications for the actor's step in the process are graded as high, medium and low. High corresponds to a high impact upon the process, indicating that significant value can be reaped in that specific step. Medium corresponds to some degree of effect upon the process step. Low corresponds to a minimal effect.

For the data collection, Easy-Source will enable the opportunity for all of the actors to reap benefits of having both POS-data as well as subscription data generated from customers (Chase, 2014; Marr, 2015). However, Local-Res already possessed POS-data, due to their direct sales to customer, but may now track them more closely through subscription times, leading to a medium impact. However, these key points rely upon the fact that Local-Res share their data upstream and allow for information sharing towards Global-Tech and Global-Dist. Regarding forecasting, the implications are high for both Global-Tech and Global-Dist since the new amount of data points enables the organizations to perform forecasting with better accuracy (Chase, 2014). For Local-Res the implications are slightly less, but still significant since their forecasting is now complemented by subscription data. However, to truly reap full forecasting benefits for the whole chain, actors needs to jointly unite their forecasting for creating a holistic supply chain. In the synchronization step, Global-Tech will be able to more accurately allocate their products which leads to that Global-Dist will receive more precise products whereas Local-Dist will then also be satisfied. To succeed in this, excellent inter and intraorganizational collaboration is needed. Moreover, since direct customer contact is enabled with the portal, demand variability can be addressed through demand shaping activities, affecting all actors (Chase, 2016). Multiple capabilities of increasing flexibility are also reached though enhanced demand sensing optimized stock levels as well as direct deliveries to

customer form Global-Dist (Chase, 2014; Lapide, 2009; Aviv, 2001). The portal will allow for enhanced KPI tracking since more detailed data is available. However, these KPI's needs to be internally and externally aligned in the chain for reaping full benefits.

*Table 7: Summarization of Easy-Source's implications and actions needed*

| Demand management processes | Global-Tech | Global-Dist | Local-Res | Key actions needed |
|---|---|---|---|---|
| **Collect Data** | High | High | Medium | Improved information sharing from Local-Res. |
| **Forecast** | High | High | Medium | Unified forecasting for all actors and departments. |
| **Synchronize** | High | High | High | Increased external and internal involvement. |
| **Reduce variability & Increase flexibility** | High | High | High | Global-Dist handle logistics. Better insight in actors stock levels |
| **Measurement** | Medium | Medium | Low | External and internal consensus regarding KPI's |

Moreover, the figure 5 shows the connection between the possible effects of Easy-Source for each actor and how they lead to the final result of Easy-Source's implications on the demand management process, being increased profitability.

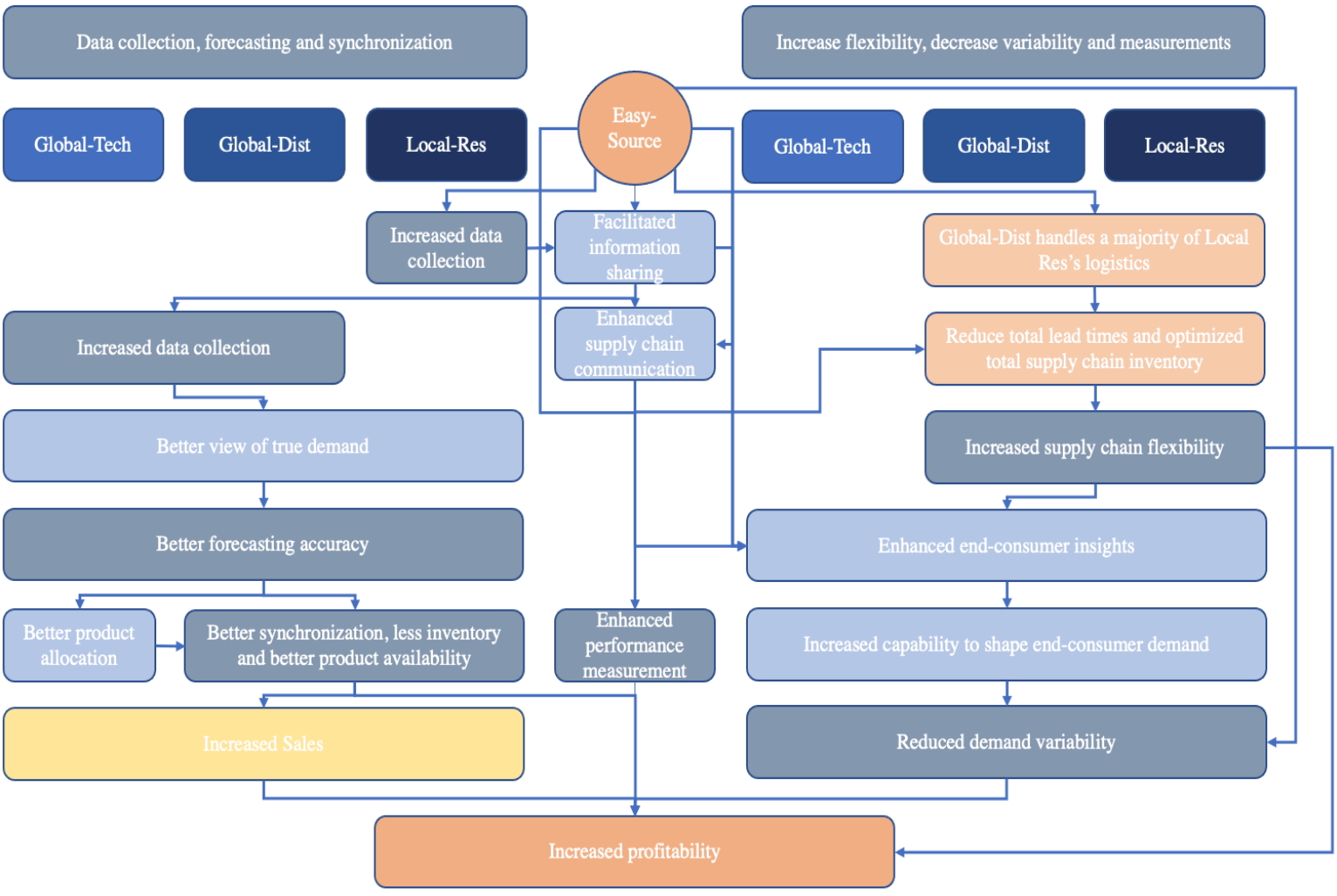


*Figure 5: Implications of Easy-Source*

The left side describes the first three parts of the demand management process and the right side the final two (increase flexibility and decrease variability being the same part of the process). The left side starts with the increase data collection at Local-Res in combination with the facilitated that Easy-Source will enable (Villasalero, 2017; Chase, 2016). These factors will enable increased data collection for Global-Tech and Global-Dist (Partida, 2020). The holistically increased data collection and information sharing will give all actors a better view of the true demand which will increase the forecasting accuracy (Mendes, 2011). The forecasting accuracy enhancements will allow Global-Tech to better allocate their products and therefore enhance the synchronization for both Global-Dist and Local-Res, the forecasting accuracy will also improve the synchronization in itself of Global-Dist and Local-Res. The enhanced synchronization leads to optimized inventory which is both reduced and has increased product availability, allowing for increased sales and reduced costs, leading to increased profitability (Chase, 2016; Croxton et al., 2002; Bozutti & Espôsto, 2018).

The right part has two main parts, where the current idea is that Global-Dist will handle a majority Local-Res's logistics department. This centralization together with increased information sharing and supply chain communication will reduce the total lead times to end-consumer, and optimized total inventory for the supply chain partners (Partida, 2020). Since the inventory can be optimized, Global-Dist and Local-Res can increase their flexibility, since they will more seldom reach their credit limit and inventory space (Croxton et al., 2002). Easy-Source allow for deeper end-consumer insights and together with supply chain as well as end-consumer communication, all actors can shape the demand at the POS-level. Primarily this can be achieved via proposing an alternative product if the originally wanted product is out of stock. These demand variability decreases will lead to a reduced overall cost for both Global-Dist and Local-Res (Croxton et al., 2002). Also, Easy-Source will via its innate ability reduce the demand variability since the purchases will be decentralized to individual consumers and therefore bulk orders are believed to be spread out over an entire year. Finally, the performance measurements can be increased due to better data collection, information sharing and communication.

## 6.5. Analysis of the actors can transition to a Demand-Driven CPFR with Easy-Source

Before reaching a demand-driven CPFR, the supply chain needs to internalize a demand-driven demand management process. In addition to this the four factors of a demand-driven organization described by Chase (2014) need to be applied.

The demand-driven forecasting, S&OP and performance measurement together cover the five steps of the demand management process (Croxton et al., 2002). The demand-driven forecasting includes extensive demand translation, sensing, shaping, shifting and orchestrating capabilities (Chase, 2013). Depending on the collaboration, Easy-Source will enable this via its ability to collect higher quality data, increase information sharing as well as communicate better with the end-consumer. Furthermore, the same key points allow for the demand-driven S&OP, which entails flexible market responsiveness, close department and actor collaboration,

proactive operations and acknowledges demand volatility (Bozutti & Espôsto, 2018). Finally, the demand-driven performance measurement is facilitated primarily by the data-collection, information sharing and deeper collaboration (Smith, 2014).

In complement to this, Chase's (2014) four areas for becoming a demand-driven organization being people, processes, analytics and technology, the same key points will accomplish the overall demand-driven capabilities. The people will need to spend less time on structuring data, and more on analyzing it, these employees will also need to have solid knowledge within supply chain, as well as advanced analytics. Easy-Source will facilitate the administration of data collection, allowing the employees to spend more time on analytics and less on the data structuring. Moreover, if collaboration is increased the actors in the supply chain can utilize Global-Techs globally competitive workforce within this area. The processes include a constant incentive to work collaboratively with synchronized operations, where the Easy-Source implementation may strengthen this since increased collaboration is needed to reap the full potential of the platform. The analytics will need to be predictive where Easy-Source will enable better data on an individual consumer level as well as visualizing subscription time data instead of only sales data. This provides the analytics function with better input data, allowing them to work predictively instead of reactively. The technology needs to handle more data and integrate it with the different actors. Easy-Source will allow for smoother information sharing and individual consumer communication, but will demand new initiatives for the supply chain to reach this collaboration fully.

The implication of Easy-Source's implementation on the entire supply chain to becoming demand-driven are summarized in table 8 down below, where the green cells are direct effects of Easy-Source, the yellow cells are effects that can be reached with low effort due and the red cells indicates effects that demand higher efforts on increased collaboration. The color coding is based on the supply chain's current collaboration.

*Table 8: Implications of Easy-Source's implementation on the entire supply chain to becoming demand-driven*

| | **People** | **Processes** | **Analytics** | **Technology** |
|---|---|---|---|---|
| **Collect data** | Demand analysts spend less time on data structuring | Facilitated end-consumer level data collection | | Integrated data collection for all actors |
| **Forecast** | The same forecasting employees may be used for all actors | Unified view of what to forecast, and how to forecast it | Better quality demand data for all actors enables higher accuracy | Facilitated sharing of information needed for forecasting |
| **Synchronize** | Employee involvement from all actors and departments in S&OP | Organizationally Integrated S&OP | Improved allocation due to integrated data | Technologically Integrated S&OP |
| **Reduce variability & increase flexibility** | Holistic approach towards proactive activities | Enabled structures for joint demand shaping activities | Enhanced consumer knowledge | Personalized offerings to end-consumer |
| **Measure Performance** | Better linked to demand-driven factors for all personnel | Same performance measurements for all | Better connection to balance sheet | Sharing of other actors performances |

Since the actors with the help of Easy-Source and some initiatives for external and internal collaboration will become demand-driven in their demand management processes they are ready to make the shift towards a demand-driven CPFR. Companies can achieve a CPFR without being demand-driven or having demand management processes but to adopt a demand-driven CPFR both of these factors are a necessity.

Facilitating a shift towards a CPFR orientated supply chain entails organizations to communicate and collaborate fully across company borders for fostering efficient, economical, and customer-centric operations (Vandeursen & Mello, 2014). Reaching a Demand-Driven CPFR further calls for Demand Management processes, where every step is demand-driven, regarding all actors in the chain in combination with both organizational and technological collaboration. This will foster not only streamlined operations through the excellent performance of CPFR (Vandeursen & Mello 2014) but also by fostering sales growth with demand-driven factors as focus (Chase, 2016). Easy-Source opens up for various value creation throughout the Supply Chain for every actor, not only regarding the demand management, which will be analyzed in its ability to enable the transition towards a demand-driven CPFR environment. This analysis will be based upon Vandeursen & Mello's (2014) framework, consisting of 10 steps in how to implement CPFR within a supply chain.

The first step of the framework is the *Definition of Partnership Opportunities*, whose actions revolve around identifying partners and highlighting opportunities for every partner in the chain that they can reap from the CPFR initiative (Vandeursen & Mello, 2014). For this step,

Easy-Source will not bring any direct additional value creation since the portal is jointly initiated and developed between Global-Tech and the participants in the DPP. With that said, the construction of the portal, and one clear goal of it, has been to support and facilitate the operations of Global-Tech's resellers and distributors, hence, initiatives regarding potential partners and their opportunities as well as the potential output of the portal are in place. This means that Easy-Source indirectly affected this step, where it helped to define the partnerships opportunity in terms of the development of the portal and similar activities.

The next step in Vandeursen & Mello's (2014) roadmap for CPFR implementation is the *Understanding of Business Drivers*, where a clear understanding of partner's business drivers is established, future expenses for the actors are set, and the commitment of investments in shared forecasts are commonly agreed upon. Once again, the portal will not bring any direct values for facilitating this step since the portal won't assist in how the supply chain actors may take decision regarding their partnership and agendas. However, indirectly it may since the portal opens up for information sharing between actors. Hence, the opportunities of reaping supply chain IT integration as well as data collection and analytical benefits. With IT integration, the velocity of data sharing can be increased to enable real-time updates towards the end-consumer and between the actors in the supply chain (Yu et al, 2020; Chase, 2014). This allows for a better understanding of business drivers in the supply chain and what actions are needed to be taken, since statuses for both partners and consumers are real-time updated. Moreover, the costs of sharing, communicating and accessing data for the actors higher up in the chain decreases which reduces the hinders to invest in shared forecasts (Devaraj et.al 2007). However, if the mentioned collaboration capabilities are developed, FDDM can be implemented, which once again, mitigate hinders of investment in shared forecasts (Ryu et al., 2007). This leads to facilitated investment processes, which in turn leads to a better understanding of business drivers for all actors involved.

In the third step, the *Integration of S&OP and Other Business Processes*, the supply chain actors should incorporate cross-organizational functions, where S&OP and, for instance, budgeting processes are mutually orchestrated (Vandeursen & Mello's 2014). As of the current state, all of the actors have S&OP processes, internally, ready at their organizations. This makes the chain ready to fulfill step three in the CPFR implementation roadmap internally, however not externally due interorganizational aspects (Vandeursen & Mello 2014). From a power perspective, it is Global-Tech that determines the supply levels for both the distributor and reseller, due to power imbalances, the integration of S&OP is complicated.

For a CPFR environment to thrive, it is of utmost importance that visibility is enabled between all actors in the chain (Panahifar et al., 2015), facilitating the before mentioned free information flow that enables co-collaboration and efficiency (Crum & Boca, 2003). Hence, Easy-Source may not directly affect this step in the roadmap of CPFR implementation, it is up to the actors to enable free flow of information so that that the portal, as well as a CPFR environment, can thrive in the best manner. By that, the call for excellent technical and organizational collaboration in order to optimize the transition towards a CPFR environment. Those collaborations will be dependent upon structures that promote a culture and trust for enabling

flow of information, needed to both facilitate the shift towards CPFR and reap the most value from Easy-Source (Panahifar et al. 2015). Indirectly, Easy-Source can, as mentioned, assist this aspect since the usage of information sharing IT-systems facilitates trust, mitigates conflict of interest, and strengthens engagement between partners (Villasalero, 2017; Liou et al., 2015).

Furthermore, the fourth step in the roadmap for implementation the CPFR is the *Definition of Success Metrics*, where overall KPIs, and the measurement of them, are established (Vandeursen & Mello's 2014). Here, Easy-Source can have a possible effect on the shift to a CPFR. This need the interconnection of actors to the same system and portal, hence the alignment of incentives since multiple actors can, collectively or independently, observe performance (Simatupang et al., 2004). This is enabled through the dashboard function of the portal, making the actors able to access information from each other as well as from the end-consumer, with low latency but demand further technical and organizational collaboration.

The benefits of Easy-Source's impact upon the fourth step in a CPFR implementation go in line with the fifth step, being the *Reconciliation of Benefits*. Easy-Source can promote this part of the implementation roadmap by enabling data collection for mutual documentation. Individual and collective benefits come in the same way as the previously mentioned opportunities to conduct holistic KPI's towards end customers. Easy-Source is an important key for the implementation of CPFR since it not only gives Global-Tech an insight towards an actor that was not accessed before, but also that it connects and intervein the multiple supply chain partners. This, so that they can process the same information, hence then enhancement of performance visualization in the chain (Simatupang et al., 2004). When data and performance is visualized, reconciliation of benefits is assisted (Vandeursen & Mello's 2014). This is important since that in a technical collaboration, granular data needs to be divided between all actors in the chain (Marr, 2015), reaping learning mechanics (Şahin & Topal, 2019) but also gaining insights for better planning and execution of operations (Huang et al. 2016).

The sixth step of the CPFR implementation step is the *Definition of Ground rules*, where the actors need to incentivize themselves from acting individually to collectively to challenge traditional supply chain processes (Vandeursen & Mello 2014). Implementing CPFR will not be reached if there is no coherent and free flow of information between the actors (Vandeursen & Mello 2014). Currently, there is a lack of information flow between the actors, which may disorientate the efficiency of CPFR in the chain. The portal has huge potential in this area for all actors that is dependent upon collaboration, where the mere implementation of it calls for an improved collective mindset and the exclusion of independent agendas (Villasalero, 2017).

The seventh step in the CPFR implementation, according to Vandeursen & Mello (2014), is the *Determination of Data Sets for Collaboration*, where the portal itself will not facilitate this step directly. Instead, it up to the actors within the supply chain to determine this. Nevertheless, as mentioned in the 2nd step, if excellent organizational & technical collaboration is established between partners in the chain, the portal will enable further and more detailed insights into a market than before, hence better understanding of market characteristics and by that receiving the knowledge of what data that is needed for addressing those characteristics.

Regarding the eighth step, *the Sourcing of a Flexible and Secure platform* that meets the requirements of CPFR (Vandeursen & Mello (2014), the step is already met due to that the portal is jointly developed, mutually between the actors, and now implemented in the chain. Since Easy-Source is meant to address the customers of SME's within Global-Tech's DPP program, the horizon of the initiative is long, with engagement from all actors, which fulfills the two last steps, step nine & ten, of a CPFR implementation that is the *engagement in implementation & rollout* as well as the *evaluation and securement for further expansion & development*. (Vandeursen & Mello 2014).

To conclude, there are multiple aspects of Easy Source that will facilitate the CPFR-implementation. These aspects include facilitated information sharing, more detailed data collection as well as indirect collaboration aspects. However, some obstacles need to be addressed regarding the collaboration between partners where the disconnected information flow currently jeopardizes a well-executed demand-driven CPFR implementation. Here, both organizational and technical collaboration is needed to enable a free flow of information between all actors in the supply chain, which also will be indirectly affected by Easy-Source. The implications of Easy-Source's implementation to CPFR is summarized in figure 6:

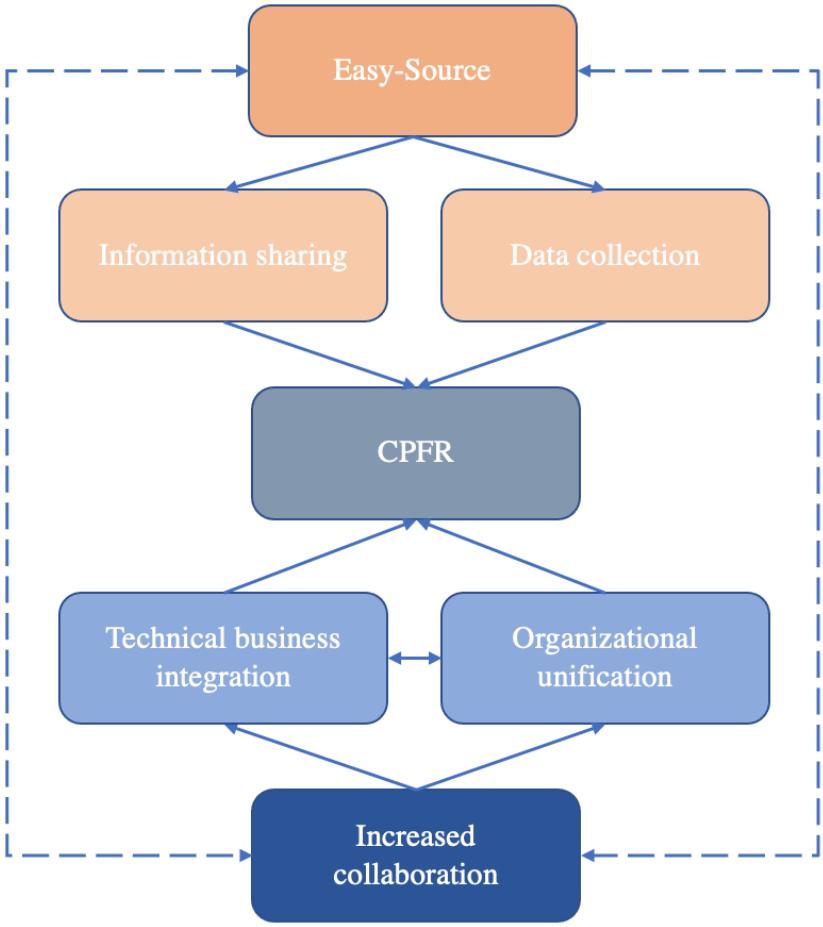


*Figure 6: Easy-Source's implications on a CPFR implementation*

# 7. Conclusion

In this study, demand management has been viewed from the traditional and demand-driven perspective, as well as how the transition can be made to a demand-driven CPFR. The resulting model was then concretized for a supply chain case where a new IT-platform has been implemented and how that platform would affect said transition. The results of the study are synthesized under corresponding research questions below.

*RQ1: What implications will Easy-Source portal have on the Manufacturer's, Distributor's and Reseller's Operational Demand Management process?*

The manufacturer will experience developed insights into a market wasn't very accessible earlier with very low administrative input. Furthermore, they will be able to allocate products with better accuracy due to enhanced data collection and increased information sharing. Easy-Source will also facilitate better collaboration with key channel partners, but other initiatives are also needed to reap the full benefit of the platform. Additionally, due to its product nature and brand equity, revenue might increase, both in terms of all around sales and add-on purchases due to the shift from a B2B market to a B2C market.

The distributor might gain increased revenue and market share due to increased demand sensing and shaping, hence an increase production allocation from the manufacturer. However due to its increased market share, they will still experience supply shortages. Since Global-Tech will have better knowledge of the final customer demand, they will allocate products towards with better precision leading to Global-Dist. These implications will also allow for decrease credit limit and optimized warehouse space which will imply enhanced opportunities for moving high-demand products and therefore less inventory of unsellable products. If the collaboration is increased with the reseller they can collect POS-data and subscription data, which allows for a more true view of demand compared to only invoices. This will lead to further optimized inventory management when synchronizing demand with supply. Through Easy-Source, they might handle an increasing amount of the shipments to the end-customer instead of shipping to reseller which would decrease total lead-times to end-consumer. Due to the new shipment agreement they will internalize consumer data, and are therefore able to further optimize their inventory levels.

The reseller will optimize their customer relationship management through enhanced insights during the customer's subscription period. More importantly they will be able to mitigate the current supply shortages due to the enhanced data insights if they communicate this to Global-Tech and Global-Dist. This will give the distributor and manufacturer a more accurate view of the true demand and thereby better product allocation. Furthermore via this information sharing to Global-Tech, Local-Res have the possibility to utilize Global-Tech's forecasting ability and therefore reap the benefits of a much more sophisticated forecasting system. The inventory levels will also be optimized since Global-Dist might be responsible for an increasing amount of the shipments, which can be optimized via business integration. Finally, Easy-Source will enable a better internal collaboration, especially between the franchises and can reach benefits beyond the inventory levels and forecasting ability such as promotional activity and best

practice benchmarking. In summary due to better customer knowledge, relationships and enhanced product availability Easy-Source might implicate higher revenue for the reseller.

*RQ2: How will Easy-Source facilitate the shift towards a demand-driven CPFR?*
Regarding the demand-driven aspects, Easy-Source's effects relate primarily to the POS and subscription data-collection where all actors can collect true demand data, given increased collaboration. Moreover, this detailed data can be visualized in real-time which generates demand sensing capabilities. This goes in line with the facilitated overall information sharing and communication where the distributor and manufacturer can perform demand shaping activities at the end-consumer level instead of through the reseller. For the demand-driven S&OP, the central issue regards extensive collaboration to handle and manage volatile demand where Easy-Source will unify the actors. Furthermore, the mentioned shaping and sensing capabilities together with the increased collaboration, the actors can handle the volatile demand more efficiently. Finally, for the demand-driven measurement, the POS sales enabled by Easy-Source will need to be integrated across the actors as well as connected to inventory levels.

There are multiple aspects of Easy Source that will enable a demand-driven CPFR environment, first of all the information sharing part of Easy-Source will affect most of the steps for the implementation of the CPFR as will the data collection. Easy-Source will not affect the understanding of business drivers, and therefore it is necessary to drive organizational collaboration beside the mutual commitment of Easy-Source. It is already a flexible and secured platform that meets the requirements of a CPFR platform.

The demand-driven factors together with the CPFR implementation creates a demand-driven CPFR which compared to the traditional demand management process generates substantial benefits for all actors in the supply chain.

These results indicate that information technology can help, to a certain degree, to enhance partnerships but the network is still dependent on the sharing of sensitive data as well as general trust and willingness to work collaboratively. As seen in the case, sharing sensitive data is not something that is taken for granted, but according to Zhao et al. (2002) and as seen in the case this is an obstacle that needs to be handled in order to drive supply chain integration and therefore performance. However mutual IT-projects can help with the trust issues but still needs overall strong collaborative processes and culture to generate significant results (Villasalero, 2017; Liou et al., (2015). Finally, the only true demand is shown at POS-level and not working with this will create huge bullwhip effects throughout the supply chain and if the reseller is not sharing this data, it will hurt them in the end due to supply constraints.

These results matter because it can be applied to several different industries which have similar characteristics. For instance, industries with similar complex supply chains may gain inspiration, from this case study, in how the utilization of a joint developed IT-platform may help in solving advanced supply chain problems. Additionally, due to issues such as bullwhips effects, sensitive information sharing and individual agendas, supply chains are suboptimized

and this report will provide deeper understanding on how to mitigate those issue and transition from them.

Further research should focus further back in the supply chain, especially on the production levels where this case has only treated a production that is constantly at full capacity. This study upon a Swedish supply chain for further depth it should be refocused on a larger geographical level to understand the full potential of Easy-Source but also similar shifts from demand management to demand-driven CPFR. Further research of interest could be on other markets outside the consumer electronics case, especially on the car leasing market where lots of companies have leasing agreements where the employees already act as if they were on a consumer market. In general, the shift from demand management processes to a demand-driven CPFR should be researched on other very different markets where the products are radically different from the consumer electronics products.

The actors described in this report should focus on developing their collaboration, both technological and organizational as well as inter and intra; the actors should evaluate and take initiatives within this field. First of all, the intra perspective needs to be evaluated since it is generally easier to start within the organization than externally. When this is improved according to the demand-driven factors, the external part should be considered. The technical and organizational aspects should be improved parallelly since technical collaboration can improve organizational collaboration, but technical collaboration depends on a specific organizational collaboration. This is more true for the external collaboration than for the internal. In order to maximize the value of Easy-Source, the organizations need to consider these areas. These steps include facilitating collaboration structures as a start, allowing for collaboration-oriented processes, which will enable a more collaborative culture if they are successful. When the collaborative culture has been enabled between all partners, issues such as sensitive data sharing and specialization within the supply chain will be truly enabled, which will benefit all three partners involved. The actors can use this report as a tool for the first, most significant actions needed to drive the transformation from their current demand management processes to a holistic demand-driven CPFR.

# References

Abdullah, Z., & Musa, R. (2014). The effect of trust and information sharing on relationship commitment in supply chain management. Procedia-Social and Behavioral Sciences, 130, 266-272.

Adler, P., Heckscher, C., Prusak, L. (2011) Building a Collaborative Enterprise. Harvard Business Review, July-August 2011, 266-272

Ahmad, F., & Huvila, I. (2019). Organizational changes, trust and information sharing: an empirical study. Aslib Journal of Information Management, 71(5), 677-692.

Alicke, K., Glatzel, C., Karlsson, P. M., Hogberg, K. (2016). Big data and the supply chain: The big-supply-chain analytics landscape. McKinsey & Company.

Andries, D., Simchi-Levi, D. (2017). Supply Chain Analytics: How High Tech Can Meet Speed, Revenue and Cost Goals. MIT Sloan Management Review, Cambridge, MA, 10 August, 2017.

Ávila, P., Lima, D., Moreira, D., Pires, A., & Bastos, J. (2019). Design of a Sales and Operations Planning (S&OP) process–case study. Procedia CIRP, 81, 1382-1387.

Aviv, Y. (2001). The effect of collaborative forecasting on supply chain performance. Management science, 47(10), 1326-1343.

Ayers, J. B. (2006). Handbook of Supply Chain Management. 2 vyd.

Bolumole, Y., Knemeyer, M., Lambert, D. (2003). The Customer Service Management Process. The International Journal of Logistics Management, 14(2), 15-31

Bozutti, D. F., & Esposto, K. F. (2019). Sales and Operations Planning: a comparison between the demand-driven and traditional approaches. International Journal of Production Management and Engineering, 7(1), 23-38.

Budd, J., Knizek, C., & Tevelson, B. (2012). The Demand-Driven Supply Chain, Making it Work and Delivering Results.[Online] Boston Consulting Group.

Burrows III, R. P. (2007). Demand driven S&OP: a sharp departure from the traditional ERP approach. Journal of Business Forecasting, 26(3), 4-13.

Burrows, R.P. (2012). The Market-Driven Supply Chain: a revolutionary model for sales and operations planning in the new on-demand economy. New York: AMACOM - American Management Association.

Bursa, K. (2008). How to effectively manage demand with demand sensing and shaping using point of sales data. The Journal of Business Forecasting, 27(4), 26.

Byrne, R. F. (2012). Beyond Traditional Time-Series: Using Demand Sensing to Improve Forecasts in Volatile Times. Journal of Business Forecasting, 31(2).

Cachon, G. P. (2003). Supply chain coordination with contracts. Handbooks in operations research and management science, 11, 227-339.

Cagliano, R., Caniato, F., & Spina, G. (2006). The linkage between supply chain integration and manufacturing improvement programmed. International Journal of Operations & Production Management, 26, 282-299

Chase, C. W. (2016). Next generation demand management: People, process, analytics, and technology. John Wiley & Sons.

Chase Jr, C. W. (2000). Modeling the Supply Chain Using Multi-tiered Causal Analysis. Journal of Food Distribution Research, 31, 9-13.

Chase, C. W. (2013). Demand-driven forecasting: a structured approach to forecasting. John Wiley & Sons.

Chiang, W. K., & Feng, Y. (2007). The value of information sharing in the presence of supply uncertainty and demand volatility. International journal of production Research, 45(6), 1429-1447.

Chopra, Sunil, et al. (2001). B2Be-Commerce Opportunities. Kellogg School of Management, Northwestern University, 5(3), 50-58

Christopher, M. (2000) The agile supply chain. Industrial Marketing Management 29(1), 37-44

Croxton, K. L., Lambert, D. M., García-Dastugue, S. J., & Rogers, D. S. (2002). The demand management process. The International Journal of Logistics Management, 13(2), 51-66.

Crum, C., & Boca, G. E. (2003). Demand management best practices: process, principles, and collaboration. J. Ross Publishing.

Dietrich, B., Ettl, M., Lederman, R. D., & Petrik, M. (2012). Optimizing the end-to-end value chain through demand shaping and advanced customer analytics. In Computer Aided Chemical Engineering 31, 8-18

Devaraj, S., Krajewski, L., & Wei, J. C. (2007). Impact of eBusiness technologies on operational performance: the role of production information integration in the supply chain. Journal of Operations Management, 25(6), 1199-1216.

Dudovskiy, J. (2016). The ultimate guide to writing a dissertation in business studies: A step-by-step assistance. Pittsburgh, USA, 51.

Goh, S. H., & Eldridge, S. (2019). Sales and Operations Planning: The effect of coordination mechanisms on supply chain performance. International Journal of Production Economics, 214, 80-94.

Flint, D. J., Larsson, E., & Gammelgaard, B. (2008). Exploring processes for customer value insights, supply chain learning and innovation: an international study. Journal of business logistics, 29(1), 257-281.

Frazelle, E. H. (2018). Supply chain strategy: Unleash the power of business integration to maximize financial, service, and operations performance. McGraw-Hill Education.

Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. Journal of operations management, 28(1), 58-71.

Li, G., Yu, G., Wang, S., & Yan, H. (2017). Bullwhip and anti-bullwhip effects in a supply chain. International Journal of Production Research, 55(18), 5423-5434.

Gleeson, B., & Rozo, M. (2013). The silo mentality: How to break down the barriers. Forbes, 2 Oct, 2013.

Glowacki-Dudka, M., & Murray, J. (2015). Strategies to encourage a sustainable interorganizational collaborative culture. New Horizons in Adult Education and Human Resource Development, 27(1), 3-14.

Gollamudi, R. (2013). Demand Driven S&OP–Maximizing Output To Match Demand Variation. BristleCone: Your Supply Chain Optimized, 7(1), 23.

Groom, Brian. (2010). Consumer Behaviour Harder to Predict. *Financial Times*, 7 Feb. 2010.

Hadaya, P., & Cassivi, L. (2007). The role of joint collaboration planning actions in a demand-driven supply chain. Industrial Management & Data Systems 107(7), 954-978.

Harper, N. “How Manufacturers Are Transitioning from B2B to B2C.” Saggitarius, 30 July 2019.

Holweg, M., Disney, S., Holmström, J., & Småros, J. (2005). Supply chain collaboration:: Making sense of the strategy continuum. European management journal, 23(2), 170-181.

Hoque, M., Mohammadi, H. Journal of Strategic Innovation & Sustainability, 2019, 14(5), 36-50.

Huang, Y. S., Li, M. C., & Ho, J. W. (2016). Determination of the optimal degree of information sharing in a two-echelon supply chain. International Journal of Production Research, 54(5), 1518-1534.

Hussein, B. A., & Hafseld, K. (2013). Impact of organizational factors on information system project. In 2013 IEEE 7th International Conference on Intelligent Data Acquisition and Advanced Computing Systems (IDAACS) 2, 591-596. IEEE.

Gunasekaran, A., Howard, M., & Squire, B. (2007). Modularization and the impact on supply relationships. International Journal of Operations & Production Management 27(11), 1192-1212

Jahanbin, S. (2015). The Impact of Consumer and Product Characteristics on Change in Attribute-Weights over Time and its Implications for New Product Sales Forecasting Using Choice-based Conjoint Analysis (Doctoral dissertation, University of Bath).

Kaipia, R., Holmström, J., Småros, J., & Rajala, R. (2017). Information sharing for sales and operations planning: Contextualized solutions and mechanisms. Journal of Operations Management, 52, 15-29.

Kumar, V. and Reinartz, W. (2012) CRM: concept, strategy, and tools. Singapore: Springer

Kwon, I. W. G., & Suh, T. (2005). Trust, commitment and relationships in supply chain management: a path analysis. Supply chain management: an international journal.

Lapide, L. (2005). Sales and operations planning Part III: a diagnostic model. The Journal of Business Forecasting, 24(1), 13-16.

Lapide, L. (2013). Supply's demand-shaping roles. The Journal of Business Forecasting, 32(3), 18.

Lapide, L. (2009). The S&OP Rudder. Supply Chain Management Review, 13(2), 4-6.

Lehtonen, J. M., Småros, J., & Holmström, J. (2005). The effect of demand visibility in product introductions. International Journal of Physical Distribution & Logistics Management, 35(2), 101-115.

Li, G., Yu, G., Wang, S., & Yan, H. (2017). Bullwhip and anti-bullwhip effects in a supply chain. International Journal of Production Research, 55(18), 5423-5434.

Li, S., & Lin, B. (2006). Accessing information sharing and information quality in supply chain management. Decision support systems, 42(3), 1641-1656.

Lilien, G. L. (2016). The B2B knowledge gap. International Journal of Research in Marketing, 33(3), 543-556.

Liou, D. K., Chih, W. H., Hsu, L. C., & Huang, C. Y. (2016). Investigating information sharing behavior: the mediating roles of the desire to share information in virtual communities. Information Systems and e-Business Management, 14(2), 187-216.

Magids, S., Zorfas, A., & Leemon, D. (2015). The new science of customer emotions. Harvard Business Review, 76, 66-74.

Marr, B. (2015). Big Data: Using SMART big data, analytics and metrics to make better decisions and improve performance. John Wiley & Sons.

Melanie Chan. "Identifying the Key Differences between a B2B and B2C Supply Chain." Unleashed Software, 14 Apr. 2019, www.unleashedsoftware.com/blog/identifying-key-differences-b2b-b2c-supply-chain. Accessed 22 Mar. 2021.

Mencarelli, R., & Riviere, A. (2015). Perceived value in B2B and B2C: A comparative approach and cross-fertilization. Marketing Theory, 15(2), 201-220.

Mendes Jr, P., Leal, J. E., & Thomé, A. M. T. (2016). A maturity model for demand-driven supply chains in the consumer product goods industry. International Journal of Production Economics, 179, 153-165.

Mendes, P. (2011). Demand driven supply chain: A structured and practical roadmap to increase profitability. Springer Science & Business Media.

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. Journal of Business logistics, 22(2), 1-25.

Mentzer, J. T. (1999). The impact of forecasting on return on shareholders's value. The Journal of Business Forecasting, 18(3), 8.

Miclo, R., Fontanili, F., Lauras, M., Lamothe, J., & Milian, B. (2016, June). An empirical study of Demand-Driven MRP. In 6th International Conference on Information Systems, Logistics and Supply Chain-ILS Conference (pp. 1-7).

Monczka, R. M., Petersen, K. J., Handfield, R. B., & Ragatz, G. L. (1998). Success factors in strategic supplier alliances: the buying company perspective. Decision sciences, 29(3), 553-577.

Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. Journal of marketing, 58(3), 20-38.

Nagashima, M., Wehrle, F. T., Kerbache, L., & Lassagne, M. (2015), Impacts of adaptive collaboration on demand forecasting accuracy of different product categories throughout the product life cycle, Supply Chain Management: An International Journal, 20(4), 415 – 433.

Neubert, G., Ouzrout, Y., & Bouras, A. (2004). Collaboration and integration through information technologies in supply chains. International Journal of Technology Management, 28(2), 259-273.

Ostdick, N. (2017). How to Move S&OE Beyond the Spreadsheet, Flexis, https://blog.flexis.com/how-to-movesoe-beyond-the-spreadsheet.

Panahifar, F., Heavey, C., Byrne, P. J., & Fazlollahtabar, H. (2015). A framework for collaborative planning, forecasting and replenishment (CPFR). Journal of Enterprise Information Management, 28(6), 1-36.

Peng, R., & Xiao, Y. (2014). How to manage the bullwhip effect in the supply chain: A case study on Chinese Haier Group. [Student thesis, Högskolan i Gävle].

Pereira, D. F., Oliveira, J. F., & Carravilla, M. A. (2020). Tactical sales and operations planning: A holistic framework and a literature review of decision-making models. International Journal of Production Economics, 228, 107695.

Pukkila, M., (2016). S&OE: The Secret Ingredient for Delivering Planned Business Results, Gartner Webinars, Gartner.

Hippold, S., (2019). How to Set Up S&OE in Supply Chain Planning, Gartner. https://www.gartner.com/smarterwithgartner/how-to-set-up-soe-in-supply-chain-planning/

Rėklaitis, K., & Pilelienė, L. (2019). Principle differences between B2B and B2C marketing communication processes. Management of Organizations: Systematic Research, 81(1), 73-86.

Ross, D. F. (2015). Distribution Planning and control: managing in the era of supply chain management. Springer.

Ryu, S. J., Tsukishima, T., & Onari, H. (2009). A study on evaluation of demand information-sharing methods in supply chain. International Journal of Production Economics, 120(1), 162-175.

Şahin, H., & Topal, B. (2019). Examination of effect of information sharing on businesses performance in the supply chain process. International Journal of Production Research, 57(3), 815-828.

Shedlawski, J. (2017). APICS S&OP Performance: Advancing Sales and Operations Planning. APICS Insights and Innovations, 1-44.

Simchi-Levi, D., Schmidt, W., & Wei, Y. (2014). From superstorms to factory fires: Managing unpredictable supply chain disruptions. Harvard Business Review, 92(1-2), 96-101.

Smith, D. A., & Smith, C. (2014). Demand driven performance: using smart metrics. McGraw-Hill Education.

Småros, J. (2007). Forecasting collaboration in the European grocery sector: Observations from a case study. Journal of Operations Management, 25(3), 702-716.

Terwiesch, C., Ren, Z. J., Ho, T. H., & Cohen, M. A. (2005). An empirical analysis of forecast sharing in the semiconductor equipment supply chain. Management science, 51(2), 208-220.

Thomé, A. M. T., Scavarda, L. F., Fernandez, N. S., & Scavarda, A. J. (2012). Sales and operations planning: A research synthesis. International Journal of Production Economics, 138(1), 1-13.

Yan, B. (2019). Research on the Influence of Customer Perceived Value on Brand Equity. American Journal of Industrial and Business Management, 9(3), 609-626.

Yu, Y., Huo, B., & Zhang, Z. J. (2021). Impact of information technology on supply chain integration and company performance: evidence from cross-border e-commerce companies in China. Journal of Enterprise Information Management. 34(1), 460-489.

Zhang, X., Van Donk, D. P., & van der Vaart, T. (2016). The different impact of inter-organizational and intra-organizational ICT on supply chain performance. International Journal of Operations & Production Management. 36(7), 803-824.

Zhao, X., Xie, J., & Leung, J. (2002). The impact of forecasting model selection on the value of information sharing in a supply chain. European Journal of Operational Research, 142(2), 321-344.

Van der Vaart, T., & Van Donk, D. P. (2008). A critical review of survey-based research in supply chain integration. International journal of production economics, 111(1), 42-55.

Vanderursen, J. & Mello, J. (2014) 'A Roadmap to Implementing CPFR', Foresight: The International Journal of Applied Forecasting, (33), 8–12.

Vereecke, A., Vanderheyden, K., Baecke, P. and Van Steendam, T. (2018), "Mind the gap – Assessing maturity of demand planning, a cornerstone of S&OP", International Journal of Operations & Production Management, 38(8), 1618-1639.

Vickery, S.K., Jayaram, J., Droge, C. and Calantone, R. (2003), "The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships", Journal of Operations Management, 21(5), 523-539.

Villasalero, M. (2017). A resource-based analysis of realized knowledge relatedness in diversified firms. Journal of Business Research, 71, 114–124. Retrieved from https://doi.org/10.1016/j.jbusres.2016.10.011

Williams, B.D., Waller, M.A., 2011. Top-down versus bottom-up demand forecasts: the value of shared point-of-sale data in the retail supply chain. J. Bus. Logist. 32, 17e26.

# Appendix

The appendix will account for the interview questions for the different units.

## Interview type A: Business Development

### General Questions

- Describe your background, role and department.

### Demand Management

- Do your department use information generated by forecasts? If so, how?
    - Do you have an active role in shaping how forecasts are conducted?
- What are the differences between the B2B & B2C market?
    - How do you address those differences between the markets?
    - What data are you working with for improving revenue streams for each segment?
- What activities are taken to shape demand?
    - How do you shape demand before the forecasted period? During the period?
- How do you work to reduce demand variability?
- How are managing unplanned changes? Planned changes?
- How is your performance measured?
- How is your department's performance measured?
    - How are you working with improvements based on measurements?
- Do you have any specific department goals & strategies and what are they based on?
- What are you biggest issues today?

### Organization Collaboration

- How is your department structured?
    - How do you collaborate between departments? Between actors?
    - Do you solve problems collaboratively?
- How do you communicate between departments? Between actors?
- Do you work against common goals between departments? Between actors?
- Do you conduct demand shaping activities between departments? Between actors?
- Do you trust other departments with sensitive information? Other actors?
- How is the department's attitude regarding working cross-functionally? With other actors?

### Technical Collaboration

- Is demand data shared between organizational departments? Between actors? How?
- Is supply data shared between organizational departments? Between actors? How?
- How is other relevant information shared between departments? Between actors?
- Are the forecasts synchronized between departments? Between actors?
- Are Business Development analytics coherently synchronized between departments? Between actors?

- Are the actors' different systems integrated? The departments' different systems?
    - What systems? For what information?
- What do you know about Easy-Source?
    - How do you think it will facilitate your work?
    - What impact do think it will have in general?

## Interview type B: Finance Engineering & Forecasting teams

**General Questions**

- Describe your background, role and department.

**Demand Management**

- Could you briefly describe your forecasting process?
    - What data are you basing your forecasts upon?
        - How do you collect data?
    - For how long period do you forecast?
    - On what product hierarchal level?
- What are the differences between B2B & B2C data collection and analysis?
    - How do you address these differences?
- Could you describe your process after a finished forecast?
    - How is the demand synchronized with supply?
    - How do you handle shortages?
- What activities are taken to shape demand?
    - Do you work proactively with analyzing data for shaping demand?
    - Do you pursue a reduction in demand variability? If yes, how?
- How are managing unplanned changes? Planned changes?
- How is your performance measured?
- How is your department's performance measured?
    - How are you working with improvements based on measurements?
- Do you have any specific department goals & strategies and what are they based on?
- What are you biggest issues today?

**Organization Collaboration**

- How is your department structured?
    - How do you collaborate between departments? Between actors?
    - Do you solve problems collaboratively?
- How do you communicate between departments? Between actors?
- Do you work against common goals between departments? Between actors?
- Do you conduct demand shaping activities between departments? Between actors?
- Do you trust other departments with sensitive information? Other actors?
- What is the department's attitude regarding working cross-functionally?

**Technical Collaboration**

- Is demand data shared between organizational departments? Between actors? How?
- Is supply data shared between organizational departments? Between actors? How?
- How is other relevant information shared between departments? Between actors?
- Are the forecasts synchronized between departments? Between actors?
- Are the actors' different systems integrated?
    - What systems? For what information?
- Are the departments' systems integrated?
    - What systems? For what information?
- What do you know about SmartPortal?
    - How do you think it will facilitate your work?
    - What impact do think it will have in general?