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Purchasing in the Space of Data Driven Business Models

A case study of a purchasing unit in Company X

Master's thesis in the Master's Program
Management and Economics of Innovation

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SUMMARY

Problem Company X has sensors in their trucks that generate data, however, their business is mainly built on a traditional automotive business models which does not utilize data. The company is experiencing a trend of transitioning towards data driven business models, combined with that some of their suppliers are more mature in using data in their business models. On this basis, Company X feels the need to develop a data driven business model and has therefore initiated the process. The company is interested in what role the purchasing unit can have and how they will be impacted in the area of data driven business models. Considering that data driven business models are a way of offering new solutions to end customers, purchasing is to many not the obvious department to be considered in this area since they traditionally operate on the opposite side of the supply chain, i.e. with the suppliers. However, data driven business models affect the entire company as well as the ecosystem around it. Therefore, the purchasing unit has potential to contribute and they will also experience changes when comes data driven business models.

Purpose This master thesis investigates the topic of data driven business models in the context of Company X to create a basis for a common understanding in the company. The characteristics of data driven business models in Company X are explored and assessed in relation to the purchasing unit to provide an understanding of how the purchasing unit can contribute to, and furthermore how the department will be impacted by data driven business models.

Theoretical framework Different theories regarding servitization, business models, data driven business models and purchasing are included in the theoretical framework. These theories form the basis for the collection of empirical data and execution of the analysis. Since purchasing's role in data driven business models is an unexplored area in the literature, the theories have been merged to fit the purpose of the study.

Methodology An inductive research approach is applied since the study investigate future possibilities in an unexplored field where previous research is highly limited. In this study, 13 semi-structured interviews were conducted with employees at Company X, where the theoretical framework and research questions worked as a guidance. The collected data was analyzed with content analysis and structured based on the research questions.

Results and implications When investigating the future data driven business models in Company X, three types were identified; Sell data, Improve existing offering and Create new service offerings. A common characteristic among these three types is that they are more customer-focused. With regard to the three types of data driven business models and their characteristics, the analysis identified four roles of the purchasing unit. The impact on the department varies between the roles, where the impacts are grouped into four areas. The purchasing unit has the potential to contribute in a data driven business model by matching resources, competencies and solutions in the supplier market to the customer problems by utilizing and strengthening their external network, with the prerequisite that they understand the end customer. Four main contributions by the purchasing unit to data driven business models Company X are identified; Provide ideas of new solutions for Company X's offerings, Leverage external resources and capabilities to enhance the development of Company X's offering, Involve suppliers to increase the innovativeness in Company X by collaborating with the company, and Create new revenue streams to Company X.

Keywords: Purchasing, Strategic purchasing, Business models, Data driven business models, Servitization, Digitized service offerings, Service taxonomies, Supplier involvement.

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1. Introduction

Traditional business models (BMs) focused on products where competition is based on dimensions like cost, flexibility, time or quality are not something that manufacturing firms can rely on in the global economy today (Clegg, Macbryde, Dey, Dimache & Roche, 2013). Manufacturers are increasingly integrating intelligent, digital systems in their products (Münster & Meiren, 2011), creating product-service offerings that alters the value creation mechanism in the industries. Thus, companies that ignore these changes risk to be outcompeted by other players offering customized, responsive offerings (Lerch & Gotsch, 2015). It has been claimed by several scholars that BM innovation done properly can be a powerful way to obtain competitive advantage (Sorescu, 2017). Chesbrough (2007) emphasized this further by stating that “A better business model often will beat a better idea or technology” (p.12). Business model innovations create new possibilities regarding how a firm can engage in economic exchange due to that it goes beyond simply introducing a new product or service within an existing business model (Hamel, 2001; Mendelson, 2000; Mitchell & Coles, 2003). Johnson, Christensen and Kagermann (2008) noted that new business models is a hot topic, highlighting that more than half of executives is of the opinion that the importance business model innovation will supersede that of product innovation, according to a survey by the Economist Intelligence Unit in 2005.

To outperform competitors in terms of operating efficiency and revenue growth, a study has shown that organizations which include big data and analytics in their innovation processes are 36 percent more likely to do so (Marshall, Mueck & Shockley, 2015). Social media, mobile phones, and Internet of Things (IoT) has resulted in new, massive amounts of data being available to companies (Morabito, 2015). As a consequence traditional business functions are changing, in some cases radically, causing industry boundaries to blur (Porter & Heppelmann, 2014). One way of responding to the opportunities and challenges of new technology is through making the BMs data driven (DD), called Data Driven Business Models (DDBMs). In DDBMs, big data is utilized as an enabler to enhance and differentiate the offering to create competitive advantage. Some of the world’s largest companies illustrates the potential impact entailed by DDBMs. Amazon, Facebook and Google have all used BM innovation based on data as a complement to product innovation to achieve their success. (Sorescu, 2017).

Adrodegari, Pashou and Saccani (2017) argue that manufacturers can achieve competitive advantage and new revenues through an extensive transformation from traditional BMs to product-service-systems BMs. When a company transforms its approach from being product-centric to service-centric, it is called servitization according to Kowalkowski, Gebauer, Kamp and Parry (2017). The authors explain that such a transformation implies that the service business functions as the engine of growth for the company, which entails changes of substantial measures to the company’s mission and business model. To meet customer needs and create new business opportunities, traditional manufacturing companies are increasingly transitioning towards delivering services. Thus, there is a shift from value being produced at the point of sales to value being created when the products are used (Adrodegari, Pashou, & Saccani, 2017). Digitalization is seen as a driver and enabler of the BM, value capture and value creation in the studies about servitization (Lerch & Gotsch, 2015; Parida, Sjödin, & Reim, 2019; Porter & Heppelmann, 2014). Hence, data is an enabler for servitization and DDBMs are a way for companies to create and deliver DD service offerings to the customers. Hence, both the concept of DDBMs and DD service offerings are investigated in this thesis to fully comprehend the topic.

One example of an engine manufacturer company that has succeeded with developing a DD service offering is Rolls-Royce (Smith, 2013). The company shifted from selling pure products and repairment, to a service package where the customer rents the engine by the hour. Their offering is based on data on

how much the customer uses the engine which enables the customer to pay only for the usage. The offered service resulted in cost savings for both Rolls-Royce and their customers, since the service included data monitoring to prevent maintenance and thereby reduced the downtime of the engine and unnecessary repairs.

1.1 The Role of Purchasing

According to Monczka, Handfield, Guinipero and Patterson (2015), purchasing can both be seen as a functional group and functional activity. Purchasing has traditionally had its own objectives, budget and strategies (Sheth, Sharma & Iyer, 2009), engaging in typical work tasks, such as identification and selection of suppliers, contracting and negotiation, buying, and managing the supplier base etc. (Monczka et al., 2015). Doing the “five rights” is often mentioned when referring to purchasing, meaning that purchasing should acquire material with the right quality, quantity, timing, source and price. The purchasing department has been a key contributor for cost savings, since in the manufacturing industry, more than 50 percent of every dollar of revenue generated from sales of products and services, are paid to suppliers. Traditionally, purchasing has made cost savings by negotiating with suppliers to get lowered prices but it can also be achieved by building strong supplier relationships to share costs in products and services, which is a more modern approach. (Monczka et al., 2015).

Three main trends have changed the role of purchasing in the organization according to Sheth, Sharma and Iyer (2009). Firstly, manufacturing companies are increasingly focusing on core activities and thus, outsources non-core activities. Additionally, companies’ capabilities are superseding tangible goods in importance, which emphasizes the emergence of service logic in marketing (Vargo & Lusch, 2004). Secondly, Sheth, Sharma and Iyer (2009) state that the strategic importance of purchasing has increased while their influence on routine products has decreased. A more strategic role of purchasing is required by new product development, product design and customization of products in manufacturing companies. Thirdly, as globalization has opened up for global sources of raw materials, it has also enabled global competition which has resulted in a more important and strategic role of purchasing. Simultaneously, the global capacity for finished products has increased forcing purchasing to focus on the supply chain’s end customer. Due to these trends, enhanced understanding and collaboration between marketing and purchasing exceeding their traditional roles in the company is required. (Sheth, Sharma & Iyer, 2009).

It is evident that purchasing has taken a more strategic role in companies worldwide and they are now more intertwined in the company than before. Previous economic changes that has changed the way companies operate, e.g., globalization, has also affected the role of purchasing. Since DDBMs requires companies to transform the way they do business, it is reasonable to assume that a transition to DDBMs will result in changes for purchasing as well.

1.1.1 A Purchasing Unit in the Automotive Industry

Company X (CX) is a leading company in the world of manufacturing buses, trucks, construction equipment, industrial and marine engines. The company has over 100 000 employees and serves 190 markets with 12 brands. This thesis concern the truck manufacturing part of the company which delivered over 127 000 medium to heavy duty trucks globally in 2018. The Purchasing Unit (PU) is the purchasing organization within CX consisting of 1400 employees, located in 25 different countries around the world. Annually, they purchase 2,2 BSEK parts for a total spend of approximately 140 BSEK from 30 000 suppliers. The thesis is written in collaboration with a department within PU at CX.

Currently, CX has sensors in their trucks that generate data, however, their business is mainly built on a traditional automotive BM which does not utilize data. The company is experiencing a trend of transitioning towards DDBMs, combined with that some of their suppliers are more mature in using data in their BMs. On this basis, CX feels the need to develop a DDBM and has therefore initiated the process. The company is interested in what role PU can have and how they will be impacted in the area of DDBMs. Considering that DDBMs are a way of offering new solutions to end customers, purchasing is to many not the obvious department to be considered in this area since they traditionally operate on the opposite side of the supply chain, i.e. with the suppliers. However, DDBMs affect the entire company as well as the ecosystem around it. Therefore, purchasing has the potential to contribute and they will also experience changes when comes to DDBMs. Additionally, Morabito (2015) states that the concept of DDBMs is currently evolving, thus, the literature in the area of successfully developing BMs built on data is scarce (Sorescu, 2017). Hence, to study this unexplored area it is necessary to build this thesis on the specific case of PU in CX. To fulfill CX's desire about being anonymous, the abbreviations used in this thesis are presented below in table 1.1.

Table 1.1 - Abbreviations of departments mentioned in the thesis

Explanation	Abbreviation
Purchasing Unit	PU
Technological Product Development Department	PD
Marketing and Sales department	MS
A subsidiary to Company X	XS

1.2 Purpose

The purpose of the master thesis is to investigate the topic of DDBMs in the context of CX to create a basis for a common understanding in the company. The characteristics of DDBMs in CX are explored and assessed in relation to PU to provide an understanding of how PU can contribute to, and furthermore how the department will be impacted by DDBMs. A categorization of contributions in different roles in relation to characteristics of DDBMs is provided to create an understanding for PU on how they can contribute to the company going forward. Additionally, impacts on PU are presented in relation to different possible roles to create awareness of eventual challenges and changes.

1.3 Problem analysis

To take advantage of CX's massive amount of data, new BMs are needed. Currently, there is a lack of joint thinking around the topic of BMs and there is a need to create a common understanding of what a DDBM is to CX. PU is focused on managing the supplier base and currently has an inadequate understanding of the market perspective. Moreover, they focus on operational work and DDBMs is a new topic for them as well as for the rest of the organization. This has created a need to investigate how PU can contribute in DDBMs beyond cost savings. Additionally, it is unclear how a transition towards a DDBM will impact PU, thus this is another area of interest. Based on these need and challenges, three research questions have been formulated to fulfill the purpose of this thesis. Descriptions of the research questions and how they are answered in the thesis are presented below.

Research question 1

The purpose of the first research question is to understand the concept of DDBMs in CX and create a foundation for further analysis answering research question 2 and 3. This research question is answered in the first part of the analysis, since it requires a combination of theory and empirical data to fit the context of CX. Research question 1 is stated as:

What characterizes a data driven business model in Company X?

Research question 2

Based on the answer in research question 1, empirical findings and theory are analyzed with the purpose of investigating what roles PU can have in DDBMs to contribute to the organization. Thus, research question 2 is answered in the analysis and is formulated as below:

What are the roles of PU in relation to data driven business models?

Research question 3

With outset in the roles identified in research question 2, the purpose of research question 3 is to assess the impacts on PU in each case. Impacts includes requirements, challenges as well as changes, and are also identified and presented in the analysis. Below, research question 3 is formulated:

How will PU be impacted by adopting the roles in data driven business models?

1.4 Delimitations

In the thesis, DDBMs in CX are defined with the purpose of creating a common understanding of the term in the organization. Thus, different types of DDBMs are analyzed although, no recommendation is provided regarding the decision of CX's future DDBMs since this is not the purpose of the thesis. The thesis presents how PU can contribute in DDBMs, but it does not concern how purchasing or CX can utilize data to increase their performance. Further, due to the Covid-19 pandemic, the thesis does not include CX's perspective from the department closest to the customer side, i.e. MS, since it was not possible to perform these interviews. Additionally, the supplier side has not been investigated due to the time constraint. Hence, the thesis is limited to PU and PD's perception combined with findings from XS. Moreover, the possible roles of PU in DDBMs are found, but the thesis does not include how CX should develop these roles. The impacts on PU of having these different roles in DDBMs are discussed, although, the extent to which these impacts occur is not investigated. To analyze this further, more information about PU's operations is needed.

2. Theoretical framework

This chapter presents the literature upon which the thesis is built. The first section provides an understanding of what a service offering is. The second section explains the notion of business models in general and how data changes business models. To get a deeper understanding about the context of the thesis, purchasing is then described in the third section. The structure of the chapter and how the different sections relate to one another are visualized in figure 2.1.

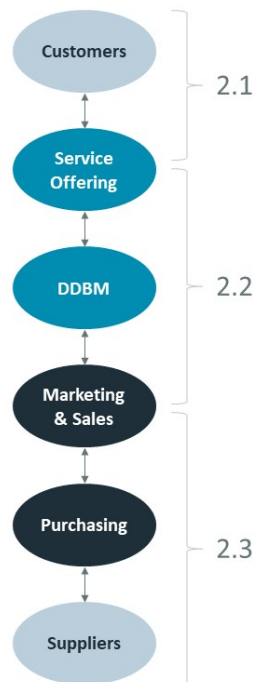


Figure 2.1 - A visualization of the theoretical framework

2.1 Service Offerings

Lerch and Gotsch (2014) argue that there is an interactive effect of digitalization and servitization, implying that the development of manufacturers' offerings are influenced by both. Manufacturers are increasingly delivering individualized, innovative product-service systems which increases the value delivery towards the customers which in turn increases the competitive advantage (Boyt & Harvey, 1997). To fully comprehend concept of DDBMs, it is necessary to understand service offerings offered by manufacturing companies. Thus, this section presents themes of manufacturers' servitization as well as taxonomies to describe service offerings.

A study of 219 articles written between 2005 and 2017 conducted by Raddats, Kowalkowski, Benedettini, Burton and Gebauer (2019) identified five main themes of servitization. The first one is service offerings which is the service that manufacturers offer to their customer to add value to them. The second one is the manufacturers' service strategy including the organizational design implications. Third is the manufacturers' motivation of creating a service and the performance of the service as well as how this affects the company. The fourth theme is resources and capabilities needed by the manufacturer to transition towards a service-centric approach. This includes the resources and capabilities internally in the company and the ones that enables manufacturers to establish and maintain required relationships with external actors, e.g., suppliers and customers. The last theme is activities in terms of development, sales and delivery of the service that the manufacturer need to conduct. These

five themes is something that the company undergoing servitization need to include. However, there are themes where external actors are involved as well, which is illustrated in figure 2.2 below.



Figure 2.2 - Servitization themes and the actors involved (Raddats et al., 2019, p. 3)

The service offering, i.e., the first theme can have different characteristics which is described by taxonomies presented in table 2.1 below.

Table 2.1 - Service offering taxonomies and descriptions (Raddats et al., 2019, p. 7)

Taxonomy	Description	Indicative source(s)
Service supporting products (SSPs) vs. services supporting the customer's actions (SSCs)	Services are product complements, which facilitate the sale and usage of physical goods (SSPs) or process-oriented offerings, not linked to specific products (SSCs)	Mathieu (2001)
Customer vs. supplier ownership of equipment	The customer either buys the equipment and services or the supplier retains ownership and is responsible for operations and maintenance	Windahl and Lakemond (2010)
Product complements vs. substitutes	Services are not just complements for products but can be substitutes for them	Cusumano, Kahl and Suarez (2015)
Transactional vs. relational	Transactional services only require 'arm's length' relationships between seller and buyer, while relational services require mutual trust, commitment, long-term orientation	Penttinen and Palmer (2007)
Standardization vs. customization	Services are either created in standard packages or customized for client requirements	Matthyssens and Vandenbempt (2010)
Offered individually vs. integrated bundles	Services mainly offered on their own or bundled with a range of other services, ranging from a price bundle to a complex integration of different offerings as part of a solution	Matthyssens and Vandenbempt (2008)
Input- vs. output-based	Input-based services focus on the delivery and performance of a particular deed and the payment model is to 'pay-per-service' unit, while output-based services focus on the achieved outcome	Ulaga and Reinartz (2011)
Base, vs. intermediate vs. advanced services	Service outcomes focused on product provision (base), maintenance of the product condition (intermediate) and capability through the performance of the product (advanced)	Baines and Lightfoot (2013)
Free vs. chargeable	Formalized service offerings may be provided 'free' as part of the product sale or charged for separately. Some design/consultation services may also be free	Witell and Löfgren (2013)
Own products vs. multi-vendor	Whether services are offered on mainly own products or also serve the installed base of competing manufacturers	Davies, Brady and Hobday (2006)

2.2 Business Models

This chapter gives an understanding of what a BM is and common building blocks to describe it. Moreover, how data can be incorporated in the BM is explained.

2.2.1 Defining Business Models

BM's have according to Teece (2010) since pre-classical time been essential in economic behavior. Even if the term "Business model" emerged in 1957 in an academic article (Bellman, Clark, Malcom, Craft & Ricciardi, 1957), it was not until the arrival of the internet in the middle of 1990s the BM concept became popular (Zott, Amit & Massa, 2011). The concept has since that time been discussed in various types of publications (Zott, Amit & Massa, 2011), but it is still considered as an immature phenomenon (Osterwalder, Pigneur & Tucci, 2005). According to Zott, Amit and Massa (2011) there is a lack of a common definition of a BM in literature. Further, they also state that scholars have not yet agreed upon what a BM actually is and that researchers often adopt different definitions adjusted to the purpose of their study. The authors found four appearing themes despite the disparity between researchers. Firstly, BM is a new entity of analysis that is separated from the company, network, product or industry, i.e., it focuses on a specific company but with extended boundaries than those of the company. Secondly, BMs explain how firms do their business. Third, both a company's partners and its activities play a significant role, and lastly a BM try to explain how a firm creates value and capture value. (Zott, Amit & Massa, 2011).

Osterwalder, Pigneur and Tucci (2005) discovered by a survey performed by members of the Information System Community that the comprehension of a BM varying especially between business oriented people and technology oriented people. The authors also found that BMs are often referred to as different things in literature, e.g. some components of a BM, concepts such as relationships and elements of a model, different types of BMs etc. This had led to confusion about the concept since different authors use it to address different things (Linder & Cantrell, 2000). To illustrate how ambiguous the definition of a BM is, table 2.2 below presents what the BM has been referred to at a common level.

Table 2.2 - Common explanations of business models

Explanations	Authors
A description	Applegate (2000), Weill and Vitale (2001)
A statement	Stewart and Zhao (2000)
An Architecture	Dubosson-Torbay, Osterwalder, and Pigneur (2002), Timmers (1998)
A representation	Morris, Schindehutte and Allen, (2005), Shafer, Smith and Linder (2005)
A structural template	Amit & Zott (2001)
A conceptual tool or model	George and Bock (2009), Osterwalder, Pigneur and Tucci (2005)
A framework	Afuah (2004)
A set	Seelos and Mair (2007)
A method	Afuah and Tucci (2003)
A pattern	Brousseau and Penard, 2006

In this study, we will use the definition by Osterwalder and Pigneur (2010) who define it as "A business model describes the rationale of how an organization creates, delivers, and captures value" (p. 14).

2.2.2 Building Blocks of a Business Model

To create a common understanding and simplify descriptions and discussions about the BM concept, Osterwalder and Pigneur (2010) created a model called Business Model Canvas (BMC). The model became popular and almost every entrepreneur in the world is familiar with the model. The book "Business Model Generation" by Osterwalder and Pigneur has been translated into 26 languages and more than 500 000 copies are sold. (Hong & Fauvel, 2013). The BMC consist of nine building blocks; Customer segments, Value proposition, Channels, Customer relationships, Revenue streams, Key resources, Key activities, Key partnerships and Cost structure (Osterwalder & Pigneur, 2010), illustrated in figure 2.3.

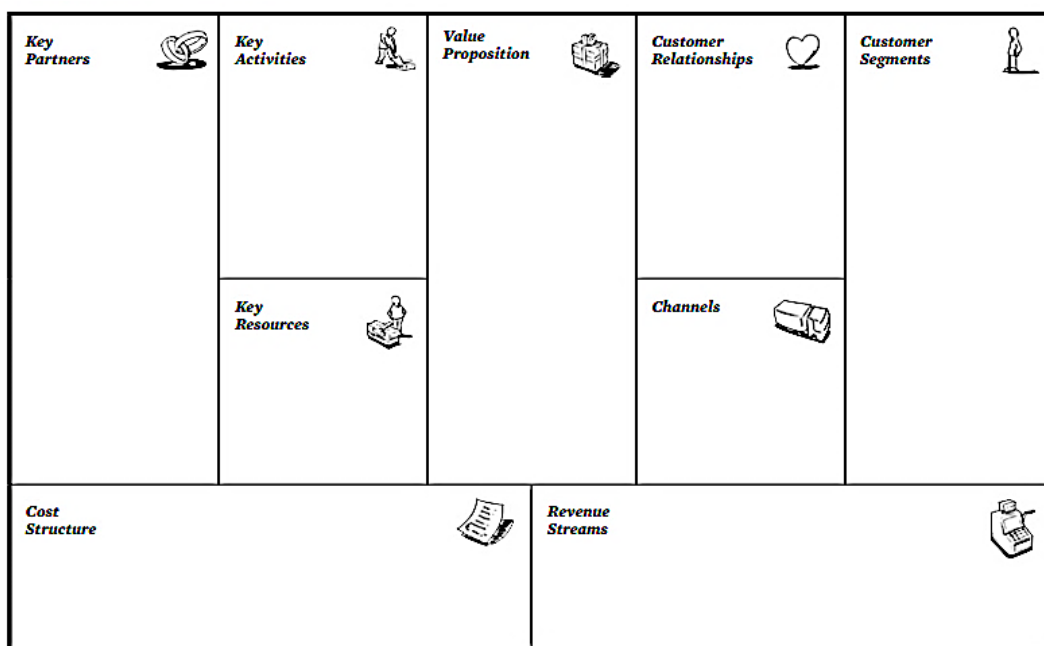


Figure 2.3 - Business Model Canvas (Osterwalder & Pigneur, 2010).

Similar to the BMC, Lüdeke-Freund, Gold and Bocken (2019) divides a BM into four main dimensions with two subcategories each, presented in table 2.3. *Value proposition* is the first dimension which describes how products and services are bundled to create value for a particular customer segment (Osterwalder and Pigneur, 2010). Secondly, *Value delivery* describes how the value proposition is delivered, i.e. value delivery processes, and to whom, i.e. target customers. This dimension also includes different types of relationships that a company creates with a particular customer segment (Osterwalder and Pigneur, 2010). The third dimension is *Value creation* which describes the partners and stakeholders as well as activities involved in creating the value proposition to the customers (Lüdeke-Freund, Gold & Bocken, 2019). This dimension includes the components Key partners, Key resources and Key activities mentioned in the BMC. Lastly, *Value capture* is the dimension that describes the company's cash obtained from the specific customer segments, i.e. revenues, and all costs related to realizing the BM. (Osterwalder and Pigneur, 2010). This dimension is needed to sustain the value creation and thus, to develop and deliver the value proposition (Lüdeke-Freund, Gold & Bocken, 2019). This BM categorization will be used as an outset in this thesis to study CX's DDBMs.

Table 2.3 - Business model dimensions used in Lüdeke-Freund, Gold and Bocken's (2019) analysis.

Major dimensions	Subcategories
<i>Value proposition</i>	Products
	Services
<i>Value delivery</i>	Target customers
	Value delivery processes
<i>Value creation</i>	Partners and stakeholders
	Value creation processes
<i>Value capture</i>	Revenues
	Costs

2.2.3 Data Driven Business Models

Table 2.4 is a theoretically extended version of table 2.3 presented in the previous section. Two columns are added describing the characteristics of a traditional BM in the automotive industry and characteristics of data and digitalization in each subcategory. The table is based on merged theory in this section and will be further developed to CXs context based on the empirical findings and analysis in following chapters.

Table 2.4 - An extended framework based on the table created by Lüdeke-Freund, Gold and Bocken (2019)

Major dimensions	Subcategories	Traditional automotive industry	Data and digitized dimensions	CX's DD service offering
Value proposition	Products	Vehicles	Connected products (IoT), technologies, databases and datasets	
	Services	Aftermarket services: Maintenance, warranty issues	Expert knowledge, analytics, platforms, digital services; supporting products, supporting customers, substituting products	
Value delivery	Target customers	Vehicle owner, vehicle operator	Private customers, component manufacturers, suppliers, integrators, operators, distributors, solution providers, customers outside traditional industry	
	Value delivery processes	Distributor, Reseller	AI, IoT, predictive delivery	
Value creation	Partners and stakeholders	Components manufactures, governments and regulatory authorities	Digital enablers	
	Value creation processes	Value-in-exchange, manufacturing	Value-in-use	
Value capture	Revenues	Pay per product/service (selling vehicles and aftermarket services)	Subscription, pay per use, license	
	Costs	Production, labor	Data management, technology investments	

Luz Martín-Peña, Días-Garrido and Sánchez-López (2018) state that today, entire BMs are altered by digitalization and digital business are getting increasingly widespread. The authors define digital business as “*the business management practices and activities which result from the incorporation of digital technologies into the operations of the firm*” (p. 92). Mobile devices including applications, analytic tools, platforms for capacity sharing and IoT are the mostly used technologies in digital businesses (Luz Martín-Peña, Días-Garrido & Sánchez-López, 2018). Morabito (2015) explains that social media, mobile phones, cloud computing and IoT generate massive amounts of data on a daily basis. Big data have three characteristics; volume, variety and velocity (Sorescu, 2017) and can be a

source for competitive advantage when incorporated properly into the BM (Marshall, Mueck & Shockley, 2015; Sorescu, 2017).

Industries such as retail, manufacturing, financial services, media and telecommunications, healthcare etc. use big data to transform their BMs and enhance their performance in various ways (Morabito, 2015). Sorescu (2017) states that companies or consumers could either leverage external data or leverage internal data to manage and cleverly use tremendous amounts of data. Leveraging external data implies that a company builds a BM that get the data back, package it and then sell the appropriate external data to data consumers. Individuals, companies and governments can all be considered as data consumers. Leveraging internal data can be done in two ways, according to Sorescu (2017). The company can use the generated data by their consumers to improve the product or service and also to create revenues. Secondly, there are some companies that accumulate massive amounts of data from several sources but they do not have the knowledge regarding how to convert it to profit. Therefore, there are some companies that have created a BM aiming to support and help these struggling companies with this, e.g. Microsoft and SAP. They provide enterprise applications that delivers answers from the data in order to assist them by solving business problems. (Sorescu, 2017).

Morabito (2015) defines a big data driven business model (BDDBM) as “*a set of businesses which rely on big data to achieve their key value proposition and to substantially augment their value proposition to differentiate themselves in order to gain competitive advantage*” (p. 66) which is the definition that is used for DDBMs in this thesis. To understand DDBMs, each building block of a BM presented in section 2.2.2 is described with characteristics of DDBMs below.

Value proposition

Companies can sell experts, technologies, analytics services and databases in order to make profit of big data. Many firms sell their customer data to get complimentary revenues, but the related risk of selling the customer data depends on the size of the firm. Small firms may face a reputational risk of selling customer data while this is nonexistent to large companies such as airlines. However, raw data is useless unless there is a purpose for analyzing it. (Morabito, 2015). Moreover, DD services towards the customers are a common value proposition in DDBMs. The traditional idea of standalone products are reshaped by the concept of DD services, since companies are required to capitalize on products, services and software. The products, services and software need to work together, in order to obtain value from digital servitization. (Kohtamäki, Parida, Oghazi, Gebauer, & Baines, 2019).

Value delivery

Big data has changed the mass customization concept, and is additionally an enabler for it. By using big data, companies have the ability to individually target each customers based on their purchasing habits, preferences, demographic location, and physical position to mentioned a few. The increased probability of a purchase stemming from the fine targeting of offers, content, products and services could result in massive returns. Increased sales from profiling customers by utilizing big data have been a major reason for why companies adopt new technologies. However, companies can also improve their customer service due to the massive information they obtain about them. Hence, they can increase loyalty and intimacy of their customers. The lack of extensive customer information have been a critical challenge for customer service operators. (Morabito, 2015).

Regarding the delivery options in business-to-customer (B2C), it is possible to apply techniques based on big data to increase the flexibility for customers while reducing costs. It is possible to reduce costs by using a data driven sequencing software that can quickly analyze information about traffic conditions, delivery information, availability for loading etc. One option is to maximize the schedules of delivery

routes to conventional fleets by using real-time optimization. Another option is to deliver products directly to people's current position by utilizing combinatorial optimization i.e. locating both the driver's and the recipient's paths in order to re-route the vehicle to the next superior point to deliver the package. In business-to-business (B2B), logistics big data can enhance just-in-time operation and increase efficiency by predictive modeling. The storage for goods can be reduced while securing the business' continuity. Predictive modeling can consider disruptions caused by natural disasters, civil unrest, economic development among others, in addition to purchasing patterns and customer feedback. With big data technology and analytics it is possible to observe and track every change in any risk factor that is critical for the organization. If any changes occur it can alert and generate risk management plans, such as rescheduling an order through another country. (Morabito, 2015).

Value creation

Big data does not only cause big challenges and investments in technology to access, process and analyze the heavy amounts of data, but it also requires that companies make equivalent changes on their business processes to take advantage of it. To create value from data, companies need to have the capability to judge the quality of the data and overcome problems with geographical variations and apply to organizational goals. (Morabito, 2015).

Moreover, the ecosystem is significant for DDBMs since it is beneficial, and in most in cases necessary, for a company to cooperate with other players in the ecosystem to create value. Hence, the value creation process exceeds the company's boundaries and it is crucial to understand the ecosystem. It is likely that new ecosystems emerge when companies moves toward IoT, which creates huge amounts of data. Changes in one company's BM may have substantial impact on another company's operations. Therefore, to move toward a DDBM a redefinition of a company's BM configuration is necessary. To redefine their BM configuration, companies should comprehend the configurations of the other companies included in the ecosystem. By doing that they can achieve a strategic fit between the BMs such as with technologies, value propositions, routines and pricing logics. (Kohtamäki et al., 2019).

Value capture

Unlike traditional manufacturing businesses where the revenues stem from asset sale, DDBMs have the potential of creating other types of revenue streams. Whereas asset sale results in a one time, larger payment, DDBMs can also create continuous, smaller revenue streams, e.g. through subscription fees. (Schüritz, Seebacher, & Dorner, 2017)

According to Viscusi and Batini (2014) accounting for intellectual property rights, intangible assets and data will probably become a focus as data, knowledge and information become the focal point for cooperation. Data classified as an asset on the balance sheet take place on more than 20 percent of big companies today. In the future, it is expected that valuation of data will become an important skill for accountants. (Morabito, 2015).

2.3 The Purchasing Organization

Baily, Farmer and Jessop (2005) state that the primary objective for purchasing should be to meet the current needs of the organization with a continuous supply of materials and services. Continuity is ensured by the second objective which is fostering effective relationships with suppliers while simultaneously securing secondary supply sources in case an alternative is needed or new needs emerge. Third, purchasing should obtain the highest possible value to the lowest possible cost in an efficient and ethical manner. As these first three objectives are focused on how purchasing works externally, the latter two have an internal perspective. The fourth objective is to serve the organizational effectiveness by maintaining relationships with other departments and provide information as well as advice. Lastly, to achieve these objectives, purchasing should develop the organization by updating and improve policies and procedures and develop the staff.

Without taking the strategical work conducted by purchasing into account, Baily, Farmer and Jessop (2005) presents a summary of the purchasing process. It is initiated with recognizing a need which is then specified. Following the specification is the decision if the company should produce the product or service in-house or if it should be bought. In the case the product or service should be bought source identification takes place, after which the identified sources are narrowed down and the appropriate one is selected. Then purchasing handles the contracting and the contract management. Purchasing also takes care of a possible inspection of bought goods and the receipt, followed by a payment. The purchasing is then completed once the need recognized in the beginning of the process is fulfilled.

In this section, literature about the purchasing organization is presented to understand their role in the value chain and in relation to the business strategy. It also includes how purchasing can interact with suppliers and how the suppliers can be integrated in the company. Lastly, the evolution of purchasing competencies due to digitalization are described as well as factors that impacts the performance of the department.

2.3.1 Purchasing in the Value Chain

It is important to distinguish between the two concepts 'Supply chain' and 'Value chain'. According to Van Weele (2018) supply chain management is described as *"The management of all activities, information, knowledge, and financial resources associated with the flow and transformation of goods and services from the raw materials suppliers, component suppliers and other suppliers in such a way that the expectations of the end-users of the company are met or surpassed"* (p. 19). Further, the author states that a value chain is *"Composed of value activities and a margin which is achieved by these activities. Value activities can be divided into primary activities and support activities. The margin represents the value that customers want to pay extra for the company's efforts compared with the costs that were required for these"* (p. 19). Activities that are connected to the physical transformation and managing the final products that are delivered to the customers are primary activities. It also includes the services and distribution to the customers. Porter (1985) divides primary activities into the five following categories; Inbound logistics, Operations, Outbound logistics, Marketing and sales, and Services, see figure 2.4. Activities that supports and enables the primary activities are support activities, and they can support only one primary activity or the whole process. The support activities are divided into four categories; Procurement, Technology development, Human resources management and Firm infrastructure as illustrated in figure 2.4. Purchasing is connected to the support activity procurement since this activity relates to the inputs which can include raw materials, consumable items, supplies etc. that are used in the company's value chain. Moreover, considering primary activities purchasing should support the Inbound logistics, Operations and Outbound logistics by delivering materials that meet the

requirements. To sum up, purchasing is mostly involved in the three first categories of primary activities, but their operations are considered as a supporting activity in the value chain. (Van Weele, 2018).

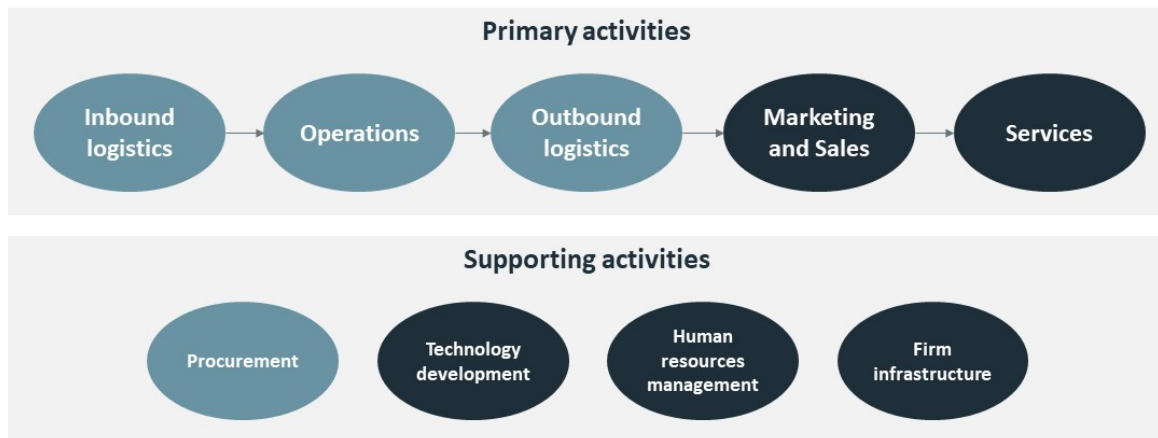


Figure 2.4 - The primary and supporting activities in Porter's (1985) value chain where the activities involving purchasing are light blue

2.3.2 Purchasing and the Business Strategy

Reck and Long (1988) state that there are two main approaches in which the purchasing organization contributes to the organization which affects the way purchasing operates, called non-strategic and strategic. According to the authors, the purchasing organization can be strictly non-strategic, strategic or a mixture of both. In a non-strategic approach, the purchasing organization is reactive to other functions, works in isolation and the objectives has a short term perspective. A strategic purchasing department operates proactively to achieve goals set by the company, is integrated with the rest of the company and has a long-term perspective (Reck & Long, 1988). In addition, a strategic purchasing organization provides valuable input in the company's strategic work and is considered to be an important department in the company (Freeman & Cavinato, 1990). The professionals of strategic purchasing have the right skills and knowledge to work at a strategic level (Carr & Pearson, 2002). According to Carr and Pearson (2002), a strategic purchasing seeks continuously for opportunities to give inputs that will positively affect the quality of the products and the company's future growth.

To obtain a sustainable profitability and competitive advantage, companies generally choose between three different strategies which are cost leadership, differentiation or focus (Van Weele, 2018). To succeed with the chosen strategy Carr and Pearson (2002) state that there are several ways that strategic purchasing can support the company. According to the authors, strategic purchasing can bring value in cost management by effectively manage the cost of inputs and provide the company with important information about supply trends to improve the company's decision making and to reach its goals. Wernerfelt (1984) states that differences in competitive performance among companies are due to the resources and relationships the company has and how they are used to solve customer needs and problems. Resources include financial resources, knowledge, human capital and technology, and the relationships are between the company and employees, suppliers, clients, investors and unions. Thus, purchasing contributes to the company's competitive performance through appropriate establishments of close relationships with suppliers to enhance the delivery and quality of materials (Hogan and Armstrong, 2001). The resource dependency theory complements this resource-based view since according to the theory, companies need access to suppliers resources and capabilities in addition to their own to deliver customer value. Furthermore, it advocates that suppliers are needed to anticipate and adapt to changes in the supply chain's environment. Therefore, to foster the competitive advantage

of a company and create customer value creation, effective relationships with the most appropriate suppliers are crucial to obtain the necessary external resources (Pfeffer & Salancik, 2003).

2.3.3 Supplier Involvement

Svahn and Westerlund (2009) claims that there are two main exchange types that can take place between the supplier and the buyer. Historically, the dominant one in most manufacturing industries has been transactional exchange which is characterized by individual events with a clearly defined beginning and end in a short term time frame (Dubois & Gadde, 2000; Dwyer & Oh, 1988; Tsang, 2006). This approach is often chosen by companies seeking to take advantage of competition among suppliers and the supplier-buyer interaction is to a large extent dependent on contractual agreements (Axelsson & Wynstra, 2002; Dubois & Gadde, 2000). The second type of exchange is the relational approach which implies creating partnerships with suppliers with the intent to benefit from cooperation (Sheth, 1996; Axelsson & Wynstra, 2002). According to Svahn and Westerlund (2009), the purchasing strategy is based on what the purchasing organization aims to achieve. The authors state that efficiency and effectiveness are the two main functions related to the purchasing strategy. Efficiency is centered around the price and focuses on reducing cost while effectiveness is related to improving and adding value (Macbeth, 1994; Axelsson & Wynstra, 2002). These two functions can be fulfilled in different ways which impacts the relationship with the supplier. Svahn and Westerlund (2009) have identified three different types of relationships that are linked to two strategies each, one efficiency focused and one effectiveness focused.

According to Van Weele (2018), there are several benefits of involving suppliers in the company's processes. All types of supplier involvement seeks to create a win-win situation for the involved parties and implies a high degree of collaboration. The product development process is the first step in the value chain where suppliers can be involved. This requires establishing constructive relationships and cross-functional teams with technical experts from both the supplier and the company. When the supplier is involved in an early stage of new product development (NPD) or new service development (NSD) it is called early supplier involvement (ESI). An increasing amount of innovation in the industry is stemming from suppliers, thus, collaborating with them in NPD is important to take part of their innovation power. The importance is further emphasized for large organizations by the rapid development of technology and NPD related cost which can be managed in conjunction with the suppliers. Since different companies work in different ways and have their own set-up, it is common that effective collaboration is difficult to achieve. A prerequisite for ESI is that the company decides early on what parts of the process that should be managed with suppliers or in-house. An important challenge for the purchasing department is to decide how to reward the suppliers' contributions in the NPD to secure a long-term intensive relationship. Hence, traditional price centric negotiations and contracts are replaced by revenue- and risk sharing agreements.

The second step in the value chain where suppliers can be integrated is in the order fulfillment process. Key issues that a joint team with the two parties work on is how to reduce inventory in the supply chain pipeline, increase responsiveness and customer service, improve transaction flexibility and communications, and improve utilization of assets by using modern ICT solutions. This implies that the company and the supplier have a mutual goal which is satisfying the end customer to the best of their abilities. Suppliers can moreover be actively challenged to provide ideas on how to improve existing products and their quality. The ideas can concern everything from product design to manufacturing technology and other processes in the business. It is important that the suppliers' ideas are not interpreted as criticism, but as improvement suggestions and that actions are taken by the company to realize the feasible, good ideas. There are risks associated with this collaboration but if the company does not take

the ideas seriously, the suppliers will stop providing them. Lastly, the company can collaborate with the suppliers to identify all costs, including the drivers of the cost and strategies to reduce the costs in the supply chain. All involved parties are required to work together with the end customers to realize the cost savings. To ensure motivation, it is crucial that all involved parties benefit from the cost savings. (Van Weele, 2018).

2.3.4 Current and Future Competencies

According to Bals, Shulze, Kelly and Stek (2019) previous assumptions of Purchasing and Supply Management's (PSM) required competencies are challenged by changes caused by digitization. The authors conclude that there is a need for a modernization of the PSM competency profile to meet the needs of a business context influenced by industry 4.0 and sustainability, e.g. the transition towards circular economy and supply chains. In a study conducted by Bals et al. (2019) 46 interviews were conducted with interviewees from 16 different companies, and the authors mapped out top ten current and future competencies needed for PSM, see table 2.4 below.

Table 2.4 - The ten most important current and future PSM competencies, commonality between current and future competencies are highlighted in grey. (Bals et al., 2019).

Current competencies	Future competencies
<i>Analytical skills</i>	<i>Analytical skills</i>
Basic Knowledge on PSM roles & processes	Automation
Communication skills	Big data analytics
Cross-functional abilities & knowledge	Computer literacy
Interpersonal communication	eProcurement technology
Negotiation	Holistic supply chain thinking
Stakeholder relationship management	Process optimization
<i>Strategic sourcing</i>	<i>Strategic sourcing</i>
<i>Strategic thinking</i>	<i>Strategic thinking</i>
<i>Sustainability</i>	<i>Sustainability</i>

As shown in table 2.4 there are several different competencies needed to be successful in the role as a PSM, and Bals et al. (2019) also found interrelationships between some of them. Negotiation was the most frequent one in current competencies, and one interviewee in the study by Bals et al. (2019) stated that it was not a surprise that negotiations were mentioned but highlighted that PSM have to be able to negotiate on both external and internal level, i.e. negotiating with suppliers about contract and price, and internally positioning themselves and selling their ideas. In future competencies many of the mentioned competencies are related to digitization, e.g. Big Data Analytics, Automation etc. Further, sustainability received a high ranking as well, hence the authors state that digitization and sustainability are becoming increasingly important competencies required for the future. Considering digitization one interviewee stated “*This is giving a kind of requirement of their way of working and solving process. Because the*

massive data that you are getting today is so big. Given that you do completely understand the equipment that you are buying for your organisation, might be helpful in some part. But how do you merge this tons of information into something meaningful and make the right decision. This is important and not everybody is capable of doing that and that is where we all have to learn and develop.” (Bals et al., 2019. p. 6)

Bals et al. (2019) compared their identified competencies with a study by Tassabehji and Moorhouse (2008) and found that there were some competencies that did not match. Big data analytics, automation innovative sourcing approach and innovation sourcing was some of the new competencies identified in the study by Bals et al. (2019). In relation to this, one interviewee mentioned how hard it was in the past to get market information compared to today where there is an overflow of information and the challenge is to sort, prioritize and make decision about the useful and right information. Another interviewee stated that if they managed to set up the procurement function correctly, strategic procurement professionals would be able to focus more on the developments in the market which can lead to valuable insights of what is happening in the market and which innovation to acquire. Moreover, traditional businesses viewed Automation, Big Data Analytics and Computer Literacy as very important competencies in contrast to social businesses where it is of less importance. In addition, bigger companies might find it more challenging with the overall competencies related to digitization since it is harder to induce change in these organizations.

Deal with ambiguity, open mindedness, curiosity and holistic supply chain thinking were also some of the competencies identified by Bals et al. (2019) that did not match with Tassabehji and Moorhouse (2008) study. Openness is described as being open to new technologies and solutions in addition to other functions requirements and views (Bals et al., 2019). To understand the holistic supply chain thinking more deeply, one interviewee stated “*(...the ability) to pick up quickly an understanding of the whole supply chain related to the good or the service that (buyers) are actually dealing with. And it's not just the first level supplier but the second, third, and fourth, and fifth level supplier and that we teach them the skills to understand how to sort of think through and map and come to some ideas around the whole supply chain and how that supply chain can be influenced to be of value to our company be it in a cost perspective be it in an innovation perspective be it in an environmental or sustainability perspective so they see the whole supply chain and understand what really happens.*” (Bals et al., 2019. p.9).

For suppliers, the competencies Product knowledge and Holistic Supply Chain Thinking are the most frequently coded competencies among their top ten, which is not the case for buyers (Bals et al., 2019). The authors conclude that this could indicate that buyers with deeper understanding of the acquiring products and with wide supply chain are viewed by suppliers as more appropriate business partners. Further motivated by that this makes the buyer more reasonable considering negotiations and secure the buyer-supplier relationship to be more balanced.

Gracht, Giunipero and Schüller's (KPMG, 2016) and Deloitte's (2013) reports are also aligned with the findings in the study by Bals et al. (2019), both KPMG and Deloitte conclude that future competencies such as analytic skills, cross-functional abilities, data-driven orientation, stakeholder engagement and environmental and sustainability compliance are becoming increasingly important. In addition, KPMG (2016) and Deloitte (2013) emphasize the creative and inventive skills, i.e. “out of the box thinking”, to enable innovation sourcing.

3 Research Method

When conducting a research project, deductive or inductive approach are the two main approaches (Patel & Davidson, 2019). Deductive research is appropriate if the aim is to test an existing theory (Bryman & Bell, 2011) and there is available information about a subject (Patel & Davidson, 2019). Inductive research is applicable to use when the aim is to develop a new theory (Bryman & Bell, 2011) and if the information and previous research investigations are limited (Patel & Davidson, 2019). This study investigate future possibilities in an unexplored field where previous research is highly limited. Hence, an inductive research approach is applied. This chapter presents the working procedure of the thesis, the collection of data, and lastly, the data analysis.

3.1 Working Procedure

In this thesis, the inputs stem from a literature study in combination with interviews. The interview objects are all employees at CX in different relevant departments and positions. The aim was first to get an understanding of the topic of DDBMs and then to understand it in the context of CX to identify the future roles of and impacts on PU in DDBMs. The theory combined with the findings in the interviews then formed the basis for the analysis and recommendations.

The area of the thesis was requested by CX, however, since it is a new topic to the company the purpose was unclear. The scope of the study was developed in collaboration with the supervisor at Chalmers University of Technology, Árni Halldórsson, and CX. Since the thesis covers several areas, the purpose was redefined a couple of times to ensure a useful result. Early in the process, a planning report was created including background information on the topic, a first purpose and research questions as well as possible outcomes. The first phase in the data collection process was to conduct a literature study to obtain necessary information about DDBMs, BM innovation process and purchasing. In an early stage of the literature review phase an interview with human resources was conducted with the purpose of understanding PU's knowledge and ways of working. When this was finalized, the second phase started which was conducting interviews. During this phase, the scope of the thesis changed which resulted in that the BM innovation process was no longer included. Additional literature about DD service offerings was added as well as other complementary theories about purchasing.

After collecting the data, an analysis connecting the data from the interviews with literature was conducted. During the analyzing phase, the researchers noted that more literature about services offerings and different degrees of servitization were needed. Therefore, additional theory is included in the analysis chapter to perform a deeper and more accurate analysis. More details about how the analysis is structured and why are presented in section 3.3. Lastly, a recommendation based on the results from the analysis were written.

3.2 Data Collection

This section presents how the qualitative data has been collected. First, the collection of the qualitative data is presented, including the sampling of the interviewee objects, how the interviews were performed as well as the interview objects. Second, the literature study is described and lastly, a discussion of the collection of data and how this affected the result is included.

3.2.1 Collection of Qualitative Data

Qualitative data is described by Easterby-Smith, Thorpe and Jackson (2015) as collected information that is not numeric. The collection of qualitative data can be seen as an interpretative and interactive

process. According to Wallén (1996) it is suitable to use a qualitative approach in studies where the purpose is to interpret and explain key concepts and connections in the research area and in studies that are explorative. Since the research area in this study is unexplored it can be viewed as explorative. Moreover, due to the purpose of this study which was to investigate the roles of and impacts on PU in DDBMs, it was more appropriate to collect qualitative data instead of statistical data since this is non existing.

Interviews were the main source for qualitative data in this study. In addition, the company's website has also been used to gather specific information about the company and their DD service offerings. The aim with the interviews was to collect insights about BMs and DDBMs in general, CX's current DD service offerings, the interviewees' vision of CX's future DDBMs and challenges, competencies needed for the future DDBMs, how PU can contribute and how they might be impacted by their new roles. The interviews consisted of both specific questions and open questions. Specific questions were asked about current ways of working, current DD service offerings and the use of data in CX today. The more open questions were asked for the future DDBMs, challenges and PU's contribution to DDBMs and how they might be impacted.

3.2.1.1 Sampling

This section describes how the interview candidates that participated in the study were chosen. A combination of different sampling methods were used in the study to ensure a representative sample to achieve the purpose stated in chapter 1. The sample size was determined to get reliable data, however, due to the Covid-19 pandemic it was not possible to fulfill the planned sample size. However, the researchers in collaboration with CX and the supervisor at Chalmers evaluated the current sample size when the effects of the pandemic occurred to ensure that it was sufficient to use in the study.

Convenience sampling

Convenience sampling was the primary method used in this study to select interview candidates. Bryman and Bell (2011) state that this type of sampling is non-probability sampling where data that is easy for the researchers to access is utilized to determine the sample. For the purpose of this thesis, the contact with interview objects were provided with two different approaches. First, possible contacts were provided by CX through the supervisor, these contacts were then ranked by the researchers in collaboration with the supervisor from CX based on the relevance of the interviewee's position, knowledge and availability. Secondly, an internal competence matrix was used to identify different departments where it would be interesting to collect data. The contact details of relevant persons were then provided by people within CX.

Convenience sampling results in only including interview objects available to the researchers which entails an issue that needs to be taken into account. Lack of information outside of the researchers knowledge implies that it is not possible to determine what population the sample represents. Therefore, a generalization of the results obtained from this type of sampling is not appropriate. (Bryman & Bell, 2011). For this thesis, convenience sampling was considered to be the most appropriate way to initiate the sampling since CX is such a large organization. Thus, it would not be reasonable for the researchers to scan the entire organization for a sample. Furthermore, the sampling was done in close collaboration with the supervisor from CX which increased the legitimacy of the thesis amongst the interviewees. Bryman and Bell (2011) state that convenience sampling is accepted, e.g. when the opportunity for data gathering in the convenience sample is without parallel.

Snowball sampling

When the interviews with the most prioritized and available interview objects provided by CX were initiated, the second sampling method, i.e. snowball sampling was used. According to Bryman and Bell (2011), this type of sampling is also non-probability sampling where initial contacts are utilized to provide other relevant contacts, which is exactly what was done in this thesis. All interviewees that were asked if they had additional interesting interview objects for the study provided contacts, although, all was not used. Bryman and Bell (2011) stated that the issue with not being able to determine what population the sample represents is also valid for snowball sampling. Important to note is that quantitative studies has higher requirements regarding external validity and generalizability than qualitative studies. In this case, the snowball sampling was controlled by the researchers by stating what information was missing to obtain contact details of possible interview objects relevant for the study.

Sample size

Bryman and Bell (2011) state that two main factors to take into account when determining the sample size are time and cost. The authors explain that increasing the sample size after a certain point is not economically defensible, since additional data will not decrease the sample error in the same rate as before. Hence, the positive effects on precision will eventually decline when increasing the sample size. In this study, 13 interviews with interview objects related to purchasing and/or data driven development in CX were conducted. Five additional interviews were planned, but due to the global implications of the Covid-19 pandemic, it was not possible to conduct these interviews. However, the purpose of the additional interviews was to complement the data and increase the validation of the study. In the last interviews, most of the provided information only confirmed previous answers, thus, the qualitative data that was collected is considered to be sufficient.

Moreover, Bryman and Bell (2011) state that the homogeneity or heterogeneity of the sample population is important to consider. If the sample is homogeneous the diversity will be significantly less than in a heterogenous sample where the variations can be expected to be high. An example of a homogeneous sample is employees in the same company, and an example of a heterogeneous sample is habitants in a city. On this basis, the higher the heterogeneity in the sample, the larger sample size will be needed. Since all interview objects in this study are employees at CX, the sample can be considered to be relatively homogeneous. This furthermore motivates that the sample size used in this thesis can be seen as adequate.

3.2.1.2 Designing Interviews

According to Easterby-Smith et al. (2015), interview design can be divided into three categories: unstructured, semi-structured and highly structured interviews. It is difficult to prepare for unstructured interviews since questions are asked during the conversation and the aim of them is basically to get the conversation going instead of receiving any particular answers. In semi-structured interviews the questions are addressed in an open and flexible way, but the issues to be covered are included in a topic guide. For highly structured interviews a predefined and detailed list of questions, which could have predefined answers, are used. Semi-structured interviews are used in this study since the aim is to get an understanding of PU's role in future DDBMs. The interviews could not have been based on free conversations, i.e. unstructured interviews, since the topic is so new to everyone and the experiences are limited, nor could it have been structured interviews since some valuable aspects could have been lost.

To customize the questions for the interviewees four different interview templates were created. The templates were categorized in which division the interviewees belong to; HR, PU, PD and XS, see Appendix 1. Two of the templates, i.e. PD and PU, were almost the same to compare the results from

actors with different positions and divisions. However, the follow-up questions and the answers given on the DDBM part and PU's contribution part differed between the interviewees from PU and PD. The supervisors at both Chalmers University of Technology and CX reviewed the interview templates before the interviews were conducted. The input from the supervisors was discussed and some adjustments were made to improve the templates in order to ask the most appropriate questions for this study.

3.2.1.3 Interviews Objects

One interview with HR was conducted to learn more about PU's current competencies and the difference between their position. The purpose of this interview was to facilitate the preparation of some specific questions to each of the interviewees but also to support the sampling of the interview objects. Since the purpose of this thesis is to investigate how PU can contribute in CX's future DDBMs as well as how they might be impacted by this, the researchers chose primarily interview objects from PU since they are the ones who best know their capabilities and strengths. Since DDBMs are very new for almost everyone in CX, it was necessary to interview other divisions in CX as well to receive a wider perspective and detect challenges and possibilities. Therefore, some interview objects from PD were chosen since they have a little more experience in DDBMs than PU and their view of PU's contribution could differ. Moreover, due to the unexplored topic three interviews with XS were conducted to learn from their DDBM development project where purchasing was involved in some activities. XS is another brand within CX and is not directly connected to PU.

In this study 13 interviews were conducted, however, five additional interviews were planned but they could not be performed due to the Covid-19 pandemic and the rapid close down of CX. One of the missing interviews was with MS and this department has more insight in CX's current DD service offerings and future plans. MS is also closer to the end customer market than PU. Hence, it would have been valuable to have included their perspective in this study. Table 3.1 presents the date of the interviews, interviewees' position and division, and the abbreviations used in the empirical findings in Chapter 4. All interviewees are anonymous, but they agreed to publish their title.

Table 3.1 - An overview of the interview objects, date and the abbreviations used in this study

Interview date	Interview object	Abbreviation
March 4, 2020	Manager, PD	T1
March 5, 2020	Lead Engineer, PD	T2
March 13, 2020	Technology and Strategy Leader, PD	T3
March 18, 2020	Senior Manager, PU	P1
March 16, 2020	Manager, PU	P2
March 4, 2020	Segment leader, PU	P3
March 11, 2020	Senior buyer, PU	P4
March 20, 2020	Senior buyer, PU	P5
March 18, 2020	Senior buyer, PU	P6
Feb 27, 2020	Project Manager, XS	S1
March 9, 2020	Buyer, XS	S2
March 3, 2020	Buyer, XS	S3
March 5, 2020	HR	H1

3.2.1.4 Performing Interviews

All potential interviewees were initially contacted through a standardized email sent by the supervisor at CX to increase the probability to receive a response. The email contained information about the researchers and the aim with the study. This type of first instructions are emphasized by Andersson (1985) to obtain desirable result with the future interviews. All candidates that were contacted responded positively and the researchers contacted them with an invitation for the interview. Some days before the planned interview the candidates received an email with further information about the upcoming interview where four main areas were described to give the interviewee time to prepare.

The interviews were mainly performed via Skype voice call since the interviewees were located all around the world. If it was possible the interview were held in person. The majority of the interviews were held in English due to different native language, however if the person spoke Swedish then this was chosen to avoid misunderstandings. The planned time for each interview was an hour, but some of the interviews where the interviewee was less elaborate with the answers, were shorter. All interviews were recorded with approval of the interviewee. According to Andersson (1985) there are many advantages with interview recording. A recorded interview ease the analysis process and since the interviewer does not need take notes it makes both the interviewer and candidate more focused. During the interviews, both researchers participated where one communicated with the interviewee and one took notes. Hence, the recordings were used to ensure that no information was left out. In addition, if the interviewees shared confidential information during the interviews the interviewees wishes of leaving this information out was respected.

3.2.3 Literature Study

This thesis covers several areas, however DDBMs was the main focus throughout the entire process. Therefore, literature was first collected regarding BM where keywords used in the search for articles related to this topic were *business model definition*, *what is a business model* and *Osterwalder business model*. To develop an understanding of DDBMs, this was the second topic where articles were reviewed. The keyword used for this search was *data driven business model*. A search for articles concerning BM innovation process was also made since this was the initial focus of the thesis. Although this area was excluded from the thesis after a refocus of the scope, it yielded some valuable insights. Keywords used in this search were *business model innovation process* and *business model development process*. Since the aim of the study was to investigate what role PU can have in DDBMs and how this will impact them, a literature review about the purchasing organization was essential. For this search, the keywords used were *purchasing organization*, *purchasing in organizations*, *purchasing business model*, *purchasing and supply relationships* and *purchasing suppliers*. To further comprehend purchasing's involvement in business development, a search with the keyword *purchasing new product development* was conducted. Chalmers Library and Google Scholar were the two databases used for searching for all articles. Additionally, literature was retrieved from the course Purchasing and Supply Management. For a more thorough understanding of DDBMs in CX, the researchers attended two webinars proposed by CX with the theme DDBMs. The relevance of the literature review has been continuously discussed with the supervisor from Chalmers.

The literature study was adjusted and refined during the process, partly due to the refocus of the scope and also to secure the relevance of the thesis. Thus, some parts of the literature were taken out or shortened and some were elaborated or added. As the knowledge about CX's perception of DDBMs grew, literature about DD service offerings were added to complete the understanding of the subject. The articles used for this part was suggested by the supervisor from Chalmers. During the analysis, some

additional literature was added to the literature study to fit the purpose of the thesis. Thus, the literature study was a work in progress throughout the majority of the thesis process.

3.2.4 Discussion

When performing the study, the literature review formed a knowledge base. This was necessary before creating the interview templates, since an understanding for the topic was needed to formulate the questions. An issue with the literature study was that it covers several areas since the topic of the thesis is highly unexplored. Thus, there are no articles investigating the connection between DDBMs and purchasing. The questions asked in the interviews were of exploratory nature to investigate the interview objects' views and opinions. A challenge that emerged in some interviews was when the interviewee lacked knowledge about the topic which occasionally resulted in that the question was not understood correctly. This might be an indication that the questions were too difficult. However, it is reasonable to assume that this challenge was rather due to the complexity of the topic, since the questions were formulated as openly as possible, see Appendix 1. When this problem occurred, it was managed by the interviewer by asking follow up questions to assure that the necessary information was obtained in every interview. The majority of the interviews were conducted via Skype voice call which, according to Easterby-Smith et al. (2015), results in that the non-verbal communication is lost.

An interview with MS regarding DDBMs and PU's role was planned but not conducted. It would have been beneficial for the study to understand what direction CX is going when it comes to DDBMs and how this can relate to PU since MS has the market perspective. This would have been a good way to validate and complete the collected data since several interviewees suggested that MS should be interviewed. Due to the unexplored nature of the subject, the thesis is investigatory. Hence, the thesis remains relevant without the input from MS since the findings from the collected inputs are informative for PU. Further, in absence of the time constraint and Covid-19, more interviews with employees in PU could have been conducted. Easterby-Smith et al. (2015) state that when the interviews have varying structures, standardization of the templates is difficult which makes conducting more interviews time consuming. More qualitative data would increase the validity of the study, although, many interviews only confirmed the answers from previous interviews. In addition, case studies would have been beneficial for the study to collect learnings from past experiences. The issue is that the subject of this thesis is very new, which makes the difficulty of finding such cases high. Thus, the time constraint discouraged this option.

Lastly, due to the Covid-19 pandemic, the collaboration with CX was interrupted after the last interview. Therefore, it was not possible to discuss the empirical findings and analysis to ensure a common ground.

3.3 Data Analysis

To analyze the collected qualitative data in this thesis, the approach called content analysis has been applied. Content analysis is suitable for theory building and testing hypothesis (Hsieh & Shannon, 2005; Flick, 2009), hence this approach was the most appropriate to use with the purpose of this thesis. Easterby-Smith et al. (2015) describe the aim with content analysis as organizing data in accordance with certain ideas or concepts, and then systematically make implications from it. Thus, the analysis of the data is performed with respect to the meanings, relationships and presence of the chosen ideas or concepts.

In general, the first step in a content analysis is to select appropriate information for the study's research questions which are based on specific criteria (Easterby-Smith et al., 2015). In this study the main criteria was that all questions included in the interview template should contribute with valuable insights

to at least one research question. To answer the first research question the first step of the data analysis was to create an understanding of what position CX has with DD service offerings today based on the empirical findings and theory. Further, the current DD offerings were analyzed with theory to describe them in terms of a DDBM. To visualize this, the framework presented in the theoretical framework was applied but two columns were added to present the characteristics of two identified service types. The aim of explaining the current DD service offering in terms of DDBM was to analyze what the transition towards DDBMs will imply. For the future DDBMs several ideas were stated in the interviews and were categorized into three different DDBM types. With an outset in these three categories of DDBMs, applicable theory were used to describe the characteristics of those. Lastly, to answer the first research question, a comparison between the current DD service offerings and future DDBMs was conducted. The answer of the first research question created a base to analyze the two following research questions in the study, i.e., PU's role and impact.

To answer the second research question, the data was organized and analyzed from three different theories; Value chain, Business strategy and Supplier involvement. Based on this, three possible roles were identified and the implications of these were analyzed. Hence, both research question two and three were answered.

3.3.1 Research quality

According to Bryman and Bell (2011) it is very important that the findings presented in the study are trustworthy to the scientific community. To assess the research quality of this study, four criteria as presented by Halldórsson and Aastrup (2003); credibility, transferability, dependability and confirmability.

Firstly, since the interviews were recorded, the researchers listened to them again after conducting them and completed the notes. Thus, credibility was ensured since all statements in the empirical findings are quoted correctly which implies that the empirical findings present the interviewees' respective realities (Halldórsson & Aastrup, 2003). Secondly, transparency in the research methodology is important to ensure transferability according to Halldórsson and Aastrup (2003). This was ensured in the study by describing how it has been performed in this chapter, as well as the appendix providing full transparency on what questions were asked to collect the qualitative data. On this basis, it should be possible to conduct the study in a new setting. Moreover, transferability applies to how well the findings can be generalized. This study is a single case study and the results are adapted to Company X. However, the description of PU is in line with theory, and although the analysis presents contributions based on characteristics of future possible DDBM types in Company X, the characteristics are based on generalized service taxonomies, which makes the study applicable in other companies as well. Thirdly, by recording and writing down findings, and using illustrations, several tools has been used to document the findings and thus, ensuring dependability (Halldórsson & Aastrup, 2003). Lastly, confirmability was ensured by basing the analysis and recommendations on the empirical findings, which has then been reviewed with the supervisors at Company X and Chalmers to secure that the findings represent the result (Halldórsson & Aastrup, 2003).

4 Empirical Findings

In this section, the empirical findings are presented. Section 4.1 presents the empirical result in DDBMs in CX by presenting CX's current service offering, how BMs and DDBMs are defined by the interviewees and how future DDBMs for CX are envisioned. In 4.2 PU's possible contributions as well as impacts on PU in the space of DDBMs are presented. Lastly, in section 4.3, section 4.1 and 4.2 are merged to present the future role of PU in CX's DDBMs. Table 4.1 presents a recap of the interviewees as presented in chapter 3 Method.

Table 4.1 - An overview of the interviewees' respective departments in CX

Department	Interviewee
PD	T1, T2, T3
PU	P1, P2, P3, P4, P5, P6
XS	S1, S2, S3

4.1 Data Driven Business Models in Company X

This section contains three main parts. Firstly, CX's service offerings are presented and explained. CX's current service offerings are mainly focused on to increase the **uptime** of the vehicle, **supporting the vehicle** and or increase the **customer satisfaction**. Secondly, to create an understanding of what the interviewees mean in their statement, their definitions of a BM and DDBM are included. The majority of the definitions of a BM contains a **monetary perspective** in some way, and in the definitions of a DDBM all interviewees include **the use of data** but there is split view on how you use it. Further, some of the candidates state that there is a strong connection between DDBMs and **digitized services** and the interviewees' overall experiences of DDBMs are low. Thirdly, the view of future DDBMs can be divided into three main types; **Sell data, improve existing offerings** and **create new service offerings**. New revenue streams, customer satisfaction, decreasing the impact on the environment are some of the aims with the new future DDBMs. To succeed with DDBMs in the future eleven competencies are identified. The majority stated **data science** as the needed competence and the competence to **monetize on data** was the second most mentioned. Considering challenges for CX, the majority mentioned three main areas; **Organizational change management and mindset, legal issues** and how to **extract value from the data**.

4.1.1 Company X's Current Service Offerings Based on Data

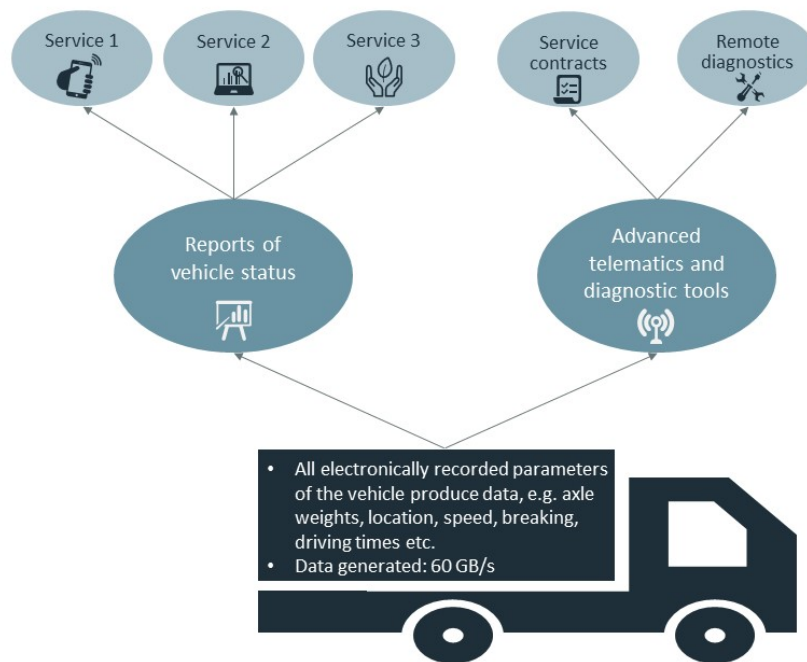


Figure 4.1 - An overview of CX's current DD service offerings

CX currently offers range of services to enhance the usage of the trucks, illustrated in figure 4.1. With advanced telematics and diagnostics tools, they can monitor the trucks' health remotely, making it possible to plan and prepare workshop visits. To accompany the needs of different truck owners, CX offer three different service contracts for service and repair. In case of an unplanned stop, CX offers a service that makes it possible for the company to access information about the truck and the fault so that the right parts and repair service can be delivered quickly. Furthermore, CX offers services that compile and visually presents data about the status of the trucks including location, fuel efficiency, truck health and driver times. For fleet managers, i.e. owners of several trucks, a service called Service 1, which is accessible through an app, offers the capability to keep track of information of the fleet, fuel and drivers for a fixed monthly fee. To use Service 1, a hardware needs to be installed in the trucks either at the factory or in retrospect by a CX dealer. Services are also available for independent truck owners and the drivers of the trucks. For truck owners wanting to enhance the fuel economy of the truck, a service called Service 3 is available. Service 2 is a digital interface letting the user access all digital services and data. Information about the truck's uptime, efficiency and productivity enables the owner to prepare, plan and improve operations. In addition, CX offers digital driver support through Driver Development trainings that enhances the drivers' knowledge in how to drive safer and more efficient to reduce wear and tear of the truck and enhances fuel economy. (Company X, 2019).

T3 stated that 60 GB data is generated per second all of which is not used. Another interviewee, T2, claimed that CX owns the majority of the data and some of it is owned by third parties. In some cases, CX buys external data from third parties, e.g. map data. T2 further described the variety data generated from the trucks. Any electronically recorded parameter of the vehicle produces data, such as location, axle weight and pressure, speed, fault codes, breaks etc. For the data that is being used, Service 1 is the core product of vehicle connectivity for CX. T2 explained that CX's services, which are reports of the vehicle status, are all based on data generated by the trucks. T1 explained that CX has quite a good understanding of the vehicle and works with data that they provide to end customers in different ways. The candidate also highlighted that the intention with using the data is to offer a better product rather

than how to capitalize on the data. Therefore, all services are focused on improving uptime. This was also mentioned by T2 explaining that the current services such as predictive maintenance, fuel efficiency and fleet efficiency all revolve around this issue. T3 stated that CX is a hardware manufacturing company and thinks that is the reason why all services are exclusively tied to the vehicles.

CX's information about their DD services and the interview responses show that the current DD service offerings support the trucks and enhance customer satisfaction. Interviewee P4 explained that the data collected is used to create services for CX and its existing customers. This statement was further emphasized by T3 *"We are focused on safety or making the product interesting for the customer, not to make new revenues"*. The customer can be both the operator of the vehicle and the owner of the vehicle, which is not necessarily the same actor. Interviewee P3 said that the services are bought and used by customers of all sizes, ranging from individuals and small fleets to large fleets, i.e. fleet owners. However, P4 explained that some services that CX offers, such as data about how long the driver has been operating the vehicle is statutory. In those cases, the data is transferred to relevant authorities, but currently the data cannot be sold to other actors. Candidate P5 mentioned that CX has an increasing number of sensors in their trucks. However, T1 stated that CX is relatively late with leveraging the data that is being generated. *"We have a lot of skilled people working with Service 1 and similar services, that is not my role, but I see that we are missing a lot"*. When it comes to creating services based on data that has another purpose than supporting the vehicle, T3 stated that *"We are fairly new in the industry [...] we have not yet found the right way to make a proper BM for it"*.

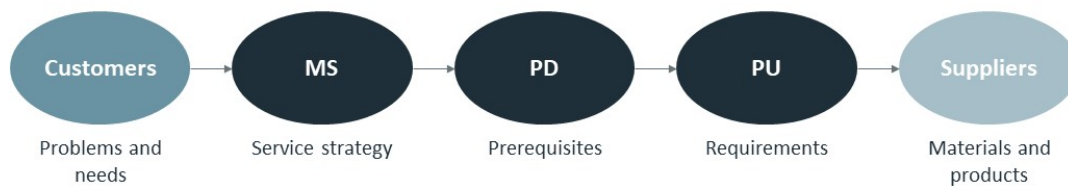


Figure 4.2 - Describing how new services are developed in CX

How CX creates a service was described by P3 and T2, shown in figure 4.2. The service strategy is first defined by MS, which is the interface towards the customers, in collaboration with PD. After this has been defined, it is broken down into prerequisites by PD which is the technical enabling department to deliver the service offering. PU then receives information from PD to state requirements to suppliers and makes the necessary purchases. When the service is available in the market, the customer can add the service when they buy the truck or retrospectively for a subscription based fee. Then the customer can log on to their profile to see the vehicle reports.

The knowledge about the services offered by the company differs a lot depending on the role of the employee. Some interviewees had poor knowledge about current service offerings. *"I am not involved in that, I think it is new... Business models are in the other end of the organization, sales and marketing has better input"* P2 stated. *"I am not very knowledgeable about that, I know we collect a lot of data but I am not sure if we do business with it"* P6 stated.

4.1.2 Business Model Definitions in Company X

As a starting point it was unclear how a BM was defined in the company and some assumed that the term had different meaning for everyone. Therefore, it was of interest to investigate this further during the interviews. It was clear that the assumptions were correct, some employees could not define it at all and the given definitions varies as shown in table 4.2 below. The majority of the given definitions included a monetary aspect.

Table 4.2 - An overview of BM definitions in CX

Definition	Defined by
How someone gets paid and how someone buys something	T1
How a company makes money	T2, P1
How to create value and get paid	P2
Standard way of making business in the automotive industry	P3
How some components generate cash for one actor, and service output for the other one	P6
A way to commercialize innovation. It's a structure to identify how you control, implement and make a product and/or service from innovation. It includes how you manufacture, sells, support and exploit the product/service and your revenue streams	S1

The interviewees were also asked to define a DDBM. Some interviewees defined a DDBM when they were asked to define a general BM, hence these interviewee's definition is only presented once. The given definitions of a DDBM are presented in table 4.3 below.

Table 4.3 - An overview of DDBM definitions in CX

Definition of a DDBM	Defined by
It all starts with data driven development which is securing information about how your product or service are being used and then you need data. When you have that, the data can be used for BMs like pay per use, partnership etc. If the information is shared or used then it is easier to find new customers. Basically, it is digitalization to find new things	T1
The product is data, it is intangible	T2
Data being used to create a valuable service for the driver. Turning the sensors into something useful	T3
The data from the products owned by CX and how we sell it - it could be both product and data	P1
How we capitalize or sell the data to earn money on it	P2
It is a change in the way we make business, the trucks that support our BM will be the one supporting our services, and services will be what we make money on in the future	P5
Product or service generated from data, and the output will be supported by data	P6
A BM where the product/service has data as its main raw material. Data is the input in the process when we produce value to customers	S1
Avoiding downtime for our vehicles	S3

The attention of DDBM has increased within CX, although the experiences regarding DDBMs are overall not very extensive. All the interviewees from PD, i.e., T1, T2 and T3, had some experiences either from CX or previous work places. However, P1, P2, P3, P4 and P6 from PU stated that they did not have any or very limited experience. To illustrate, P2 stated *“Pretty limited experience, or very. I believe that this is very new for everyone in Company X and an ongoing change for many companies right now”*.

In the definitions presented above of the DDBMs, some interviewees included services in their definitions and based on this the interviewees were asked if they saw any connection between DDBMs and digitized service offerings. Both T2 and P1 stated that it was the same and found it hard to differentiating them since digitized services use data. Interviewee P2 believed that DDBM is a prerequisite to create a digitized service offering. Further, T3 believed that there is a difference between the two concepts and explained it as *“In data driven business models you look for a pattern of what is being used by customers and try to reduce something, but in digitized services you need to come up with these services. The services do not only need to be collected data but instead you need to practice to come up with something that has not existed before and is disruptive, i.e. how you can achieve a new service based on combined data”*.

4.1.3 Vision of Future Data Driven Business Models and Implications for the Company

Table 4.4 - An overview of three identified types of DDBMs

DDBM type	Explanation	Aim
Sell data	Monetizing on data i.e. sell the collected data Produce more data Find new markets and customer for the data produced	New revenue streams Find new customers
Improve existing offering	Need data for decision making Increase uptime Support business and product predictability Attractive products	Improve customer satisfaction Do more with the same resources
Create new service offerings	Data to create new services Product is free but other applications are charged Sustainable transport solutions / circular services Subscriptions e.g. kr/km Transported cargo instead of selling trucks	New revenue streams Satisfy customers Decrease the impact on the environment Subscription models to stabilize the economy Value creation

The vision of the future DDBMs for CX are to some extent both similar and dissimilar among the interviewees. An overview of the main types of DDBMs discussed in the interviews is presented in table 4.4. All interviewees agree on that data is a new and necessary source for future revenues and that data is needed to create new services. Both T1 and P1 state that CX will need new BMs for three areas; new revenues streams from existing customers, suppliers and third parties. In addition, P1 highlighted that

they need to make sure that everyone are involved in the development of these BMs and the goal should be profit making and to satisfy the customers. T1 also believes that partnership where data sharing and collaboration in developing new services will be needed in the future. Further, T1 also mean that there are many mature industries with different BMs in the market today, hence this means that CX needs to develop flexible BMs and being able to react rapidly to market changes and trends.

There are many thoughts of how the data will be used in the future. Interviewee T2 state that CX will need to monetize on data in the future and produce more data. They will also need to find new markets and customers for the data they produce. Further, T3 state that they need data to take the right decisions in order to improve their current offerings in the future. Improvement of current offerings is also how interviewee P4 and P5 envision the future DDBMs. For P5 it is all about uptime and that the service can be helpful if it increase uptime, support business predictability and product predictability. Both T3 and P5 meant that the main goal for the future DDBMs is to improve customer satisfaction. T3 also mentioned that the perception of the business will be changed in the future since it will be possible to do better than today but with the same resources.

T3 gave an example for future DDBMs *“Example in terms of data driven business models, I think about something in an extreme scenario where you give the product for free but charge for other applications. But if you ask me, I will try to be even more ambitious, maybe we can be more efficient and leave less carbon footprint meaning do something good for the human being. Since in the future the environmental perspective will affect the transport solutions and Company X’s business”*. Taking the environment into account when thinking of the future is also something that P6 and T1 had but stated it in terms of sustainable transport solutions and circular BMs respectively.

Regarding the future DDBMs P2 stated *“I believe that data driven business models is a part of the company’s future, but I do not think that we will sell trucks in the same way as we do today. I believe that we will lease out our trucks such as they do on the vehicle side. We will become a service company and in association with that change, we need to investigate how to sell all of our collected data. We have a lot of data and I believe that cities can be an even more important customer”*. Subscriptions is also something that T1, T3 and P5 also mentioned. An example of P5’s subscription model could be that the customer will pay X kr/km. Moreover, since the lifetime of a truck is 10-15 years there are potential to earn money during all these years in forms of services instead of a onetime payment according to T3. Further, T3 meant that subscriptions can give CX a more stable economy if the economy changes. In an economic recession it is unlikely that people update their hardware, but their services will still be needed, further explained by that it is unlikely that people unsubscribe Netflix in these scenarios since they are used to them.

Interviewee P4 has a long-term perspective for the future DDBMs and envision that the trucks will be autonomous. In this case it becomes really important to understand why the customer choose CX since what you sell will be transported cargo instead of a truck, which will make the brand less important. P4 stated that in this case CX needs to understand what they can make business on. The value does not need to be money, but attractive products P4 explained. Lastly, interviewee P6 imagined the future as the following *“We will make services for any customer to go from point A to B, we will only sell services and not machines. For sure it could be only data driven services. It is no more about the product but about services”*.

To develop and succeed with the future DDBMs some competencies are needed, P2 stated *“It is a big change, and the competencies that we have in-house today will not be the same needed in 10 years from now”*. The interviewees’ view on which competencies they will need in the future are presented in table 4.5 below.

Table 4.5 – An overview of the required competencies of future DDBMs

Competencies	Stated by
Business development	T1, P1
Closer collaboration between PD, PU and MS	T1
Technical expertise	T2, P6
DDBM expertise	T2
Data science	T3, P1, P2, P3
Data analytics	T3, P1
Monetizing on data	T2, T3, P1
Market sensing	P4
Understanding of the environment	P6
Thinking outside of the box	P6
Collaborative mindset	P6

Business development is mentioned by T1 and P1, both refer to defining a value proposition from the data and make use of it. T1 stated that a closer collaboration between PD, PU and MS is necessary to become more efficient in the future, but there has not been taken any action to improve this so far in the company. Further, P2 explained that knowledge about servitization will increase dramatically in the future and that engineering and know-how for how to produce mechanical parts will gradually decrease.

The majority of the interviewees stated data science as a future competency. The motivation behind this is that they need someone or an entity who can collect data and handle it. Data analytics were highlighted by T3 and P1 due to the importance of interpreting and working with data in order to get something concrete out of it, which later can be turned into business areas. Interviewee T3 also stated that it is important to secure that you have the competence of creating right hypothesis from the data and quickly being able to validate or invalidate, i.e. being able to understand the behavior behind the data, which is a competence that exceeds the competence of just collecting data.

Interviewee P4 believes that there are very few in the company that understand the market and value of data, which is a competence that will be necessary in the future to sense what kind of data that is demanded outside of the company. This competence is similar to P6 opinion who stated that they will need to have knowledge about their environment in future, but in this setting it is not only the market perspective but the whole network of CX and the surroundings. P6 mentioned the competence to think outside the box, meaning that to be able to come up with new solutions and ideas, the employees needs to be more creative than they are today. P6 explained further that a collaborative mindset is also needed in the future since collaboration with other companies that are more experienced with DDBMs can give CX leverage.

Challenges related to DDBMs and the future were also discussed with the interviewees, where the three main challenges identified are presented in figure 4.3 below.



Figure 4.3 - An overview of CX's challenges related to DDBMs

Regarding the organizational mindset, interviewee T2 explained that one challenge is that CX need to reorient the way they think since DDBMs is not a traditional focus area in the business. Furthermore, P2 believed that one challenge will be to redirect the company since there will be a shift from selling products to data. T1 explained that the business mindset will be needed when data evolve, hence this will be a challenge for many departments since the ‘business part’ has not been included in their mindset to that extent before. In addition, T1 stated that many in CX are stuck in the optimizing view on everything and the challenge will be to widen the innovation perspective. T3 further emphasized the issue of a fixed mindset *“That is the problem right now, people are new to this area and they do not understand how it works so therefore they are maybe scared of it”*. Moreover, interviewee S1 also highlighted the change of mindset in the organization as a challenge. The interviews brought up current operations as being a distractor for creating pure services. P4 said *“When Tesla creates new solutions they do not need to test them the same way we do. We need to maintain the old system simultaneously as we are creating the new one”*. T3 further explained that management sometimes sees new service ideas as a distraction for the current business.

Another challenge mentioned by many interviewees is the legal issues, including data privacy and the restrictions from GDPR. The challenge to secure the ownership of the data was mentioned by T3 and P5. Interviewee P3 saw challenges to define which data they should protect and which data they can and should share with others. However, P4 stated that there are implications to sell data due to GDPR. According to P5 and P3, a challenge for CX is that they operate globally and this implies bigger challenges since data laws varies between countries.

Turning the data into something valuable were a challenge mentioned by T3, P1 and P6. Interviewee T3 explained *“We need to have a strong data science department or competencies to understand the data we collect. It will be a huge amount of data collected but it is an art to create something out of it, and that is our problem in the long run - to understand the useful parts of the data and turn it into fine new business areas”*. P1 described this challenge as how to make use of the value created, i.e. create a value proposition towards the customer. Hence, when the company uses the data, the interviewee highlighted that the purpose must be to create value for the customer. The value does not need to be defined in monetary terms, but rather how it creates value for a customer. Further, P1 explained that pricing the data might be the second or third step which can also be a challenge. P3 meant that the pricing or deciding the value of the data will be a challenge since if they are not able to value the data, it will be hard to negotiate with it. Except for how to use the data, interviewee P6 stated that defining the purpose of it, *“what do we want to achieve with the data”*, will be a challenge too.

In addition to the challenges mentioned above, T1 stated that it will take approximately 10 years to get high volumes of circular BMs. Since this type of BMs will not generate profit until it reaches a certain volume, the challenge is related to the cash problem before this volume is reached. Hence, the

interviewee meant that CX needs to learn how to take small steps and find segments that are built on circular BMs rather than sales. Furthermore, T1 explained that digitalization opens up an unlimited amount of opportunities and ideas, which implies that CX needs to filter out maybe 90 percent of all ideas, which is a process that they currently have not implemented in the company. Another challenge according to P2 is the decision of what to buy or what to produce in the future, and that the decision making will involve more uncertainties than they currently work with. In addition, P2 stated that working in a different way may become a challenge. The interviewee explained an example of new sensors that they have already started to buy where they have nothing to compare with. Since this is not a typical sourcing procedure, the buyers are not familiar with the new required work tasks. Lastly, P5 said *“With more services available in the market, we could be more far from the end customer since new players from other industries might enter our industry. This can become a challenge since we might lose our opportunities with our current customers”*

4.2 The Role of PU

This section presents the role of PU and is divided into three parts. The first section describes how the department works today. The main task of PU is currently to **acquire the right products and materials, decrease cost and manage the supplier base**. PU set their strategy according to MS’s strategy and today PU lacks connection to the end customer since they are mainly operating on the other side of the supply chain, i.e. with suppliers. The second section presents possible ways PU can contribute in future DDBMs and forms five key areas. The first is **External network** where PU has the potential to **bring in innovation** to the company and **find new potential customers**. In addition, due to their close relationships with suppliers, they possess strong **interaction skills**. The second area of contribution is **Negotiations** in which PU will need to shift from price focused negotiations to **profit driven negotiations**. Further, **Contract and agreements** is an area which includes defining the **scope**, minimizing **risk** and determining **payments**. They can also protect the **ownership of data**. The fourth area is **Internal network** where PU can act as a middleman in the organization to match end customers’ problems with solutions. The last area is **Data driven business mindset**. PU have strong **business acumen skills** and can find creative ways to identify **business opportunities**. In addition, they can **propose data service solutions** and evaluate ideas. The third section describes how the interviewees think PU will be impacted by a shift towards DDBMs. Their **daily operations** will be impacted, how much they will be impacted varies from **doing the same in a new setting** to completely **reinventing** themselves. Further, PU might be impacted by **blurred boundaries** between departments since it is not clear who should do what, hence PU needs to be active in taking responsibility. **Acquiring the right knowledge** will somehow affect them since they need an **understanding of data** and how to do business with it. Finally, **understanding the end customers** is necessary, hence they must move closer to the end customer than they are today. Additionally, PU needs to understand how the environment and ecosystem change.

4.2.1 Current State

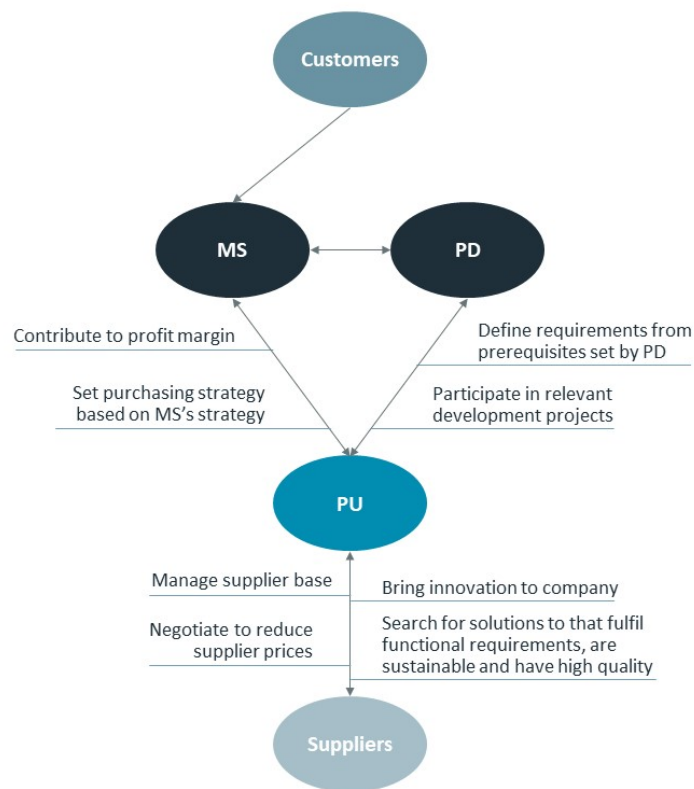


Figure 4.4 - PU's main work tasks identified in the interviews in relation to other actors. Note that this is not an organizational chart but an illustration of relationships

“Our mission is to purchase products and materials with high quality and most sustainable to the lowest price. [...] We are now only contributing to the revenue of the MS. We are not a business area, we are a business unit”, stated by P3. Interviewee T1’s view on PU was similar to P3 and described PU’s current work as optimizing businesses and decreasing costs. To understand the connection between MS and PU, interviewee T2 explained that PD are in between MS and PU. MS are the ones who usually interface with the end customer and sends requests to PD, then PD are responsible to turn these customer needs into technical solutions and PU’s role is to realize it. P3 further explained PU’s connection with “Our strategy is inspired by the strategy from MS because they are our internal customer”.

T2 stated that one of PU’s responsibilities is to make sure that they have the right resources, and on project management board meeting they are often representatives since they can answer questions about purchasing timelines. In addition, T2 mentioned that PU has been involved in a development project with PD. However, P3 said that PU has not previously been involved in development projects since the projects are often aimed to get revenues from the end customer which is MS’s responsibility. However, the topic including PU in development projects where the aim is to get revenue from the suppliers, is now growing. P4 explained that many divisions mainly focus on their own areas which has led to that people currently work in silos. P6 stated “I think we have the intention to be closer to the MS, but there is a knowledge gap. We do not know what MS wants, needs or uses all the time, since we do not have direct contact with them today. We are trying to close the gap, but MS does not always understand why”.

Further, P2 stated that many employees at CX are stuck in processes. Traditionally, PU has had mature suppliers and standardized sourcing procedures. This implies that it has been beneficial to create efficient processes which have made it easier to deal with transfers and policies. Considering processes

P4 said *“IT Purchasing have been very free, you could adjust your work after the situation which gave space for creativity and ideas. Now when everything is controlled by processes the work becomes more administrative and managers are the decision makers. It is a shame to say but I feel that my work has become less developing. The time to innovate and find new solutions has decreased as the time for the administrative have increased”*.

Today PU are quite distant from the end customer, but there are some mixed opinions on how much they actually knows about them. The importance of understanding the end customers was explained by P3 *“We need to know our customers and the market, it is a prerequisite for us when defining our strategy. We have plenty of training to be closer to the customers and understanding the world of transportation, so we do not deliver an obsolete product”*. However, P5 feels that they are far away from the end customer today. According to P2 they have started to improve PU’s insights of the end customers and that they want to move further in that direction. P2 stated *“We receive videos from the customers to decrease the knowledge gap. The goal is to understand the customer side so we can prioritize the right things. We have an important job since we are the ones with close contact with our suppliers and the suppliers possess a lot of knowledge. If we know what the customers demand then we know who we can create solutions with”*. This was also emphasized by P1 *“It is all about filling end customers’ expectations, we are a part of it since suppliers are involved in fulfilling this task”*.

P2 explained that PU should search for solutions to problems. The interviewee further explained that Innovative purchasing should find new, innovative solutions to customer problems, but instead they tend to hunt cool solutions - *“It is more a push approach to the market than pull, without knowing the need of the customer”*.

One of PU’s current main functions is to take the prerequisites specified by PD and find the right suppliers to fulfill the product requirements. P1 stated *“Purchasing needs the right partner to design the right product, the product needs to meet the functional requirements”*. T1 and P2 stated that PU have strong skills in managing the supplier base, although T1 also stated that some buyers’ main work task is to negotiate to push the suppliers’ price down. PU also has meetings with suppliers to get informed on available solutions which is a good source for bringing innovations into CX. *“I get informed and educated through them, I get insights about what they are focusing on”*, P4 stated. Currently, PU does not utilize the data when working with suppliers. P3 stated *“Suppliers ask us for data, but we do not know what to do with it”*. P4 mentioned that one prerequisite for PU to do more with the data is to know what CX wants to do with it *“We need to know what Company X wants to do with their data. When we know, we will be able to do more when we get inquiries from suppliers”*.

4.2.2 Contributions of PU in Data Driven Business Models

There are several possible contributions of PU in DDBMs which are presented in this section where they have been categorized into five main areas, which are described in table 4.6. Every employee in PU might not be able to contribute with everything presented in this section. P4 stated that *“It varies from person to person, we have a mixture of competencies in people and need to take advantage of that”*.

Table 4.6 - An overview of PU's possible contributions and activities in DDBMs

PU's contribution	Activities
<i>External network</i>	
Close relationships with suppliers Monitor the supplier base Bringing innovation into the company Internalize knowledge Identify new business opportunities Find new potential customers to CX's data driven offerings Decide who to sell data to Propose data service solutions Increase the margins by using data as payment method Strong interaction skills Gain access to supplier's data Creating partnerships Capture ideas by formalizing requirements	Scouting the market Benchmarking what other actors do Visiting suppliers Close dialog with suppliers Participating in different projects with external parties Attending various fairs Host meetings or events
<i>Negotiations</i>	
Strong negotiation skills	Preparation i.e. understanding the value of the data
<i>Contracts and agreements</i>	
Contract management Define scope and minimizing risks Setting up profit and loss sharing with suppliers Protecting CX's data	Adapting the contracts Acquire proper knowledge to deal with new types of contracts
<i>Internal network</i>	
Act as a middleman in the organization Spreading knowledge Connecting available solutions to the end customers' problems	Cross functional governance Set up meetings
<i>Data driven business mindset</i>	
Business acumen skills Proposing data service solutions and evaluating ideas Managing business risk Offer new ways of doing business Unique perspective in the organization Creative people	Evaluating new BMs Participating in decision process if an idea should be implemented or not

External network

During the interviews, one of the identified main sources of possible PU contributions to DDBMs is their external network. PU works in close relationships with the suppliers and continuously monitor the supplier base. On this basis, PU has the potential to play a key role for CX when it comes to bringing innovation into the company. *“Purchasing has the largest contact network with suppliers who has knowledge, technologies etc. and it is these technologies that create opportunities for new solutions and business models”* P2 stated. All purchasing employees that were interviewed highlighted the importance of having the ability to internalize knowledge retrieved from outside the company boundaries to identify new business opportunities. New entrants that are more invested into connectivity of vehicles increases the importance of this ability even further. P3 stated that PU need to *“Scout the market to know how the ecosystem is changing and how this will impact us in the data driven business models topic to be proactive and propose a data strategy that protects Company X’s revenue and offer the best solutions”*. P2 said that PU needs to do their part in closing the gap between external parties and CX’s solutions, although it is not solely PU’s responsibility to do so. The interviewee further stated that if PU is updated on what solutions there are available in their external network, it enables them to contribute with matching solutions to customer problems.

To succeed with bringing innovation from the ecosystem, P1 proposed benchmarking what other actors are doing as an activity. The interviewee also stated that visiting suppliers and having close dialogues with them is important. P4 stated that PU can find new solutions for CX by participating in different projects with external parties *“If you participate in different projects, you learn new things. You get the opportunity to understand the offerings on the market, the suppliers’ innovation power. It is important that we take advantage of this source of innovation”*. To get inspiration about possible services and solutions to develop P5 explained that PU attend various fairs, but also noted that they need to attend fairs in other areas than the traditional truck manufacturing fairs due to blurred industry boundaries caused by DDBMs. Moreover, P3 suggested that CX can host meetings or events where they invite suppliers to pitch their view of future generation offerings.

Knowing the supplier market furthermore enables PU to find new potential customers to CX’s data driven offerings. P4 stated that PU can contribute to DDBM that goes beyond improving existing products by *“Finding the market, identify the value and see if there is a need”*. The interviewee further explained that it is easier to know what data is interesting internally than it is knowing the value of it externally. P1 extended this reasoning by stating *“We will know who to target as a customer, being suppliers or any type of company, and offer data to them to generate cash”*. On this basis, the interviewee explained that PU should play an active role in deciding who to sell data to and propose data service solutions. Moreover, P3 and P4 stated that PU should identify opportunities to sell data to CX’s suppliers to lower the cost since data might be used as a payment method. P3 reasoned that this reduction of cost will contribute to a larger margin to the MS.

The interaction with suppliers is another important aspect of PU’s role in managing the external network. PU already has established relationships with suppliers which is beneficial. P3 stated *“Knowing how to interact with third parties is a big competitive advantage”*. T3 emphasized that the interaction with automotive suppliers is crucial for the company’s survival. The candidate further explained that PU needs to gain access to supplier data and that they also need to have a proper framework for using the data. The issue of sharing and accessing data is interrelated with the type of relationship CX should have with external actors. P1 explained that extending the relationship with suppliers and creating partnerships is a key contribution of PU. By doing so they will be able to increase their ability to innovate and find new customers. P3 stated that it simplifies finding new ways to do business and T1 stated *“If you share or work with information, it simplifies sharing or finding new customers”*. In the interaction

with suppliers, T2 stated that a role of PU is to capture ideas by formalizing requirements towards the suppliers and partners. P4 raised some issues that comes with the concept of partnerships related to who is paying who and how to share risks. The candidate further reasoned that if there are no purchases involved in the partnership but merely exchange of information, it is not obvious that PU should be the ones handling this. P1 concluded that nevertheless, PU will need to engage in extended networking outside segment activity to find new possibilities. Additionally, T2 mentioned that PU should interact with traditional suppliers and partners in innovative ways.

Negotiations

A current key skill for PU is negotiation with suppliers. This is something that was identified during the interviews as being particularly valuable in DDBMs as well. However, negotiations will not be as price centric as they are today when involving data and increasing collaboration with suppliers. P5 explained *“It’s a lot about switching from a price driven negotiation to a profit driven negotiation”*. T1 stated that this probably will change the negotiations a little but that the key focus is to work with trust and relationships rather than pushing prices down. Given that data is a new topic to CX, PU will need to understand the possibilities with the data and what the value is to the party that they are initiating negotiations with to be successful. P5 stated that *“For me, negotiation is about preparing and daring”* and raised the concern that if CX is not prepared and the other party is, it will not be possible to start a discussion. *“If you can think one step further and know the value of the data you know the starting point of the negotiation. You need background information to be a good negotiator. You need the right understanding of the value of the commodity”* P5 stated.

Contracts and agreements

Eight of the interviewees from CX mentioned contract management as a role for PU in DDBMs. This was also XS’s purpose of involving their purchasing department in the development of a DDBM. T1 stated *“When it comes to managing all the agreements, legal and engineering is not a good match. Purchasing could be a good link in this aspect”*. P1 stated that setting up contracts with suppliers and partners is the number one contribution of PU in DDBMs. P5 reasoned that the supplier base might change when transitioning towards DDBMs *“It may come a time where we cannot value traditional players, maybe smaller players. However, we cannot give them our 100 pages contract for the small ones”*. Hence, the interviewee stated that adapting the contracts to fit the suppliers’ prerequisites will be something PU will need to consider. Additionally, the purpose of PU to draw up contracts is mainly focused around defining the scope, minimizing risk and determining payments. This is a complex issue with several dimensions. P5 mentioned that the contracts need to *“Get the suppliers to share a piece of the cake, profit sharing is important”*. T3 brought up the issue that if the supplier does not deliver and it affects CX’s profit, they should share the loss as well. P3 highlighted the importance of protecting CX’s data in the contracts and ensuring that the company does not lose revenue.

P4 stated that an enabler for PU to draw up contracts involving data is that CX decides on what they are allowed to do with the data and what needs to be done to share and sell data. Another aspect that needs consideration is that PU needs the proper knowledge to formulate the contracts. S3 stated that *“This business is mostly driven by the service side which I am not used to buy. [...] I built up and signed a service agreement which I should not have been doing. IPS should have handled this”*.

Internal network

DDBMs increases the importance of collaborating across departments internally. In the interviews, one identified role of PU is to act as a middleman in the organization and spreading knowledge in the organization about what other companies are doing. Among others, P4 stated *“Purchasing should be a*

central function to interact with several departments in the organization, we need to become some kind of spider in the web". In CX, MS is the department that has knowledge about the end customer. However, P2 stated that MS might miss out on knowledge about solutions and technologies available on the supplier side. The candidate therefore reasoned that PU has a key role to play in connecting the available solutions to problems in the end customer market to enable CX to deliver successful offerings. Strengthening the collaboration between PU and the customer oriented side of the organization was also emphasized by P1, P6 and T1. P1 meant that this will enable PU to take part in cross functional governance in deciding who to sell data to. Moreover, P1 and P5 stated that there needs to be collaboration between PU and PD and Connected Solutions. P5 explained that *"They have a good understanding of new technologies and what is going on, but this knowledge tends to stay in their department. [...] many of them are passionate and skilled but sometimes too fast. Therefore, it would be good to take some time to discuss a good way forward"*.

P2 stated that in a large organization like CX, it can be hard to have a close collaboration with everyone. Therefore, it cannot be expected of PU to be the middleman for everyone in the organization but choosing the departments that matters. One activity to increase collaboration, suggested by P1 and P5, was to set up meetings with the purpose of exchanging knowledge and ideas.

Data driven business mindset

P2 stated that DDBM should be about how the company uses data. There are a lot of unexplored possibilities to do so within CX and PU's business acumen skills can be beneficial in this area. Proposing data service solutions and evaluate ideas was one identified PU key contribution by interviewee P1. Interviewee P3 stressed that *"Data driven business models is a new topic that we have to consider in our daily work"*. P2 stated that it requires a combination of *"A lot of business mindset, creating new business models, creativity and the commercial part"*. During the interviews it was clear that PU has the ability to offer new ways of doing business. P3 divided it into two different categories both focusing on lowering cost. One option is that the supplier gets access to CX's data and in exchange lower the prices. The other option is to let suppliers put components in CX's trucks and then they could access the data. The candidate highlighted that this needs to be done while protecting and making sure CX has full ownership of the data. In a wider perspective, P6 saw possibilities to do even more with the data *"We should look into what data we have, how much it is worth, how it can be used and where. It is important to take time to see what we have and find usage of it"*. P1 explained that PU has a unique perspective in the organization and should therefore be a part of evaluating new BMs and the decision process whether it should be implemented or not. Additionally, T1 stated that PU can manage business risks due to their position with suppliers.

P2 suggested that having the ability to visualize the data will enable PU to create customer value from it. Another key element in the field of DDBMs that was identified during the interviews was creativity. Exploring new opportunities for CX will require PU to think outside the box. P2 said *"I think creativity is super important for new business models"*. P6 stated that *"Not everyone is creative but some are and we could use them more"*. P1 highlighted the importance of making use of the creativity *"We need processes to take care of new ideas, both cost savings and technological ideas"*.

4.2.3 Data Driven Business Models Affecting PU

This section presents the empirical findings on how PU will be affected by DDBMs. The impacts are divided into four main categories which are shown in figure 4.5.

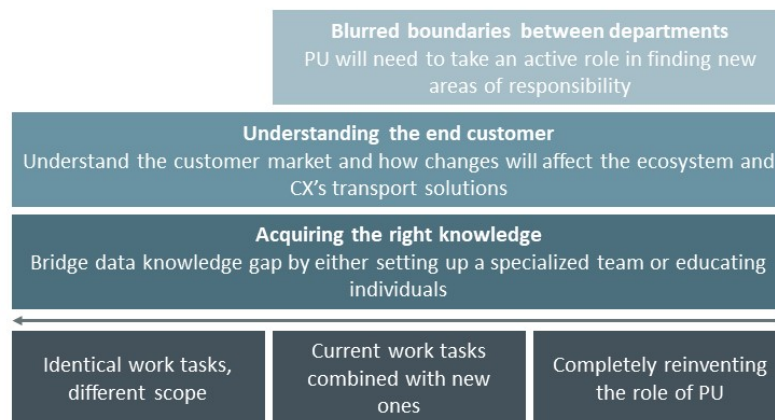


Figure 4.5 - Three different scenarios in the first main area of impact, i.e. the daily operations of PU highlighted in dark blue, in relation to the other three main areas of impact

Daily operations

A transition towards a DDBM will have impacts on the operations of PU, however, the opinions are divided whether it will be a matter of doing the same thing in a new context or if it will completely alter the function of PU.

P3 stated *“We have to continue to work as we work today, the scope is changed with data but the way we work with other departments will be the same. It is the same but new technology and information scope”*.

P4 reasoned that current ways of working will still be needed in a combination with new ways of working *“I think all tasks will be present in the future as well. Buying e.g. an axle with technical specification requires all steps in the purchasing process, securing volumes etc. This is completely different from buying data driven services where it is not certain what the price should be, since it is hard to do a cost breakdown. Both working tracks will be needed in the future too, but I think that it will be more towards the new business models”*.

P6 already senses the impacts of DDBMs on PU and thinks that the impacts will increase going forward *“We are already collecting data and are thinking about how to generate business. [...] The way of working will change, there will be more collaboration instead of a typical customer-supplier relationship. Maybe we will offer combined services from several suppliers to our customers”*. *“We will not do traditional transactions anymore, we will collaborate more and have a stronger connection with other types of companies and be more interlinked with partners, the whole ecosystem will be different”*.

S2 stated that participating in the development of DDBMs takes time from the daily work tasks *“It has taken a lot of time, especially since we do not have the knowledge yet. My first experience of being involved in the XS Connected Solutions project was that it is going to take time and resources to participate in developing data driven business models”*.

When selling data to suppliers and third parties, P1 stated *“It turns us more into a sales organization. We have some data and sell it to someone who will buy it”*. P5 explained *“Sales organization is completely different even if the business mindset is the same, how to please the buyer is a totally different thing”*.

T1 explained that PU will need to change their mission from being focused on cost cutting and being more cross-functional and innovative. The interviewee further reasoned that PU might need a new scope in terms of work tasks *“Take electric trucks for example, thousands of components are no longer needed and this happens fast. And in Vera, there is no head unit so then there is only a fraction of components left to purchase”*.

In the long term, S1 saw a limited role for purchasing *“The big difference is that we are not going to need to buy anything in the future, the raw material will be the data generated by the system. We are just talking about connectivity and business models with the information generated by the buses. Then there are no real purchasing things to do, it might change in the future but this is the way I see it now”*. S1 further stated that there will be some long-term contracts with integrated large component that purchasing can handle but that this will be a limited amount and not in the same scale as today.

Blurred boundaries between departments

When suppliers become customers and new markets and opportunities emerge, the role of PU and the division of responsibilities in the organization become clouded. If the impact on the daily operations of PU implies a change in work tasks, they need to take an active role and reinvent themselves. T1 stated that how the work tasks of PU should change is currently unclear and decisions need to be made *“If we make a deal with a partner where we cannot use our contracts, then it is not a supplier negotiation. Should PU be a part of this? We need to take a strategic decision on who should do what. Otherwise MS could be a possible department to do it but we have ten different brands and that is not beneficial with partners if they have to sign multiple agreements for every brand”*. P1 emphasized this further *“When it comes to selling data to suppliers and third parties, how will it work when the concerned party is not a supplier from the beginning? We have not made up the determination, it is the guys selling products that are doing it”*.

Given that internal collaboration was highlighted as an important factor in the space of DDBMs, PU will need to be part of cross-functional teams. P5 stated *“It might be a dedicated cross-functional team with MS that has this type of mindset and can develop data driven solutions”*. P1 explained that launching project with different departments involved will ensure a role for PU in CX’s future offerings.

Acquiring the right knowledge

All interviewees pointed out that DDBMs is a new topic which inevitably results in that PU will need some new knowledge, irrespectively of how daily operations are impacted. Currently PU should have a competence in *process and data management* according to the competence model developed by HR. However, this competence does not imply knowledge about DDBMs. P4 stated *“I would interpret this competence as how I derive statistics on how I purchase things and how I analyze it to take purchasing decisions”*. P1 stated *“We do not need to work with data collected from the products but we can utilize it and there are other business values with data that we can use in negotiations”*.

During the interviews, two main suggestions on how to bridge the data knowledge gap were presented. The first suggestion was to create a team in the PU organization that can tackle these issues. P1 stated *“Today we need a team to work with data”*. S2 explained that DDBMs create new needs for specialization *“Adding a segment called data or connected services or solutions where the major proportion is data contracts. These employees will need to have traditional IP purchasing knowledge but also data management knowledge”*. The other suggestion was to train individuals *“What we need is people that become more skilled in data and spread the data information in the organization to create awareness about data”*, P3 stated. S2 suggested that individuals should be trained to know their

responsibilities within their given segment. In addition, T3 stated that *“There is a need for initiators that are super excited and then the rest of the organization will be more inclined to follow”*.

Understanding the end customer market

Several interviewees voiced that DDBMs changes the way the company does business in a way that requires the purchasing department to understand the end customer regardless of their future work tasks. P2 stated that *“PU needs to continue to move even closer, like what I said before about closing the gap between Sales and PU. When you take the solutions closer to the problems in practice. It is about taking the customer to the supplier and get them to sit at the same table, then you are going to be extremely successful in creating value for our customers”*. P3 stated *“This connection to the customer market will support us to understand how the world will change. To do this we have to analyze and understand how it will affect Company X and the transport solutions”*. T1 stated that in today’s ever changing digital landscape it is a prerequisite for keeping up with the pace of innovation *“Let go of the pure technical aspects and investigate how it looks business wise in the ecosystem. We need to keep up with the change, otherwise we are lagging behind”*. The candidate further explained that for PU to be part of business innovation, they need to take one step further towards the market, but that also means taking one step away from the supplier mindset. T1 also raised a challenge in that CX is B2B but there are a lot of opportunities in the B2C market, i.e., delivering various services to the truck drivers, that are not exploited today. This adds another dimension to the customer market than what CX traditionally has been targeting.

P6 suggested that direct contact between MS and PU can be an activity to foster understanding of the end customer market within PU *“Contact the MS and understand them, what they are looking for and their plans”*. P3 proposed that PU can conduct end customer market surveys in their own segment and use the result to try to anticipate technological change and how it will affect the purchasing and supplier landscape. It was stated by P2 that an activity can be to *“in a structured way map the customers’ challenges and take that with us when we are scouting solutions”*. The interviewee also suggested that it would be interesting to conduct workshops with customers and a number of external parties where customers’ challenges could be matched with solutions.

4.3 The Role of PU in Company X’s Future Data Driven Business Models

To get an understanding of PU’s role in relation to DDBMs in CX, this section presents the role of PU in relation to the challenges identified in 4.1.3. The challenges represents the empirical findings on what changes CX will experience as a result of transitioning towards DDBMs. Hence, for CX to succeed with DDBMs, these challenges need to be tackled and it is therefore reasonable to present the role of PU in this aspect. Table 4.5 presents the three main challenges in relation to the contributions of PU presented in section 4.2.1. Table 4.8 presents the competencies presented in 4.1.3 and the impacts identified in section 4.2.2 in relation to the challenges. For the impacts to occur and the competencies to be needed, PU must make some contributions as stated in table 4.7.

Table 4.7 - How PU can contribute in the five areas to tackle the three main challenges related to DDBMs

Challenge	Organizational change management and mindset	Legal issues	Extract value from the data
<i>External network</i>	Bringing innovation into the company Internalize knowledge Identify new business opportunities Propose data service solutions Creating partnerships	Decide who to sell data to Gain access to supplier's data Strong interaction skills Creating partnerships	Close relationships with suppliers Monitor the supplier base Bringing innovation into the company Identify new business opportunities Find new potential customers to CX's data driven offerings Decide who to sell data to Propose data service solutions Increase the margins by using data as payment method Creating partnerships Capture ideas by formalizing requirements
<i>Negotiations</i>		Strong negotiation skills	
<i>Contracts and agreements</i>		Contract management Define scope and minimizing risks Setting up profit and loss sharing with suppliers Protecting CX's data	Define scope and minimizing risks Setting up profit and loss sharing with suppliers Protecting CX's data
<i>Internal network</i>	Act as a middleman in the organization Spreading knowledge Connecting available solutions to the end customers' problems		Act as a middleman in the organization Spreading knowledge Connecting available solutions to the end customers' problems
<i>Data driven business mindset</i>	Business acumen skills Proposing data service solutions and evaluating ideas Offer new ways of doing business Unique perspective in the organization Creative people	Managing business risk	Business acumen skills Proposing data service solutions and evaluating ideas Managing business risk Offer new ways of doing business Unique perspective in the organization Creative people

Table 4.8 - Competencies needed and impacts based on the contributions stated in table 4.7 in relations to the three main challenges of DDBMs

Challenge	Organizational change management and mindset	Legal issues	Extract value from the data
<i>Competencies needed by PU</i>	Business development Closer collaboration between PD, PU and MS Collaborative mindset	(DDBM expertise, need to know purpose of setting up legal structure) Monetizing on data Understanding of the environment	Business development Closer collaboration between PD, PU and MS Monetizing on data Market sensing Understanding of the environment Thinking outside of the box Collaborative mindset
<i>Impacts on PU</i>	Daily operations Blurred boundaries Acquiring the right knowledge	Daily operations Blurred boundaries Understanding the end customer Acquiring the right knowledge	Daily operations Blurred boundaries Understanding the end customer Acquiring the right knowledge

5 Analysis

This Chapter combines the data presented in the empirical findings with the theoretical framework to analyze the characteristics of DDBMs in CX, and the role of and impact on PU if CX transitions to a DDBM. Hence, the aim of this analysis is to answer the three research questions of the thesis illustrated in relation to the structure of the Chapter in figure 5.1:

What characterizes a data driven business model in Company X?

What are the roles of PU in relation to data driven business models?

How will PU be impacted by adopting the roles in data driven business models?

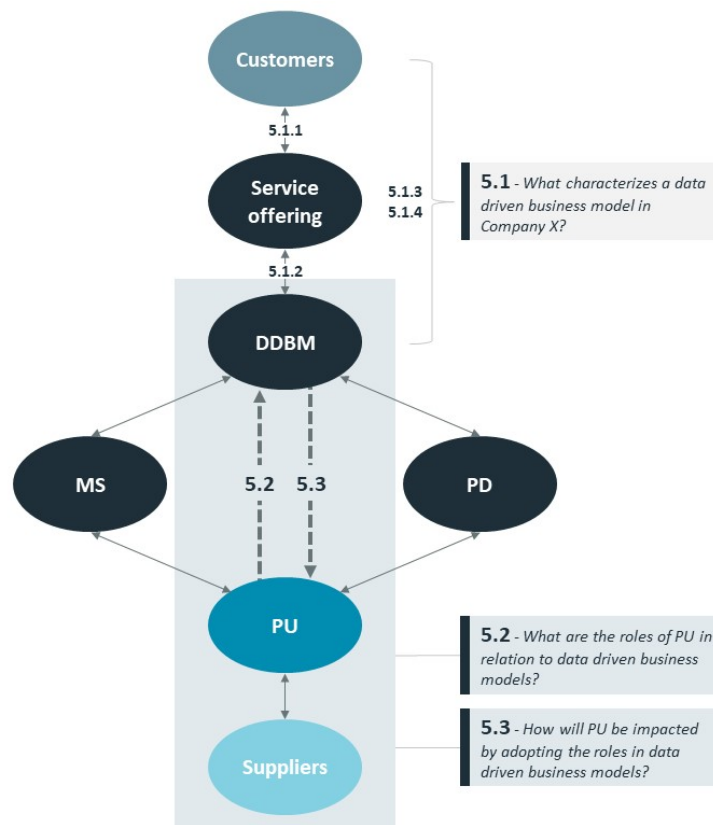


Figure 5.1 - Structure and analytical framework of Chapter 5, including in which section each research question is answered

5.1 Data Driven Business Models in Company X

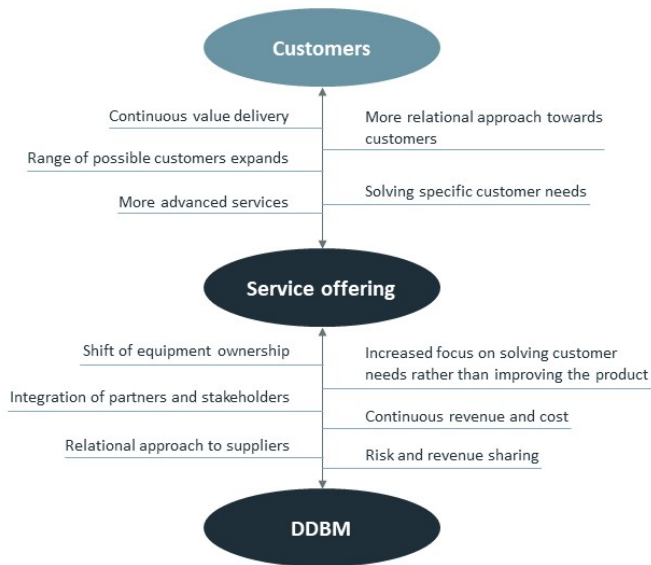


Figure 5.2 - Key characteristics of future DDBMs and the offering towards the end customers

This section has its outset in CX's current DD service offerings, where the service taxonomies from Raddats et al. (2019) presented in Chapter 2 are applied to describe the current characteristics. These characteristics are used to describe CX's current DD service offerings in terms of DDBMs. The empirical findings identified three possible future types of DDBMs in CX which are analyzed with the service taxonomies to describe the characteristics. Lastly, the current and future DDBMs are compared to analyze the implications for CX to transition towards future DDBMs with the current DD service offerings as a benchmark. Figure 5.2 illustrates the key characteristics of future DDBMs identified in the analysis.

5.1.1 Key Characteristics of Current Data Driven Service Offerings

Oliva & Kallenberg (2003) emphasize that service components should be integrated with the core products of a product manufacturing company. According to the empirical findings CX currently offer some services related to their core products, where data has been an enabler for these. With an outset in table 2.1 where different taxonomies and descriptions of service offerings by Raddats et al. (2019) is presented, the taxonomies that are applicable to describe the DD service offerings based on the information provided in the empirical findings are used to analyze the offerings:

- Service supporting products (SSPs) vs. services supporting the customer's actions (SSCs)
- Customer vs. supplier ownership of equipment
- Product complements vs. substitutes
- Transactional vs. relational
- Input- vs. output-based
- Free vs. chargeable

CX's Service Contracts are all linked to a specific product, i.e., their trucks, to facilitate the usage and sale of it, thus they fall into the taxonomy as a Service Supporting the Product (SSP) in figure 5.3 below. Since the services are sold either when the customer buys the truck or in retrospective, in addition they are closely linked to the products, the services are a complement to the products rather than substitute

since there is no demand for the services if the customer does not have a truck from CX. According to Cusumano, Kahl and Suarez (2015) a complementary service like the Service Contracts where maintenance or repair, and insurance are included is called a smoothing service since they only aims at “smooth” the product usage or sales and does not change the functionality of the product. A service with these characteristics, and where the service provider ensure the user of proper functionality of the product are input-based (Ulaga & Reinartz, 2011). The relationship between the buyer and seller could be described as an “arm’s length” and there is no need for mutual trust or long-term orientation, hence they are called a transactional service by Penttinen and Palmer (2007). Moreover, the Service Contracts are chargeable and at the majority of the cases the customer owns the trucks regardless if it is a driver or a fleet owner.

Data collected from the trucks is an enabler for the services Service 1, Service 2 and Service 3. These services are aimed to support and facilitate the customer’s process and are more action oriented, hence they fulfill the criteria for Service Supporting the Customer (SSC) in accordance with Mathieu (2001) descriptions of SSC. To illustrate, Service 1 helps the fleet owner to improve the planning process of its fleet or Service 2 presents all available data of how the trucks is used to improve the customers’ operations. The services does not promise a specific result, it only creates an opportunity for the customer to perform better, hence they are considered as input-based services in accordance with the description of an input-based service by Ulaga and Reinartz (2011). Further, it could be argued that Service 3 is a SSP since the truck needs fuel to operate and with more optimized fuel consumption the usage of the truck can be improved and the service is closely related to the product. However, Service 3 is mainly considered to be a SSC since the main purpose is to improve the customers’ operations, i.e. their processes. Another common service taxonomy for Service 1, Service 2 and Service 3 is that they are all a complementary service, since they do not substitute the truck. The services do not change the functionality of the product, they only support the usage of it in the customer's process, hence they are a smoothing service (Cusumano et al., 2015). The customer owns the trucks and all the services are chargeable, hence the services are categorized customer owned equipment (Windahl & Lakemond, 2010). Considering if the services are transactional services or relational services, the empirical findings provided is inadequate to draw any conclusions. It could be assumed that they are closer to a transactional service where there is an “arm’s length” relationship between the buyer and seller. However, some of services could also require information exchange, operational linkages and commitment which are the characteristics of a relational service according to Cannon and Perreault (1999).

The service Remote Diagnostic is considered as a SSP since it is linked to the specific product, i.e., the truck, and aims at facilitating the usage of it. It is complementary service, since the service is useless without a truck. In accordance with Cusumano et al. (2015), it can be considered as a smoothing service since the purpose is to make sure that the truck is functioning, not to change the functions of it. It can also be seen as an output-based service since the service provides information about the truck’s present health, hence trying to achieve performance, i.e. increase uptime by planning workshop visits optimally (Ulaga & Reinartz, 2011). Remote Diagnostic is a transactional service since the service does not require commitment or information exchange between buyer and seller. Even for this service, the customers own the trucks and are charged for the service.

	SSP	SSC
Input-based	Service contracts Service 3	Service 1 Service 2 Service 3
Output-based	Remote diagnostics	

Figure 5.3 - A matrix of CX's current service offerings in two main dimensions of service taxonomies

In summary, this analysis contributes to the first research question by providing an understanding of CX's current position in DD service offerings. This will be further elaborated in the following subsection to describe the DD service offerings in terms of DDBMs.

5.1.2 Current Data Driven Service Offerings in Terms of Data Driven Business Models

As shown in figure 5.1, the next step in the framework is to analyze the DD service offerings mentioned above with respect to the attributes of DDBMs. This provides an understanding of how CX's offering towards the end customers can be related to traits of DDBMs. The DD service offerings are currently not developed or delivered explicitly stated as DDBMs. Thus, table 5.1 below describes the two different categories of current DD service offerings derived from figure 5.3, i.e. Advanced telematics and diagnostic tools which is SSPs and reports of vehicle status which is SSCs, in terms of DDBMs based on this analysis. The first two columns includes the structure of a BM presented in Chapter 2. The middle two columns present traits of a traditional automotive BM and digitized dimensions in a DDBM, also based on Chapter 2. These are used as guidance and a point of reference when presenting the last two columns which describe the current DD service offerings in terms of DDBMs. Some cells in the table are left blank due to lack of empirical evidence of the current service offerings.

Table 5.1 - DDBMs of CX's current DD service offerings

Major dimensions	Sub-categories	Traditional automotive industry	Data and Digitized dimensions	SSP	SSC
Value proposition	Products	Vehicles	Connected products (IoT), technologies, databases and datasets	Truck owned by the customer	Truck owned by the customer
	Services	Aftermarket services: Maintenance, warranty issues	Expert knowledge, analytics, platforms, digital services; supporting products, supporting customers, substituting products	Service contracts Remote diagnostics	Service 1 Service 2 Service 3
Value delivery	Target customers	Vehicle owner, vehicle operator	Private customers, component manufacturers, suppliers, integrators, operators, distributors, solution providers, customers outside traditional industry	Fleet owner Vehicle owner Vehicle operator	Fleet owner Vehicle owner Vehicle operator
	Value delivery processes	Distributor, Reseller	AI, IoT, predictive delivery	IoT Reparation and maintenance of the truck	IoT Digital interfaces Reports of vehicle status
Value creation	Partners and stakeholders	Components manufactures, governments and regulatory authorities	Digital enablers		
	Value creation processes	Value-in-exchange, manufacturing	Value-in-use	During the fulfillment of reparation or maintenance	When the reports are utilized in the customers' operations
Value capture	Revenues	Pay per product/service (selling vehicles and aftermarket services)	Subscription, pay per use, license		Subscriptions
	Costs	Production, labor	Data management, technology investments	Labor	System maintenance

The first two rows in table 5.1 presents the value proposition, i.e. the product and service dimension of the DDBM. The customers must own or drive a CX truck to utilize both the SSPs and the SSCs. Thus, the product category of the DDBM is equal for both types of service offerings. The value proposition for the product is the possibility of transportation but this is not the service offering described. In the

service category, the services presented are the ones identified in the empirical result. There are three different types of Service Contracts which creates value for the customer by ensuring repair and maintenance adapted for their needs. The Remote Diagnostics service creates value in that the customer can rely on that when the truck needs service or repair, they receive a notification and can take action accordingly. For the SSCs, the value in Service 1 is that the fleet owner can optimize their operations and for Service 2 the user can also optimize operations and see status of the vehicle or vehicles. Service 3 creates value since the customer can optimize fuel consumption and be more sustainable and cost efficient.

Value delivery of the DD service offerings is described in the third and fourth row in table 5.1. The target customers are the same for all current DD service offerings since they target fleet owners, vehicle owners and vehicle operators. However, the value delivery processes differ. IoT is the enabling value delivery process in both the SSPs and SSCs since the data collected through the sensors delivers information that can notify need for service or reparation and the information about the vehicle status. For the SSPs, value is also delivered through the reparation and maintenance done on the trucks. The digital interfaces are the value delivery used for SSC since it is through the interfaces the customers can access the information and use it in their operations.

In row five and six in table 5.1, the value creation dimension of the DD service offering is presented. There is insufficient information in the empirical findings to draw conclusions about the partners and stakeholders for the different services. Hence, these cells are left blank in the table. The value creation processes are in both the SSPs and SSCs characterized by value-in-use, i.e. the value is created when the service is utilized. For the SSPs the value is directly created when the reparation or maintenance is fulfilled, and indirect when the uptime increases due to the possibility to plan workshop visits efficiently. In the case of the SSC, the value is created when the customer views and uses the reports to obtain insights and conduct improvements in operations.

The information about value capture for the DD service offerings, described in the seventh and eighth row in table 5.1, is also sparse. It is stated in the empirical findings that the SSCs revenues stems from the customer paying a subscription based fee. However, it is not clear whether customer e.g. pays for spare parts when repairing the truck, therefore it is difficult to state the revenues from the SSPs. The evident cost in the SSP is the labor cost when the reparations and maintenance are conducted. For the SSC the collected data needs to be compiled so that the customer can use it. The empirical findings lack information about how this is done, but regardless, there is a cost in maintaining the systems used to deliver the services.

Summarizing, this subsection contributes to the first research question by presenting CX's current state in DDBMs. This will be used to compare with future DDBMs with the purpose of illustrating the difference it will entail for CX.

5.1.3 Future Data Driven Business Models

The possibilities of how to use data and for whom it is useful for are endless (Morabito, 2015). However, three different types of possible DDBMs for CX were identified which are presented and described with the service taxonomies by Raddats et al. (2019) in table 5.2 below.

Table 5.2 - Possible future DDBMs for CX and their respective service classifications

DDBM type	Explanation	Aim	Type of service offering
<i>Sell data</i>	Monetizing on data i.e. sell the collected data Produce more data Find new markets and customers for the data produced	New revenue streams Find new customers	SSC Input-based Transactional or relational Free or chargeable
<i>Improve existing offering</i>	Need data for decision making Increase uptime Support business and product predictability Attractive products	Improve customer satisfaction Do more with the same resources	SSP or SSC Complement Intermediate or advanced Input- or output-based Transactional or relational Free or chargeable Customer ownership of equipment
<i>Create new service offerings</i>	Data to create new services Product is free but other applications are charged Sustainable transport solutions / circular services Subscriptions e.g. kr/km Transported cargo instead of selling trucks	New revenue streams Satisfy customers Decrease the impact on the environment Subscription models to stabilize the economy Value creation	SSC Substitute Advanced Output-based Relational Chargeable Supplier (CX) ownership of equipment

One new way for CX to create revenue streams is to sell data to new customers which is stated in the first row in table 5.2. This type of DDBM is not connected to a specific product and since many of the taxonomies describing are linked to a product service offering, some taxonomies are not applicable when describing this DDBM. Due to the same reason, sell data is not a SSP but rather a SSC since the aim is to improve the customers' processes and the data is not necessarily linked to the customer's product (Mathieu, 2001). This implies that CX does not have any commitment to ensure that the customer achieves a certain outcome, thus, sell data is categorized as input-based (Ulaga & Reinartz, 2011). To protect CX and their data, contracts for different scenarios will be necessary. The approach towards the customer can be both transactional and relational depending on who the customer is. However, it is important to note that transactional approach has a lower degree of collaboration and trust (Penttinen & Palmer, 2007). Therefore, transactional approaches needs other types of contracts which reasonably should be more strict. Depending on who CX sells data to, it can be either free or chargeable. The empirical findings showed that one idea is to use data as leverage in negotiations with suppliers to get a lower price and thus lower the cost. In this case, sell data would be categorized as free and the aim of finding new customers is fulfilled. If CX charge the customer for the data, both the aim of finding new customers and revenue streams is fulfilled.

Second, Improve existing offering can be done in numerous ways. If the data is used to improve the truck or the usability of the truck, it is classified as a SSP. Improvements in the offering can also be made in a way that generates value for the customers' processes and in this case, it is a SSC (Mathieu, 2001). The prerequisite for this DDBM type regardless of how it is designed is that it complements the product rather than substituting it since otherwise, it would be an entirely new service offering. These

complementary services are categorized as smoothing or adapting since the improvements can range from increasing the sale or usage of the truck to expanding the functionality and develop new usages of it (Cusumano et al., 2015). However, to achieve improvements in the offering and an increased customer satisfaction that goes beyond CX's current DD service offerings, the services are intermediate or advanced. This is motivated by that the purpose of base services is to ensure that the product functions properly, e.g. by supplying spare parts for the truck when it breaks down, and this will most likely not increase customer satisfaction, rather the customer will be dissatisfied when these services do not exist (Kano, Takahashi & Tsuji, 1984). In addition, base services are something that CX already offers and they are not DD. Furthermore, depending on the nature of the improvements it can be input- and output-based and the relationship can be transactional or relational. In the same manner, services to improve the existing offering can be both free or chargeable. Lastly, since this type of DDBM does not substitute the product, the customer is the owner of the vehicle in the majority of cases since this is the current set-up.

Third, Create new service offerings implies from the description that CX owns the trucks, i.e. it fits with the taxonomy supplier ownership of equipment (Windahl & Lakemond, 2010). On this basis, this DDBM type is a SSC since the service substitutes sales of trucks and the customers' transportation needs are solved by the CX service, i.e. the customers' capabilities are enabled by the performance of CX's product which is the definition of an advanced service (Baines, Lightfoot, Smart, & Fletcher, 2014). Moreover, Create new service offerings described in these terms focuses on delivering a predefined outcome and it is therefore categorized as output-based. This type of commitment between CX and the customers alters the relationship (Ulaga & Reinartz, 2011). Raddats and Kowalkowski (2014) state that several studies have shown that a relational approach is a prerequisite for delivering these types of service offerings. When the sales of the trucks is substituted by new services, the service offerings must be chargeable for CX to sustain or improve their revenue and profit.

This section answers the first research question by providing an understanding of possible future DDBMs in CX and their characteristics.

5.1.4 Comparison Between Current and Future Data Driven Business Models

The definitions of DDBMs identified during the interviews have more dimensions than the ones for a regular BM. In addition to how to monetize on the companies offering, several definitions of a DDBM also included how to extract something valuable from the data, i.e. value proposition and value creation. Less attention was paid to the free vs. chargeable dimension of the offering and more to the usability.

Digitalization at a basic level enables companies to more effectively and efficiently deliver base and intermediate services (Raddats et al., 2019). These type of services are something that CX already offers and does not require entirely new ideas since the purpose with them is to enhance the usage of the truck. Allmendinger and Lombreglia (2005) state that digitalization may also open up for new opportunities which often implies the company to transition towards advanced services. This section compares characteristics of CX's current DD service offerings in terms of a BM with the characteristics of DDBMs which is summarized in table 5.3. The DDBM identified in the empirical findings that differs the most from CX's current DD service offering is Create new service offerings. Since there are several options for CX when creating their future DDBM, the characteristics of DDBMs described in table 5.3 is based on a significantly different set-up compared to CX's current BM and DD service offerings. Adopting a DDBM with these characteristics would entail the biggest change for CX. Thus, when analyzing the characteristics presented in table 5.3 it is possible to understand what a transition towards such a DDBM would imply.

Table 5.3 - Characteristics of current DD service offerings in terms of BM and of future DDBM

Major dimensions	Sub-categories	Data and Digitized dimensions	Characteristics of current DD service offerings	Characteristics of DDBMs
Value proposition	Products	Connected products (IoT), technologies, databases and datasets	The product is an enabler to deliver DD services The customer owns the equipment	The product is an enabler to deliver DD services CX owns the equipment
	Services	Expert knowledge, analytics, platforms, digital services; supporting products, supporting customers, substituting products	Focus on improving the usage of the product to enhance customer satisfaction SSP and SSC Complements Input-based Base and intermediate	Solving specific customer needs SSC Substitutes Output-based Advanced
Value delivery	Target customers	Private customers, component manufacturers, suppliers, integrators, operators, distributors, solution providers, customers outside traditional industry	Traditional customers Mainly transactional approach	Range of possible customers expands Relational approach
	Value delivery processes	AI, IoT, predictive delivery, platforms	IoT is a key feature Digital and physical value delivery processes Separated from the customers' processes	IoT and ICT are a key features Continuous, mainly digital value delivery processes Integrated with the customers' processes
Value creation	Partners and stakeholders	Digital enablers	Traditional partners and stakeholders Mainly backwards in the supply chain Combination of transactional and relational approach	Untraditional partners and stakeholder might be needed Both backwards and forward in the supply chain Relational approach
	Value creation processes	Value-in-use	Value-in-use Value created by customer Value created by CX	Value-in-use Customer value co-creation
Value capture	Revenues	Subscription, pay per use, license	Continuous revenue streams	Possibilities to create new revenue streams Continuous revenue streams Payments based on performance- and emotional measures Revenue sharing
	Costs	Data management, technology investments	Continuous cost	Continuous cost Relationship investments Risk sharing

Value proposition

The product, i.e. the truck, is the enabler for CX's offerings both in the current DD service offerings and the DDBM. One significant difference is that in the future, the empirical findings showed that there is a possibility that the ownership of the truck shifts from the customer to CX. When the customer owns the truck, they are responsible for repair and maintenance. However, when CX owns the truck, they have responsibility to ensure that the truck is working. Therefore, current services such as aftermarket services and warranty issues will no longer be additional services but rather something CX needs to conduct to ensure consistent functioning of their offerings. In both cases, the products are connected where they have sensors that collect different kinds of vehicle information. The difference is that the current offerings does not utilize all collected data. For CX to adopt a DDBM more data needs to be utilized, thus, the databases and data sets will become more complex to handle and the possibilities to create additional offerings based on the data expands. Morabito (2015) states that there is no use for raw data unless it is analyzed to meet a purpose. CX can tackle this issue in creating DDBMs by acquiring data science and analytics competencies identified in the empirical findings. However, these competencies only implies the ability to get information from the data. To create a DDBM with it, i.e. to meet a specific purpose, DDBM expertise and the ability to monetize data are important competencies, which were also identified in the interviews. This opens up for the possibility to sell data to third parties other than existing customers. In this case, the truck is no longer an enabler for the new customers to utilize the offering, i.e. the sold data. It is however an enabler for CX to be able to deliver the new offering since the truck is the source of the data on which the new offering is based.

It is evident that utilizing more data to create future DDBMs opens up for numerous options for value propositions. Thus, the competencies mentioned during the interviews; market sensing, understanding the environment, thinking outside of the box and business development are important to harvest the potential benefits of the data by coming up with new ideas on how to utilize it. It was also noted that CX needs to be capable to sort out the valuable ideas to ensure that they only offer the ones that bring value to the customer. Since future DDBMs are characterized by solving specific customer needs, prioritizing ideas becomes increasingly important. Benedettini, Swink and Neely (2017) describe that an increasing number of different service offerings leads to increased coordination complexity, meaning that a challenge for CX with creating multiple different DD offerings can be the coordination of activities in the company. This was also highlighted during the interviews where blurred boundaries between departments was identified as an impact of DDBMs. A higher level of coordination complexity can furthermore be an explanation for why increased collaboration between different departments was mentioned in several interviews as a key factor for success.

As shown in table 5.3, almost all taxonomies characterizing the service changes in future DDBMs. These shifts are due to that future DDBMs are more integrated total solutions since the services substitutes the products instead of complementing them. Moreover, specific customer needs are solved and the focus is to deliver a result rather than ensuring functionality of the product, i.e. it is an outcome-based SSC which results in that CX will be more integrated with the customers. This further implies that the future DDBM includes advanced services since the company is likely to take over customers' operations (Baines et al., 2014). A challenge with advanced services was identified in a case study performed by Alghisi and Saccani (2015) that the internal and external aspects of the business need to be aligned. The internal aspects are the strategic orientation and portfolio of services, whereas the external aspects are actors in the network, including the customers. For CX to have the capability to offer advanced services, the need of understanding the customers increases, which was also stated in the empirical findings. According to Morabito (2015), data enables customizing the offering for the specific customer which is favorable in CX's future DDBMs to ensure that the specific customer's needs are met. To sum up, the

services in the future DDBMs are different in the characteristics and will require new mindset and capabilities, especially in that CX needs to adopt a more pure service logic and serve the customers.

Value delivery

Today CX mainly have traditional customers but the opportunities to target new customer segments increase with the usage of data (Morabito, 2015). Another change that will occur due to the transition towards DDBM is that the relationship with their customers will change from mainly a transactional approach to a relationship approach. The future DDBMs are characterized by including advanced services where customers' operations are taken over. Hence, CX will need a relational approach with the customers since they need to collaborate and understand them to successfully deliver the service (Penttinen & Palmer, 2007). In addition, to be able to deliver value to the customer, the relational approach also includes comprehensive contracts, increased information sharing and closer operational linkages between the parties (Penttinen & Palmer, 2007). The new service contracts and the legal part that will be necessary for a relational approach can be assumed to be a new area for CX since the current DD service offerings do not require a relational approach.

Moreover, today CX has a digital and physical value delivery process, however with future DDBM the process will mainly be digital. The service characteristic of future DDBMs imply that the value delivered from CX side will exceed the point of sale. Hence, the value delivery process will be continuous and more long-term and it reasonable that these processes might be more time consuming and complex than they are today. CX's current value delivery processes are separated from the customers' processes, but with advanced services CX's process will be integrated with them (Baines et al., 2014). To illustrate, currently CX delivers value when they deliver the reports about the trucks, but when the customer uses the reports in their processes, CX is not involved. If it was an advanced service then CX's value delivery process had been combined with the customers' process not separated as they are today. Currently, CX uses IoT and ICT to deliver value and with advanced services the importance of IoT and ICT increase even further (Baines et al., 2014). Hence, competencies in these technologies are crucial to deliver DDBMs and it is therefore something CX needs to consider in the future. This was also highlighted during the interviews, where technical expertise was stated to be an important future competence.

Value creation

Considering partners and stakeholders, the shift towards DDBM implies that these could be non-traditional and with a relational approach. Depending on the value proposition and the usage of data new opportunities and challenges for CX occur, hence non-traditional partners and stakeholders might be necessary. The relational approach can be partly motivated by that it is a prerequisite for advanced services, and partly by that cooperation with other players in the ecosystem is needed for digitalized services according to Kohtamäki et al. (2019). When new partners and stakeholders are needed to create value in the future DDBMs, CX's ecosystem changes. In addition, with DDBMs it becomes more difficult to study the ecosystem and the players within it. Hence, the difficulty for CX to find the right partners and stakeholders might increase as the complexity of the ecosystem rises. From the empirical findings, understanding of the environment and thinking outside the box were mentioned as future needed competencies. These competencies are crucial to identify partners and possibilities in the ecosystem for future DDBMs, although it can be challenging to achieve. Moreover, a future challenge mentioned in the empirical findings was Legal issues describing the challenges of deciding who to share data with and how, how to share profit and risk and data protection. In future DDBMs, the relational approach with increased collaboration with partners and stakeholders can make it beneficial to share data between parties. However, the complexity of the ecosystem emphasizes the challenge of deciding who to share data with and how to ensure protection of CX's data.

Today the creation of value is mainly focused backwards in the supply chain with suppliers, but to deliver advanced services it is common that manufactures integrate both forwards with customers and backwards with suppliers (Baines et al., 2014). The reason for this is that they both need to adopt the customers' activities i.e., forward, and keep the capabilities for design and production for high-value subsystems that are complex i.e., backwards. Further, considering advanced services Raddats et al. (2019) state that it is likely that companies develop resources and capabilities and service development, sales and delivery together with suppliers.

The value creation process for both current DD service offering and future DDBMs are characterized by value-in-use, meaning that the value is created when the customer uses the offering. In other words, for a customer subscribing to a CX service offering, the value is not created when the customer pays for the offering, but rather when it is utilized. Currently, CX is a value facilitator since they are providing the truck for the customer to create the value themselves when transporting goods with the truck (Svensson & Grönroos, 2008). Or in a similar fashion, CX facilitates the creation of value when providing the reports about the vehicle status, but the value is created when the customer utilizes the information from the reports. Svensson and Grönroos (2008) state that when a company has an interactive contract with the customer during the use of the offering, which is the case for the future DDBMs, there is possibilities to co-create value. The author further state that it is more challenging for a traditional company to measure value-in-use compared to value-in-exchange. This emphasizes the challenge of changing the organizational mindset identified during the interviews since CX will not be able to use the price charged for the truck to measure the creation of value.

Value capture

As described above, increased use of the data generated by CX's trucks implies the possibility to create new offerings to the existing and new customers. On this basis, creation of new revenue streams are possible given that the new offerings are chargeable. Since the future DD services are characterized by substituting the products, this means that in the long term CX will not get a large onetime payment for the trucks but rather continuous payments from the services. The empirical findings showed that subscriptions are generally more resilient in downturns of the economy. This is further highlighted by Baines et al. (2014) and additionally, it has the potential to strengthen customer relationships and competitive advantage. To strengthen the customer relationships companies delivering advanced services usually base the payments from the customers on performance and emotional measures. Baines et al. (2014) explain that performance measures should reflect the agreed outcome and the emotional measures should be aligned with the value created for the customer to reassure the customers of contract fulfillment. The future DDBMs are more likely to be SSCs and such services furthermore has a direct impact on a company's revenue and profit (Baines et al., 2014). However, due to the change of ownership of the equipment, there is a risk of CX losing revenues from aftermarket services and repair since this might be CX's responsibility to ensure delivery of the service. Since future DDBMs require a closer collaboration with partners and stakeholders, it is also possible that revenues will be shared with suppliers.

In addition to sharing the revenues with suppliers, the cost can also be shared. This lowers the risk for CX, but such a set up makes the contractual part of the relationships more complex to ensure a win-win situation between parties (Penttinen & Palmer, 2007). Today, the main portion of CX's costs currently stem from production, which is then covered by the revenue obtained from sales. For CX to deliver the predefined outcome for their customers, the future DDBMs require commitment that exceeds the point of product sale (Svensson & Grönroos, 2008). Hence, the cost will be more continuous than today. Lastly, there are also costs associated with the relationships in the future DDBMs. The approach towards

customers, partners and stakeholders will be more relational and thus, adaptations and mutual investments might be needed (Penttinen & Palmer, 2007).

With this section the first research question is answered since the characteristics of DDBMs in CX and the implications of transitioning towards them is analyzed and described.

5.2 PU's Role in Data Driven Business Models

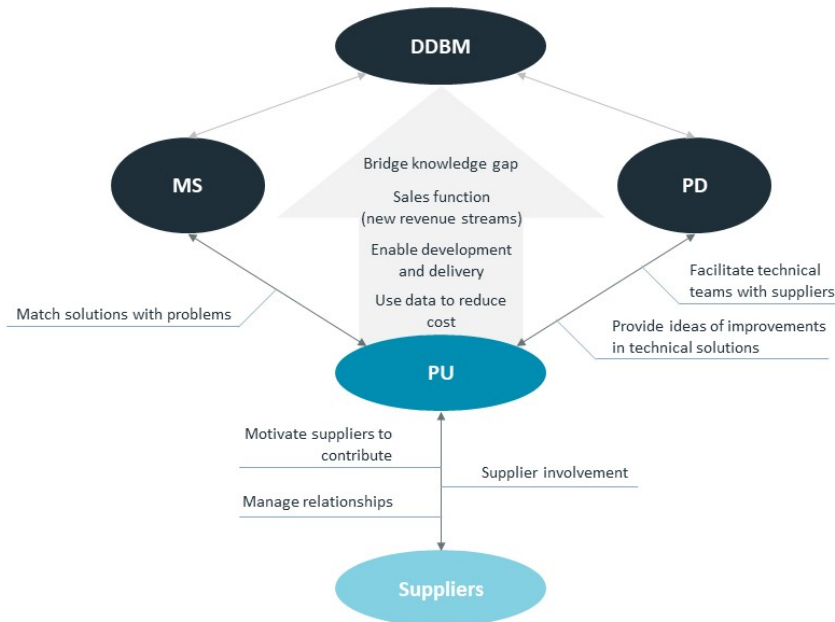


Figure 5.4 - Key roles of PU in relation to contributions to DDBMs, suppliers, MS and PD

The empirical findings showed that the number of components to purchase will decrease in the future. This puts PU in a position where their traditional work tasks diminishes, although, with DDBMs there are several opportunities for PU to take an active role. This section first analyzes PU's possible position in the value chain based on the empirical data. The following subsection analyzes in what ways PU can contribute to CX's business strategy in a DDBM scenario. Since suppliers' resources and capabilities are highly important in DDBMs, it is furthermore analyzed how PU can contribute to DDBMs by involving suppliers in CX's processes. Lastly, these three areas are used to describe the roles PU can take in the DDBM types described in section 5.1.3. The key contributions of PU in DDBMs are summarized in figure 5.4 above.

5.2.1 PU's Future Position in the Value Chain

The contributions of PU in DDBMs mentioned in the empirical findings indicate their future position in the value chain. The contributions are grouped into three different positions; traditional, more integrated and towards customers, based on which activities in Porter's (1985) value chain the contributions relate to, presented below in table 5.4.

Table 5.4 - Contributions from the empirical findings that indicate PU's future position in the value chain

	<i>External network</i>	<i>Negotiations</i>	<i>Contracts and agreements</i>	<i>Internal network</i>	<i>DD Business mindset</i>
Traditional position in the value chain (Porter, 1985)	Close relationships with suppliers Monitor the supplier base Increase the margins by using data as payment method Gain access to supplier's data Capture ideas by formalizing requirements	Strong negotiation skills	Contract management Define scope and minimizing risks Setting up profit and loss sharing with suppliers		Managing business risk Unique perspective in the organization Creative people (In terms of generating ideas of new solutions)
More integrated in the entire value chain	Bringing innovation into the company			Act as a middleman in the organization	
Moving towards the customers (Marketing & sales and Services (Porter, 1985))	Find new potential customers to CX's data driven offerings Decide who to sell data to			Connecting available solutions to the end customers' problems	

The contributions listed in the first row in table 5.4 indicates that PU will maintain the traditional position in the value chain where they support in the primary activities inbound logistics, operations and outbound logistics, as stated by Porter (1985). Close relationships with suppliers and monitoring the supplier base are two contributions found in the empirical findings that imply that PU are working closely with suppliers to acquire materials and/or services needed in the organization. Further, PU's contribution to increase the margins in the value chain will still be important, but using data as a payment method will be a new way to increase the margins in contrast to negotiating to lower the suppliers prices. To be able to contribute with access to suppliers' data, it is required that PU holds their organizational position closest to the suppliers. If PU manage to get access to suppliers' data it can bring value to other parts of the value chain that they traditionally have not been connected to. Many of the stated contributions, e.g. strong negotiation skills, contract management, defining scope and minimizing risks, setting up profit and loss sharing with suppliers, and managing business risk imply that PU will interact with suppliers to achieve some kind of exchange in DDBMs as well. Thus, this also illustrates that they will maintain their position in the value chain (Porter, 1985). However, the way they perform these might change depending on what type of DDBM CX develop. Moreover, due to their traditional position in the value chain PU has obtained a unique position in the company, where they are the ones with closest relation to the suppliers. Hence, with some creativity they can contribute with finding new ways to do business or find new possibilities for more value adding activities.

In the empirical findings it was stated that PU can contribute with bringing innovation into the company, this also indicates that their position will be at the traditional side of the value chain, but their role has a more modern approach than Porter (1985) suggest. By bringing in innovation PU can contribute with more value both internally in the organization but also towards the customers. However, to be able to

understand the innovations and its potential value, it is necessary for PU to understand the end customer. In addition, it was stated that PU could act as a middleman in the organization. With a wider role that exceeds their original position it is possible for PU to increase value creation in other parts of the value chain, but also being involved in other activities that might not be seen as classical purchasing activities in accordance with Van Weele (2018). This indicates that, with DDBMs, PU can support the primary activities Marketing & sales and Services in the value chain, in addition to the traditional activities described by Porter (1985).

There are also some contributions that indicate that PU will move more forward in the value chain i.e., towards customers. Finding new potential customers to CX's data service offerings and decide who to sell data to could be categorized as a Marketing & sales or Services in Porter's (1985) division of primary activities. These activities are not related to purchasing according to the author, hence this implies that PU will support or be involved in new parts of the value chain that they have not been before. Moreover, connecting available solutions to the end customers' problems further indicates that they will move forward in the value chain to optimize their current activities.

To summarize, the analysis presented above shows that with DDBMs, purchasing can be involved in new activities in the value chain, i.e. Marketing & sales and Services. Hence, the traditional view of the purchasing department in the value chain as stated by Porter (1985) is challenged since there are indicators that purchasing can be closer to the end customers than current literature suggests. This subsection contributes to the second research question by analyzing their possible position in the value chain. Since DDBMs are characterized by being more customer focused and PU traditionally is on the opposite side of the value chain, this is important to analyze to get an understanding of how they can contribute.

5.2.2 PU's Contributions to the Business Strategy

The shift towards DDBMs will be a part of the business strategy, since changing BM is a strategic decision on company level. The business strategy guides a company's priorities to achieve their goals in relation to the end customer market. Traditionally, purchasing's role and priorities is to provide the company with resources and decide whether to purchase materials and produce in-house or outsource (Van Weele, 2018). By contributing to the business strategy, PU can take a direct or indirect role contributing to the end customers which is a new priority for the department. In table 5.5, the contributions of PU mentioned in the empirical findings are grouped into four different areas. The areas represent four ways for a strategic purchasing department to contribute to the company's success (Van Weele, 2018).

Table 5.5 - Strategic contributions of PU in DDBMs

	<i>External network</i>	<i>Negotiations</i>	<i>Contracts and agreements</i>	<i>Internal network</i>	<i>DD Business mindset</i>
Cost reductions	Increase the margins by using data as payment method	Strong negotiation skills	Contract management Define scope and minimizing risks Setting up profit and loss sharing with suppliers Protecting CX's data		
Leveraging relationships	Close relationships with suppliers Creating partnerships Monitor the supplier base				
Company growth (i.e. new offerings, increased sales etc.)	Bringing innovation into the company Identify new business opportunities Gain access to supplier's data Find new potential customers to CX's data driven offerings Decide who to sell data to Propose data service solutions			Proposing data service solutions and evaluating ideas Unique perspective in the organization Connecting available solutions to the end customers'	Business acumen skills Managing business risk Creative people (In terms of generating ideas of new solutions) Offer new ways of doing business
Provide input to achieve company goals	Monitor the supplier base Internalize knowledge			Act as a middleman in the organization Spreading knowledge	

The first row in table 5.5 presents the contributions related to cost reduction which is one way for PU to support the company's strategy (Carr & Pearson, 2002). From the empirical findings, it was stated several times that one of PU's current primary focus areas is to reduce cost of material to increase CX's margin. As seen in table 5.5 contributions of PU in terms of cost reductions are important in a DDBM strategy as well, although the methods of achieving those cost reductions revolve more around data usage. Wernerfelt (1984) states that leveraging relationships is important to create value for customers, thus, this is shown on the second row in table 5.5. Since PU has established relationships with suppliers, they are in a good position to leverage those relationships in a DDBM strategy as well. In addition to create value for customers, the relationships can also be used to enhance delivery and material quality

(Hogan & Armstrong, 2001). Furthermore, a strategic purchasing department contributes to improving the company's existing offerings and growth by providing new ideas (Freeman & Cavinato, 1990). This is presented in table 5.5 on the third row as Company growth where the majority of PU's contributions to DDBMs identified in the empirical findings fit. Some contributions mentioned were bringing innovation to the company, identify new business areas, and offer new ways of doing business. This categorization of contributions indicates that PU has the potential to take a bigger role in the company's growth with DDBMs by contributing to the end customer market. The expansion of this role can be partly explained by the characteristics of DDBMs, e.g. blurred boundaries between departments and increased opportunities to create new revenue streams outside the traditional business. Thus, unprecedented possibilities open up for PU to take part in identifying and developing those new revenue streams by finding new solutions to new or existing customers. The fourth row in table 5.5 presents possibilities for PU to provide input to support the company in achieving its goals, which is another way for a strategic purchasing department to be involved in the strategic work (Carr & Pearson, 2002). This area is focused around utilizing the knowledge PU has through their external network with suppliers and spread it to the rest of the organization. If PU is involved in CX's strategic work related to this area, they will bridge the knowledge gap between CX and its suppliers and thus, facilitate decision making to reach the company's goals.

Overall, this section has shown that for PU to contribute in future DDBMs, they need to be a highly strategic purchasing department. Although cost reductions are one of PU's main focus areas today, it is not the area with the largest potential for PU to contribute to a DDBM strategy based on the contributions identified in the empirical findings. The area with most identified contributions is company growth, which implies that this is an area to be prioritized in the future. The contributions in this area indicates that purchasing can be more related through the business strategy to the end customer market than previously suggested in theory (Carr & Pearson, 2002; Freeman & Cavinato, 1990; Hogan & Armstrong, 2001; Van Weele, 2018; Wernerfelt, 1984). Additionally, by contributing in Company growth and Provide input PU can support CX to *extract value from data* which was the biggest challenge for the company related to DDBMs identified in the empirical findings. To conclude, by analyzing how PU can contribute to the business strategy in CX, this subsection contributes to the second research question by providing an understanding of their role in relation to the company's priorities.

5.2.3 PU Facilitating Supplier Involvement

The empirical findings stated that suppliers are a good source of innovation, which was particularly evident in the description of PU's contribution by leveraging their external network. This is further emphasized by Van Weele (2018) who suggested that suppliers can be used to increase innovativeness in the company. DDBMs require CX to reinvent the way they do business, and in addition, the theory states that resources and capabilities from external actors are needed to create value for the company's customers (Raddats et al., 2019). Thus, involving suppliers in CX's processes and establish highly collaborative win-win relationships can be an appropriate alternative to benefit from the suppliers' ideas (Van Weele, 2018). It is evident that PU is the department in CX that has highly developed relationships with suppliers and are knowledgeable about the supplier market. Many of the suggested contributions of PU revolves around e.g. the relationships with suppliers, interaction skills, and knowledge about available solutions in the market. On this basis, they have substantial prerequisites to successfully involve suppliers in CX's processes. Table 5.6 illustrates PU's contributions stated in the empirical findings that are needed for all four types of supplier involvement and contributions that are enhanced by supplier involvement in NPD and NSD.

Table 5.6 - PU's possible contributions needed for supplier involvement and contributions enhanced by supplier involvement in NPD and NSD

	Contributions needed for all four types of supplier involvement	Contributions enhanced by supplier involvement in the NPD and NSD
<i>External network</i>	Close relationships with suppliers Monitor the supplier base Strong interaction skills Creating partnerships Motivate suppliers to contribute to CX's business	Bringing innovation into the company Internalize knowledge Identify new business opportunities Propose data service solutions
<i>Negotiations</i>	Strong negotiation skills	
<i>Contracts and agreements</i>	Contract management Define scope and minimizing risks Setting up profit and loss sharing with suppliers Protecting CX's data	
<i>Internal network</i>		Connecting available solutions to the end customers' problems
<i>DD business mindset</i>	Managing business risk Offer new ways of doing business	Business acumen skills Proposing data service solutions and evaluating ideas Creative people (In terms of generating ideas of new solutions)

As seen in the first column in table 5.6, several contributions of PU that were brought up during the interviews are useful for supplier involvement. One contribution that was not stated in the interviews was motivating the suppliers to contribute to CX's operations, which was added to the table and highlighted in bold and blue. Being able to do so is a prerequisite for the supplier involvements to function in the long term, according to (Van Weele, 2018). Moreover, several contributions of PU are enhanced by involving suppliers in the NPD which are presented in the second column, one example being bringing innovation to the company. Involving suppliers in the NPD or NSD enables PU to indirectly contribute to CX's end customers through collaboration with suppliers that have innovative ideas. As this type of supplier involvement implies that the company and its chosen supplier work jointly to meet customer needs, it is a way for PU to bridge the gap between them and the end customer (Van Weele, 2018). DDBMs are characterized by solving a specific customer problem and that the solution is integrated in the customers processes as well, which increases the complexity of developing such an offering (Baines et al., 2014). In addition, Van Weele (2018) suggests that a joint team with technical experts should develop the new offering. Hence, it is a matter of organizational roles to decide if PU should be the ones involved in the developing team, or if their assignment should be to select the best in class suppliers suitable for such a collaboration and manage the relationship between the supplier and the company continuously. Van Weele (2018) presents a challenge for purchasing in this aspect as deciding how to motivate the suppliers. Thus, there is potential for PU to contribute by maintaining the long-term, close relationships.

No contributions from the empirical findings can be directly linked to involving suppliers in the order fulfillment process, the development of existing offerings or cost reductions. If PU were to involve the suppliers in these ways, they could increase their contribution to the company in these areas as well (Van Weele, 2018).

Summarizing, this subsection contributes to the second research question since supplier involvement can be a key contribution of PU in DDBMs.

5.2.4 PU's Potential Role in Three Data Driven Business Model Types

This section presents PU's potential role in the three possible DDBM types described in 5.1, based on the analysis previously presented in 5.2. This, in addition to the position in the value chain, contribution to business strategy and possible types of supplier involvement are summarized for each DDBM type in table 5.7 below.

Table 5.7 - PU's role in three different DDBM types

DDBM type	Role	Position in the value chain	Business strategy contribution	Supplier involvement
<i>Sell data to actors in the supplier market</i>	Sales function	Involved in marketing & sales, and services	Company growth	N/A
	Use data to reduce CX's cost	Traditional position	Reducing cost	Cost reductions
<i>Improve existing offering</i>	Bridge the knowledge gap between end customers, CX and supplier market	Traditional position	Cost reductions	NPD and NSD
		Supporting the primary activity Services	Leveraging relationships Company growth Provide input	Order fulfillment process Development of existing offering Cost reductions
<i>Create new service offerings</i>	Enable CX's development and delivery of the new offering	Traditional position	Cost reductions	NPD and NSD
		Can support the entire value chain	Leveraging relationships Company growth Provide input	Order fulfillment process Cost reductions

The first row in table 5.7 presents the DDBM *Sell data to actors in the supply market*, and describes the two potential roles of PU with this type of DDBM. In the empirical findings sell data was stated as a future DDBM, hence data can be sold to many actors. However, in this section the DDBM aims at selling data to the supplier market, meaning that they can sell data to both existing suppliers and other actors in the same end of the supply chain. This is motivated by that PU can take a bigger role in this scenario due to their connection to this end of the supply chain. From the previous sections, it has been shown that PU works closely to their suppliers and that they have good relationships with them, therefore it can be beneficial to take advantage of this if data should be sold to existing suppliers. If CX decide to sell data to the supplier market, PU can have the role as a sales function, where data is sold as a chargeable service to increase revenues. It was stated in the empirical findings that PU obtains strong interaction skills, this is can be valuable and needed when dealing with new actors. Additionally, their established relationships with suppliers can facilitate the sales process, but the relationships needed to

sell data depends more on the sensitivity of data. It is reasonable to assume that if the data is sensitive, then a relational approach would be required and if not a transactional approach would be adequate.

The role of PU as a sales function would impact their position in the value chain. Marketing and sales and Services are two primary activities in the value chain according to Porter (1985). Marketing and sales relate to sales, advertising, promotion, selection of distribution channels, and management of channel pricing and relations. Further, the primary activity Services is associated with activities such as repair and maintenance, parts supply, installation, training and product adjustment, in other words services towards customers that aims at maintain or enhance the value of the customer's product. Therefore, it could be argued that PU as a sales function would be involved in the Marketing and sales and Services activities in the value chain, since their work tasks would include some of these activities. From a strategic perspective, with PU acting as a sales function, they will contribute to CX's growth by finding new customers, which in this case are suppliers, and thereby find new revenue streams or increase CX's revenue streams. Moreover, supplier involvement is not applicable in this type of DDBM, since the suppliers will switch role and become a customer if CX sell data to them. In this analysis, PU's role has only been considered as a sales function but the scenario of them having two roles, i.e., sales function and classic purchasing, could also be possible.

Another role of PU in this DDBM, is that they can use data to reduce cost for CX. From the empirical findings it was stated that cost is an important focus area for PU today, and data can be used as an exchange with suppliers instead of monetary means to create a win-win situation for both parties. In this scenario, PU's relationships with the suppliers are very beneficial, since with this type of DDBM it is favorable to have a relational approach to protect CX's data to make sure that sharing it does not harm CX's business. In addition, PU's business acumen skills mentioned in the empirical findings are also needed to understand what the supplier values to get the most out of the relationship. From a value chain perspective, PU will still hold their position but they will contribute and increase the margin with data. Since the data is not free or chargeable but negotiable, it needs to be valued, although, not necessarily in monetary terms. Hence, negotiation skills become very important in this scenario and this is one of strengths of PU. Due to the nature of this DDBM, it is obviously contributing to CX's strategy by reducing cost since that is the aim of using data as a payment method. This also implies that supplier involvement in cost reductions is possible since the suppliers can contribute with ideas on how to reduce cost in exchange for data. Moreover, using data as a payment method to suppliers can create an incentive for them to contribute more and cooperate with CX. Thus, PU can motivate and keep the suppliers satisfied by using data to take advantage of their resources and capabilities.

Improve existing offering is presented in the second row in table 5.7. This DDBM type implies that CX does not change the core offering, but that they add more DD services to it with the purpose of enhancing the attractiveness. Although PU has not been involved in this previously, an increased focus from CX to improve the existing offering creates potential for PU to take the role of bridging the knowledge gap between end customers, CX and the supplier market. In the empirical findings it was stated that PU holds valuable information about the supply market including trends, new innovations etc. To improve existing offerings it is beneficial for CX to leverage this information through PU to create better services towards the end customers. PU's role as a bridging the knowledge gap would facilitate the process of matching end customers' problems with solutions since they are in the best position to know what is happening on the supplier market. To optimize this role of PU it is necessary that they are well acquainted with the end customers' demands. Since the core offering remains the same PU's position in the value chain will be traditional (Porter, 1985). CX will still need the required material to produce the trucks with add on services. However, their new role will imply that they support the primary activity Services in the value chain, since they will contribute to enhance the products or services (Porter, 1985).

In *Improve existing offering* PU will contribute to CX's strategy in all four areas described in 5.2.2. Contributions to cost reductions will be possible since material and services will be purchased and their current operations are focused around minimizing cost (Carr & Pearson, 2002). If PU leverages the relationships with suppliers they can utilize the resources and capabilities of the suppliers and thus, improve the quality of the offering (Wernerfelt, 1984). In addition, the suppliers' resources and capabilities can be used to identify new ideas which implies that PU can also contribute to company growth. By providing relevant input based on the insights obtained from the supplier market, PU can facilitate decision making that support CX in reaching the strategic goals (Carr & Pearson, 2002). All supplier involvement presented in section 5.2.3 is possible in this DDBM since PU can collaborate with suppliers to get ideas on improvements in the offering, cost and future services. Supplier involvement in NSD is particularly interesting since it has substantial potential to leverage the innovation from the suppliers which can be used to optimize the add on services (Van Weele, 2018). Due to PU's position with the suppliers and the supplier market, they are the most appropriate department to select which suppliers to engage with. However, building relationships with such a high degree of collaboration can be challenging and resource demanding (Baines et al., 2014). In this aspect, a key success factor for PU is to ensure that the suppliers stay motivated to contribute to the collaboration. Suppliers can furthermore be involved in the order fulfillment process which has the potential to increase the service quality and thus, customer satisfaction. Thus, PU can contribute to customer satisfaction through involving suppliers, which has not previously been mentioned.

The third row in table 5.7 presents PU's possible role in the DDBM type *Create new service offerings*. These services are, as described in section 5.1 advanced services characterized by solving specific customer needs and being integrated with the customers' processes (Baines et al., 2014). As previously stated, this type of DDBM alters CX's current service offering completely. PU can have a key role in enabling CX's development and delivery of the new offering since this type of service offering is more complex and requires new resources and capabilities, thus, the dependence on leveraging suppliers' resources and competencies increases. Further, when more advanced products and services are purchased from suppliers, the number of appropriate suppliers decreases (Kraljic, 1983). Thus, it can be difficult to find new suppliers if the relationship with a current supplier of advanced product and services is malfunctioning. Additionally, as seen in section 5.1, this type of DDBM is characterized by a relational approach to partners and stakeholder which includes suppliers. Hence, the importance of maintaining the relationship with the chosen suppliers increases since it can be difficult to re-build such close relationships. PU is the department in CX that is most well acquainted with managing suppliers. Therefore, they should maintain their traditional position in the value chain and continue to support Inbound logistics, Operations and Outbound logistics by securing the flow of material and services to CX as well as managing collaborative relationships with the suppliers. Moreover, untraditional suppliers might be needed to develop and deliver the new offering and these will need to be identified by PU. Changing the BM in this setting affects other actors in CX's ecosystem and collaboration with external actors is needed. Hence, PU also needs to make sure that each party's BMs are compatible with one another's (Kohtamäki et al., 2019). The empirical findings showed that PU has the potential to contribute with identifying new solutions to the new DDBM. Thus, by utilizing the knowledge they obtain from the supplier market, they can extend their operations in the value chain to support Marketing and sales as well as Services.

As a strategic purchasing department, this DDBM type enables PU to contribute in all four areas of company strategy contributions presented in section 5.2.2. Cost reduction will stay important, especially since CX will no longer sells the trucks, which implies that they do not obtain a onetime payment from the customers that covers the cost of production. Therefore, PU can contribute by finding new ways to reduce the cost, which can be done in other ways than merely negotiating with suppliers about the price,

e.g. negotiating with data or establishing win-win relationships. As described above, a more complex service offering increases the importance of utilizing external actors' resources and capabilities. On this basis, contributing to CX's strategy by leveraging relationships is crucial. With PU's insights in the supplier market, they have the opportunity to present new ways to create and deliver customer value by matching customers' problems to available solutions. However, this emphasizes the importance of PU to understand the end customer to find applicable solutions. A possible way to do this in addition to closer collaboration with MS is to involve PU in the development of the DDBM. In this way, PU will get insights about the customers' problems to be solved and can start scouting the market for appropriate suppliers and solutions at the very beginning. Lastly, PU can also provide input from their external network to facilitate decision making in the company to reach the strategic goals. This requires PU to be involved with other departments in the development and delivery of new offerings to enable the information exchange.

Supplier involvement is valuable in this DDBM since it enables CX to leverage the suppliers' resources and capabilities efficiently. Involving the suppliers in the NSD is particularly beneficial in this aspect since it creates opportunities for utilizing the suppliers' innovativeness in a highly collaborative manner (Van Weele, 2018). This set-up is favorable for data sharing between the parties and integrating the suppliers' resources and capabilities in CX. Due to that PU manages the supplier base, they are the most suited department to link the suppliers to CX by selecting them and managing the relationships. Depending on the offering this DDBM type would result in, it can furthermore be possible to involve relevant suppliers in the order fulfillment process. In this DDBM type, it is highly beneficial since the customer and its processes is the main focus. This implies that through managing the involvement of suppliers, PU can contribute to the customer satisfaction, but also the customers' processes which was not considered in the empirical findings. The last supplier involvement is in cost reductions. This becomes important due to that the cost structure changes radically, and since the approach to suppliers is relational, profit and loss sharing contracts will be appropriate (Baines et al., 2014). Thus, collaborating with suppliers to reduce cost can positively affect both parties.

Concluding, this section contributes to bridging the gap in literature concerning purchasing's role in DDBMs, by investigating how the role of purchasing can be reinvented. Since the supplier market is not traditionally viewed as a source of revenues, suppliers as a customer enables purchasing to contribute to the company's revenue streams. Moreover, purchasing can play an important role in developing new and existing offerings. The second research question has been answered by analyzing PU's potential roles in regard to possible future DDBM types in CX.

5.3 Impacts of PU's Role in Data Driven Business Models

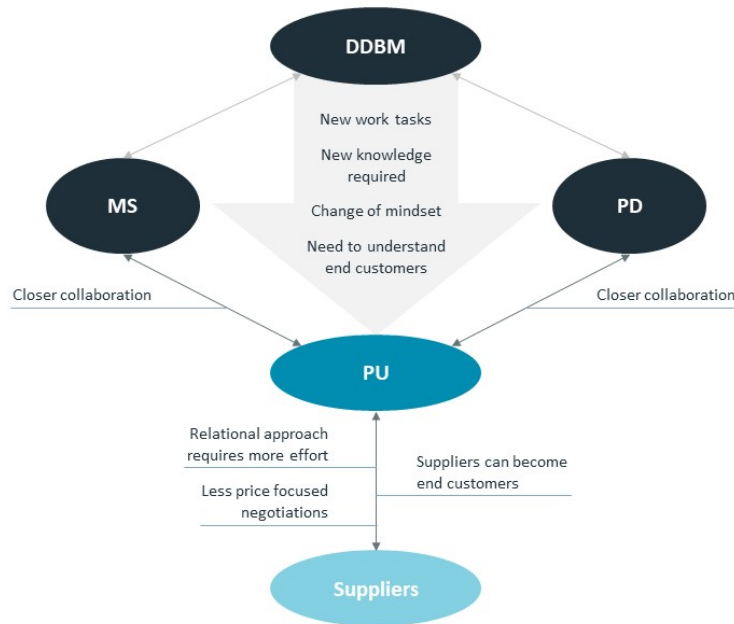


Figure 5.5 - Main impacts on PU from the roles in DDBMs

In this section, it is presented how PU can be impacted by DDBMs based on the four roles described in 5.2.4 which is summarized in table 5.8. The impacts are divided into the four categories mentioned in the empirical findings. Bals et al. (2019) states that purchasing departments will need competencies such as automation, big data analytics, eProcurement technology and holistic supply chain thinking in the future. Hence, it is reasonable to assume that PU will be needing new knowledge and competencies due to the impact of new BMs, regardless if they take a new role or not. For PU to succeed with contributing to DDBMs, they will need a mindset adapted to this setting irrespective of their role, since it is evident from section 5.1 that DDBMs change the ways of working. The main impacts are presented in figure 5.5.

Table 5.8 - Impacts on PU in the four different roles presented in section 5.2

Role / Impacts	Daily operations	Blurred boundaries	Acquiring the right knowledge	Understanding the end customer market
<i>Sales function</i>	<p>Completely reinventing the role of PU</p> <p>Needs to make a decision of having an active or passive sales role</p> <p>If combined with traditional work tasks, this role consumes time and resources from other functions of PU</p>	<p>Involving PU in Marketing and sales and Services can create confusion internally in CX</p> <p>If combined with traditional work tasks, PU's focus area becomes unclear</p>	<p>Sales knowledge</p> <p>Valuing data</p> <p>Legal constraints</p> <p>Sensitivity of data</p> <p>New contracts</p>	<p>The supplier becomes the end customer</p> <p>The data sold stems from CX's end customers</p>
<i>Use data to reduce cost</i>	<p>Identical work tasks, different scope</p> <p>Relationships with suppliers are time consuming to establish and maintain</p>		<p>Valuing data</p> <p>Relational interaction</p> <p>Legal constraints</p> <p>Sensitivity of data</p> <p>New contracts</p>	<p>The data used in negotiations stems from CX's end customers</p>
<i>Bridge the knowledge gap between end customers, CX and supplier market</i>	<p>Current work tasks, combined with new ones</p> <p>Finding new solutions to end customer problems consumes time from traditional work tasks</p>	<p>Cross-functional collaboration in CX is a prerequisite</p> <p>Collaboration with MS and PD</p>	<p>Understanding opportunities with data</p> <p>Selecting suppliers with new specifications</p> <p>Supplier integration</p> <p>Relational interaction</p> <p>Internal communication and collaboration</p>	<p>Substantial need to understand the end customers' needs and problems</p>
<i>Enable the development and delivery of the new offering</i>	<p>Ranges from current work tasks, combined with new ones to completely reinventing the role of PU</p> <p>A highly collaborative and relational approach towards suppliers is time consuming</p>	<p>Cross-functional collaboration in CX is a prerequisite</p>	<p>Understanding opportunities with data</p> <p>Selecting suppliers with new specifications</p> <p>Supplier integration</p> <p>Relational interaction</p> <p>Internal communication and collaboration</p>	<p>Substantial need to understand the end customers' needs and problems</p>

The first row in table 5.8 presents the impacts on PU of taking the role as a *sales function*. This role implies that their daily operations will be impacted, since working as a sales department is completely new for them. Some of their new work tasks will include to find new customers to sell data to, and contribute to increase CX's revenue streams which can be done in an active or passive approach. If PU actively searches for new customers, they are an active sales function, whereas if they sell data to suppliers who request it, they are passive. This new role will take time and resources from their current work tasks, but to what extent depends on if they decide to be an active or passive sales function. Blurred boundaries was mentioned in the empirical findings as one impact, and in this role where PU will be

involved in Marketing and sales and Services activities it can be assumed that this can create confusion internally since this role already exist in CX. In addition, if their role shall be combined with their current work tasks, PU's focus areas can become unclear. It might be difficult to balance these two roles since they will have two roles in one, hence it becomes challenging to decide what they should prioritize.

Moreover, PU needs to acquire the right knowledge to operate as a sales function. To sell data, PU will need to be able to value it and understand the value of data. They will also need a holistic perspective to comprehend how selling specific data might have consequences, such as affecting CX's brand negatively. However, to what extent they will need these competencies are unclear, since exactly how the data as a service will be produced and organized is unknown. The fact that PU will need some knowledge about this area cannot be neglected, otherwise it will be hard for them to become a professional sales function. Further, PU will also need to acquire the right knowledge to be able to understand what the new customers, i.e. the actors in the supplier market, need and what kind of data CX can offer. Lastly, selling data as a new service will require new contracts both with existing suppliers and new ones. It is not certain that PU should have the responsibility of creating those new contracts, but if they should then they will need new knowledge of how to create these with respect to the legal dimension of data management. It might not be necessary for PU as a sales function to understand the traditional end customer market in terms of their problems or needs. However, they must have an understanding about the sensitivity of the collected data, since the it stems from CX's end customers. The switching role of suppliers becoming customers requires that PU understands the new customers in this setting. This is needed to offer the right data and facilitate the valuation of data.

The second role of PU *use data to reduce cost*, described in the second row in table 5.8, will also impact their daily operations, but to a smaller extent than the role as a sales function. Their daily operations will be impacted by spending more time on creating and maintaining relationships with the suppliers since this is favorable to protect the CX's data. To decrease the cost of components in exchange of data, they will need to put more effort into their negotiations since sharing data is more complex than negotiating about price. In this role, PU will not be impacted by blurred boundaries since they will continue with their current work tasks. Therefore, no other departments in CX will be directly impacted by this new role. Using data to reduce cost will require that PU understands the value of data to be able to negotiate about it and value it. In addition, they will need the knowledge of how to create win-win situations. This role will require close collaboration with suppliers and therefore, PU needs to know how to manage and establish these. Further, PU would also need a new business mindset since this role implies that they understand how to obtain advantages of sharing data. PU's focus will exceed the price tag on components since sharing data can lead to other benefits such as access to supplier's resources and capabilities. Also with this role, new contracts will be required and PU will need to acquire the right knowledge to establish these. In addition, they will need some insights about the end customer due to the same reason of CX's way to collect data mentioned above.

The third row in table 5.8 summarizes the impact on PU in the role *bridge the knowledge gap between end customers, CX and supplier market*, i.e., the role in the DDBM type improve existing offering. This role implies that PU will keep their current work tasks while simultaneously adding new tasks. Their new work tasks consist of scouting the market for new service solutions that match the end customers problems. Doing this in addition to current work tasks will naturally be resource demanding since scouting the market and collaborating with suppliers to find solutions take time and effort. Thus, there is risk for increased workload and difficulty in prioritizing work tasks if not set up correctly. The information and new ideas obtained from the supplier market will need to be communicated to other departments in CX. Additionally, other departments in CX need to communicate the customer problems to PU. Therefore, blurred boundaries entail that cross-functional collaboration in the company is a prerequisite for PU to succeed in this role. This especially concerns collaboration between PU and MS

as well as PU and PD as stated in the empirical findings. The purpose of the exchange of information with MS is to communicate customer problems and come up with the most appropriate solutions. When collaborating with PD, the purpose should be to discuss improvements in technical solutions and also to facilitate eventual technical teams with PD and suppliers to enable supplier involvement.

For this role to be feasible, PU will need to acquire knowledge to manage the new work tasks. They need to understand the possibilities data entails and be able to support Services in the value chain. Furthermore, this is needed to leverage relationships, provide input and contribute to company growth in the business strategy. In other words, using their current business acumen but adding data will be a prerequisite for PU to be a strategic purchasing department in this role. Supplier selection will be necessary in this DDBM although, the requirements for selecting suppliers will include new areas. In the empirical findings, it was stated that suppliers are chosen to meet technical specifications with high quality, low cost and as sustainably as possible. With DDBMs and the increased relational and collaborative approach, other factors such as BM compatibility and collaborative willingness will need to be considered. Once the suppliers are selected, PU needs to have relational interaction skills, i.e. the competencies to maintain win-win relationships where both parties feel motivated. If suppliers are to be integrated in CX, PU needs the capability to successfully integrate them and manage the relationship. Additionally, more emphasis is put on internal communication and collaboration since this is needed for the role to function properly. To identify the most suitable new solutions on the supplier market, this role requires an understanding of the end customers and their needs. Otherwise, there is a risk of investing time and resources in solutions that are not needed in CX's offering.

Lastly, the impacts of PU's role in the DDBM create new service offerings, i.e. *enable the development and delivery of the new offering* is presented in row four in table 5.8. As stated in section 5.2.4, PU will maintain their traditional position in the value chain and has the potential to support the entire value chain. Depending on how the DDBM is constructed, this implies that the impact on their current operations ranges from keeping their current work tasks and adding new ones, to completely reinventing themselves. The complete reinvention will occur if CX becomes a pure service provider and stops purchasing hardware. However, in such a case, services might still need to be bought from other service providers. To enable utilization of suppliers' resources and capabilities, which is crucial in this DDBM, a more relational approach towards suppliers is required. Since this is more complex than buying commodities in a transactional relationship, it is reasonable to assume that it is also more time consuming. Hence, performance measures adapted to softer factors might be required to ensure that PU's employees stay motivated. If PU should support the entire value chain, it is required that they understand the activities they support. Therefore, in this DDBM type it is also a prerequisite for cross-functional collaboration within CX as a result of blurred boundaries. Depending on the new service offering, different knowledge needs to be acquired by PU. However, in all cases, the areas mentioned in the role bridge the knowledge gap between end customers, CX and supplier market, will be required with the same motivation. Since this DDBM aims at solving specific customer problems and being integrated in their processes, the need for PU to understand the end customer is inevitable if they should create value for the organization.

To summarize, this section answers the third research question by assessing the impacts on PU based on the possible roles they can have in DDBMs.

6 Recommendations

PU has the potential to contribute in a DDBM by matching resources, competencies and solutions in the supplier market to the customer problems by utilizing and strengthening their external network, with the prerequisite that they understand the end customer. Four main contributions by PU to DDBMs in CX are identified; Provide ideas of new solutions for CX's offerings, Leverage external resources and capabilities to enhance the development of CX's offering, Involve suppliers to increase the innovativeness in CX by collaborating with the company, and Create new revenue streams to CX. Firstly, three recommendations for PU to contribute by interacting with suppliers are presented. Secondly, three recommendations to enhance PU's contributions in DDBMs are provided. Thirdly, a prioritization based on the impact of the four roles identified in the analysis is presented, including a discussion regarding PU's contributions to CX in the roles. Lastly, further research is discussed.

6.1 Purchasing Should Own the Supplier Interaction

External actors are needed in DDBMs for CX to deliver their DD service offerings. PU has extensive experience in managing the supplier base and are therefore used to interacting with external actors. This puts them in a favorable position with prerequisites to own and manage the interactions with suppliers in DDBMs. However, the approach to suppliers will be altered since it will be more relational, which requires PU to adopt a wider perspective exceeding cost reductions. The recommendations of this chapter are presented and explained below, and an overview can be found in table 6.1.

Table 6.1 - Capabilities and prerequisites needed for PU to utilize interactions with the supplier market to contribute to DDBMs

Recommendation	Resource <i>Supplier market knowledge and relationships</i>	Capability <i>Create mutual benefits in collaborative relationships</i>	Prerequisite <i>Understand the supplier (both how they can use data and collaborate)</i>	Contribution to DDBM <i>Provide new ideas to positively affect CX's offerings</i>
1.	Supplier market	Selecting best in class suppliers by assessing collaborative willingness and compatibility	Understand what resources and capabilities are needed in CX Knowledge about suppliers' resources and capabilities	Leverage external resources and capabilities to enhance the development of CX's offering
2.	Supplier relationships	Create collaborative relationships with suppliers Supplier involvement in NSD and NPD Set up data sharing, and profit- and loss sharing agreements	Knowledge about suppliers' business Motivate suppliers and create incentives for the suppliers to contribute Negotiations with the aim of creating mutual benefits	Suppliers contribute to increase the innovativeness in CX by collaborating with the company
3.	Suppliers as customers	PU as a Sales department Knowledge about external network	Understand what data is available at CX and how it can be used by the suppliers	Create new revenue streams to CX

Recommendation 1. *Provide external resources and capabilities to CX by selecting best in class suppliers based on new criteria*

The analysis showed that DDBMs emphasizes the need to take advantage of resources and capabilities outside company boundaries. Hence, the supplier market is a resource that PU needs to leverage by using the capability to select appropriate suppliers, as shown in the first row in table 6.1. The selection needs to be based on criteria that involve collaborative willingness of the supplier and the compatibility to collaborate with the supplier. Making such an assessment before initiating a relationship with the supplier simplifies getting access to, and utilizing the resources and capabilities. To understand the criteria for selecting suppliers, PU firstly needs to understand what resources and capabilities are needed in the CX's DDBM. Secondly, they need knowledge about what resources and capabilities the supplier possesses. Fulfilling these prerequisites enables PU to contribute to the DDBM by leveraging external resources and capabilities to enhance the development of CX's offering.

Recommendation 2. *Collaborate with suppliers and involve them in NSD/NPD to increase CX's innovativeness*

To further take advantage of suppliers' capabilities, their innovativeness can be utilized in CX, which is presented in the second row in table 6.1. By setting up collaborative relationships with suppliers and/or integrating them in NSD/NPD, both parties can work on joint issues to come up with new ideas to enhance the offering in the DDBM. A prerequisite for managing such a set-up is for PU to have knowledge about the supplier's business to know how they can contribute, and also how mutual benefits can be achieved in negotiations. Both parties involved in the collaboration must feel heard and motivated to contribute. Since data sharing and profit- and loss sharing agreements can be a way to foster motivation, this is a capability PU needs to acquire.

Recommendation 3. *Create a direct impact on CX's revenues by turning actors in the supplier market into customers purchasing data*

PU's knowledge about the supplier market opens up unprecedented opportunities to identify actors needing data, which they can sell as a chargeable service. To exemplify, data about road condition can be sold to navigation service providers who can use the data to recommend optimal routes to their users. This recommendation requires PU to have the capability to be a Sales department selling data. The prerequisites involve PU having an understanding of the available data in CX, as well as how the potential new customer can use the data. Such an understanding will simplify valuing the data.

6.2 Purchasing Activities to Enhance the Contributions to Data Driven Business Models

As shown in the analysis, the external network of PU was the category with the largest amount of identified contributions, and the characteristics of DDBMs further emphasizes the external network. Hence, this is a key resource to be utilized to enhance PU's contributions in DDBMs. On this basis, in addition to the three recommendations presented in 6.1, a fourth recommendation regarding the external network is presented below.

Recommendation 4. *Obtain knowledge from the external network to provide ideas of new solutions for CX's offerings*

PU has an external network that no other department in CX has, which gives them a unique position. Therefore, by utilizing this, PU can get inspiration and knowledge about previously unknown solutions which they can bring into CX.

This section provides activities that PU can engage in to enhance the usage of the external network and thus, the contribution to DDBMs in CX, which are summarized in table 6.2. Activities that PU can undertake to use their external network are presented in the first column in table 6.2. To contribute to DDBMs by using the external network, PU needs a business mindset, where the activities related to this capability is presented in the second column in table 6.2. The first three activities are highly focused on learning from other actors and leverage the exchange of knowledge to CX's advantage. Monitor available and demanded data is necessary to understand what data PU has access to and what data external parties demand.

Table 6.2 Activities to utilize PU's external network to enhance their contributions in DDBMs

Resource <i>External network</i>	Capability <i>Business mindset</i>	Prerequisite <i>Understanding the end customer</i>	Contribution to DDBM <i>Provide new ideas to positively affect CX's offerings</i>
Visiting leading suppliers Participating in different projects with external parties Attend various relevant fairs, also outside the usual industry boundaries Host meetings, workshops and events for external parties to exchange knowledge and identify opportunities	Benchmarking what other actors do and leverage internally Collaborate with suppliers and other departments for mutual learnings Connect relevant suppliers with other departments, e.g. MS or PD Monitor available and demanded data	Analyze end customers' usage of CX's offerings Meetings with MS Participate in CX's development of DDBMs	Provide ideas of new solutions for CX's offerings Leverage external resources and capabilities to enhance the development of CX's offering Suppliers contribute to increase the innovativeness in CX by collaborating with the company Create new revenue streams to CX

Recommendation 5. *Develop an end customer perspective to suggest the right solutions for CX's offerings*

For PU to use the business mindset capability and leverage their external network resource, they need to understand CX's end customer since DDBMs are highly customer centric. This is a prerequisite to ensure that the resources, capabilities and solutions identified in the external network by PU matches CX's customers' needs. Thus, to enhance the contributions of PU in a DDBM, a wider perspective than traditionally is required, since PU's current perspective does not include the end customer. The third column in table 6.2 presents possible activities PU can conduct to understand the end customer. Analyze end customers' usage of CX's offerings can be done either by visiting and observing the customers or by using data. The following activities are to have meetings with MS, and to be involved in the development of DDBMs, which results in recommendation 6 presented below.

Recommendation 6. *Increase internal collaboration with other departments to close the gap between suppliers' solutions and end customers' problems*

It is suggested that the understanding of the end customers in the customer market is created by collaborating with the department responsible for developing customer offerings, i.e. MS, and also with

the department responsible for developing CX's solutions, i.e. PD. The collaboration with MS should preferably be initiated in the development of the new DDBM with a twofold motivation. First, this is an opportunity for PU to be involved in the discussion about the offering to the end customer in an early stage to ensure that they are aligned with view on what the customers value. Second, they can provide input in this process and start scouting the market for the most appropriate suppliers to collaborate with and the best available solutions without delays. To succeed with the contributions of suggesting new solutions, an internal network is required to ensure that the ideas that stem from PU are heard in the organization.

6.3 Prioritizing the Impact of Purchasing's Roles

Four different roles were identified in the analysis with respect to three different DDBM types. The impact on PU having these roles varies between the roles, hence the prioritization below is based on which extent PU will be impacted, from the role with the lowest impact to the role with the highest impact. It is important to note that the prioritization does not consider which of the roles is more difficult to develop. Table 6.3 below is based on table 5.8 in section 5.3 and summarizes the degree of impacts in the four roles.

1. *Use data to reduce cost (Low)*

This role has the lowest impact on PU, but it also limits PU's contribution to CX to only reducing cost. Using data to reduce cost can also be used as a foundation to create collaborative relationships with suppliers. However, to succeed with this role knowledge about CX's data policies is a prerequisite which PU cannot acquire without CX setting the guidelines.

2. *Bridge the knowledge gap between end customers, CX and supplier market (Moderate)*

With this role PU can utilize their external network and bring valuable information to CX, which in the long term leads to improved offerings towards the customers and increased revenue streams. Further, introducing suppliers early to PD and involve them in the NSD/NPD process, is beneficial since utilizing external resources and capabilities to develop DDBM's is favorable according to the analysis. Matching customers' problems with solutions requires that PU understands the customer market which they currently do not focus on. The interaction with the suppliers will change and the supplier selection will be based on new criteria, therefore this role is highly impacted by acquiring new knowledge and understanding the end customer market. However, their daily operations will mostly remain the same, but with some new work task. Hence, this impact is considered to be lower in this role compared to the role as a *Sales function*.

3. *Sales function (Moderate)*

PU's daily operations will be highly impacted by the role as a *Sales function* since the this a totally new to PU. The effect on CX revenues will depend on if PU is an active sales function, i.e. actively seeking for new customers to sell data to, or a passive sales function, i.e. only sell data upon request. It is reasonable that changing PU's role to a sales function, which implies that their daily operations will be highly impacted, are more challenging than understanding the end customer market. Hence, this role is prioritized as number three and *Bridge the knowledge gap between end customers, CX and supplier market* as number two.

4. *Enable the development and delivery of the new offering (High)*

As shown in table 6.3 this role has the highest impact on PU. This role is related to a DDBM that alters the current service offering completely. In this role a holistic perspective is required and the dependency of suppliers' resources and capabilities increases. Hence, this role includes *Bridge the knowledge gap between end customers, CX and supplier market*, and requires additional effort to achieve further contributions. Due to the high impact in almost every area, this role is recommended to be developed in a long-term perspective.

Table 6.3 – Estimated degree of impact by the four roles of PU in DDBMs

Role/ Impacts	Daily operations	Blurred boundaries	Acquiring the right knowledge	Understanding the end customer market
<i>Sales function</i>	High	Moderate	High	Low
<i>Use data to reduce cost</i>	Low	Low	High	Low
<i>Bridge the knowledge gap between end customers, CX and supplier market</i>	Moderate	Moderate	High	High
<i>Enable the development and delivery of the new offering</i>	Moderate-High	Moderate	High	High

The four different roles have varying contributions to the business strategy, i.e., CX's competitive advantage. *Sales function* and *Use data to reduce cost* have limited opportunities in terms of strategic contributions since they only contribute in one out of four possible areas each. The roles *Bridge the knowledge gap between end customers, CX and supplier market* and *Enable CX's development and delivery of the new offering* showed a potential for PU to be involved in all four areas of strategic contribution. Therefore, to achieve more substantial contributions, these roles should be considered and *Sales function* and *Use data to reduce cost* can be beneficial complements. An important takeaway in developing these new roles is to have a clear division of responsibility in the department and in the company, to avoid confusion and achieve efficiency in the work tasks.

6.4 Further research

Since the area of involving purchasing in DDBM is unexplored, further research in several areas is needed to provide more tangible findings and recommendations. First, due to that leveraging resources and capabilities of external actors are important in DDBMs, a deeper investigation of how to manage this is needed. A key challenge was stated as motivating the other party to contribute, and while this thesis presented data as well as profit and loss sharing, there are more aspects to consider. This involves the relational competency stated in chapter 5, i.e. how the company should establish and set up collaborative relationships with actors outside the company boundaries. Also, sharing and selling data has been discussed throughout the thesis, and in this aspect, further research on the legal dimensions is

required to assess the feasibility. Lastly, this thesis has touched upon issues of organizational structure. Blurred boundaries between departments was identified as an impact of DDBMs due to new roles and the integration of purchasing in new parts of the value chain. This causes a need to reconfigure the responsibilities of different departments and employees. Hence, to provide recommendations on how this can be managed, further research concerning organizational structure in the space of DDBMs is required.

7 References

- Adrodegari, F., Pashou, T., & Saccani, N. (2017). Business model innovation: process and tools for service transformation of industrial firms. *Procedia CIRP*, 64, 103-108.
- Afuah, A. (2004). *Business models: A strategic management approach*. Irwin: McGraw-Hill.
- Afuah, A., & Tucci, C. L. (2003). *Internet business models and strategies: Text and cases* (2nd ed.). New York: McGraw-Hill.
- Alghisi, A., & Saccani, N. (2015). Internal and external alignment in the Servitization journey – Overcoming the challenges. *Production Planning and Control*, 26, 1219–1232.
- Allmendinger, G., & Lombreglia, R. (2005). Four strategies for the age of smart services. *Harvard business review*, 83(10), 131-145.
- Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic management journal*, 22(6-7), 493-520.
- Andersson, B.-E. (1985). *Som man frågar får man svar: En introduktion i intervju- och enkätteknik* (2nd ed.). Göteborg: Elanders Digitaltryck.
- Applegate, L. M. (2000). E-business models: Making sense of the internet business landscape. *Information technology and the future enterprise: New models for managers*, 49-101. Englewood Cliffs, NJ: Prentice-Hall.
- Axelsson, B., & Wynstra, F. (2002). *Buying Business Services*. Chichester: John Wiley & Sons.
- Baily, P., Farmer, D., & Jessop, D. (2005). *Purchasing principles and management* (9th ed.). Pearson Education.
- Baines, T. S., & Lightfoot, H. (2013). Servitization of the manufacturing firm: Exploring the operations practices and technologies that deliver advanced services. *International Journal of Operations and Production Management*, 34, 2–35.
- Baines, T., Lightfoot, H. W., Smart, P., & Fletcher, S. (2014). Servitization of the manufacturing firm. *International Journal of Operations & Production Management*, 34(1), 2-35.
- Bals, L., Schulze, H., Kelly, S., & Stek, K. (2019). Purchasing and supply management (PSM) competencies: Current and future requirements. *Journal of purchasing and supply management*, 25(5), 1-15.
- Bellman, R., Clark, C. E., Malcolm, D. G., Craft, C. J., & Ricciardi, F. M. (1957). On the construction of a multi-stage, multi-person business game. *Operations Research*, 5(4), 469-503.
- Benedettini, O., Swink, M., & Neely, A. (2017). Examining the influence of service additions on manufacturing firms' bankruptcy likelihood. *Industrial Marketing Management*, 60, 112–125.
- Boyt, T., and Harvey, M., (1997). Classification of industrial services - A model with strategic implications. *Industrial Marketing Management*, 26(4), 291-300.
- Brousseau, E., & Penard, T. 2006. The economics of digital business models: A framework for analyzing the economics of platforms. *Review of Network Economics*, 6(2), 81-110.
- Bryman, A. & Bell, E. (2011). *Business research methods* (3rd ed.). New York: Oxford University Press Inc.
- Cannon, J. P., & Perreault Jr, W. D. (1999). Buyer–seller relationships in business markets. *Journal of marketing research*, 36(4), 439-460.
- Carr, A. S., & Pearson, J. N. (2002). The impact of purchasing and supplier involvement on strategic purchasing and its impact on firm's performance. *International Journal of Operations & Production Management*, 22(9), 1032-1053.

- Chesbrough, H. (2007). Business model innovation: It's not just about technology anymore. *Strategy & Leadership*, 35(6), 12–17.
- Clegg, B., MacBryde, J., Dey, P., Dimache, A., & Roche, T. (2013). A decision methodology to support servitisation of manufacturing. *International Journal of Operations & Production Management*, 33(11/12), 1435-1457.
- Cusumano, M. A., Kahl, S. J., & Suarez, F. F. (2015). Services, industry evolution, and the competitive strategies of product firms. *Strategic management journal*, 36(4), 559-575.
- Davies, A., Brady, T., & Hobday, M. (2006). Charting a path toward integrated solutions. *MIT Sloan Management Review*, 47, 39–48.
- Deloitte, 2013. Charting the Course - Why Procurement Must Transform Itself by 2020. Retrieved from: <https://www2.deloitte.com/us/en/pages/operations/articles/procurement-transformation-charting-the-course.html> 2020-03-27.
- Dubois, A. & Gadde, L.-E. (2000). Supply strategy and network effects: purchasing behaviour in the construction industry, *European Journal of Purchasing and Supply Management*, 6(3-4), 207-215.
- Dubosson-Torbay, M., Osterwalder, A., & Pigneur, Y. (2002). E-business model design, classification, and measurements. *Thunderbird International Business Review*, 44(1), 5-23.
- Dwyer, F. R. & Oh, S. (1988). Transaction cost perspective on vertical contractual structure and interchannel competitive strategies, *Journal of Marketing*, 52(2), 21-34.
- Easterby-Smith, M., Thorpe, R. & Jackson, P. (2015). *Management and business research (5th ed.)*. Thousand Oaks: Sage Publications Inc.
- Flick, U. (2009). *An introduction to qualitative research (4th ed.)*. London: Sage Publications Inc.
- Freeman, V.T. & Cavinato, J.L. (1990), Fitting purchasing to the strategic firm: frameworks, processes, and values, *Journal of Purchasing and Materials Management*, 26(1), 15-20.
- George, G., & Bock, A. (2009). *The business model in practice and its implications for entrepreneurship research*. London: Imperial College.
- Gracht, H., Giunipero, L. C., & Schüller, M. (2016). Future-proof procurement-Now or never: the big procurement transformation. *Berlin: KPMG AG*, 59.
- Halldórsson, Á., & Aastrup, J. (2003). Quality criteria for qualitative inquiries in logistics. *European Journal of Operational Research*, 144 (2), 321–332.
- Hamel, G. (2001), "Leading the revolution: an interview with Gary Hamel", *Strategy & Leadership*, 29(1), 4-10.
- Hogan, J. E., & Armstrong, G. (2001). Toward a resource-based theory of business exchange relationships: the role of relational asset value. *Journal of Business-to-Business Marketing*, 8(4), 3-28.
- Hong, Y. C., & Fauvel, C. (2013). Criticisms, variations and experiences with business model canvas. *European Journal of Agriculture and Forestry Research*, 1(2), 26-37.
- Hsieh, H.F. & Shannon, S.E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277-1288.
- Johnson, M. W., Christensen, C. M., & Kagermann, H. (2008). Reinventing your business model. *Harvard business review*, 86(12), 57-68.
- Kano, N., Seraku, N., Takahashi, F., & Tsuji, S. (1984). Attractive Quality and Must-be Quality. *The Journal of the Japanese Society for Quality Control*, 39-48.
- Kohtamäki, M., Parida, V., Oghazi, P., Gebauer, H., & Baines, T. (2019). Digital servitization business models in ecosystems: A theory of the firm. *Journal of Business Research*, 104, 380-392.
- Kowalkowski, C., Gebauer, H., Kamp, B., & Parry, G. (2017). Servitization and deservitization: Overview, concepts, and definitions. *Industrial Marketing Management*, 60, 4-10.

- Kraljic, P. (1983). Purchasing must become supply management. *Harvard business review*, 61(5), 109-117.
- Lerch, C., and Gotsch, M., 2014. The role of digitization in the transformation process from producer to producing service provider. *Die Unternehmung*, 68(4): 249-266.
- Lerch, C., & Gotsch, M. (2015). Digitalized product-service systems in manufacturing firms: A case study analysis. *Research-Technology Management*, 58(5), 45-52.
- Linder, J. and S. Cantrell (2000). Changing Business Models: Surveying the Landscape. *Accenture Institute for Strategic Change*.
- Lüdeke-Freund, F., Gold, S., & Bocken, N. M. (2019). A review and typology of circular economy business model patterns. *Journal of Industrial Ecology*, 23(1), 36-61.
- Luz Martín-Peña, M., Díaz-Garrido, E., & Sánchez-López, J. M. (2018). The digitalization and servitization of manufacturing: A review on digital business models. *Strategic Change*, 27(2), 91-99.
- Macbeth, D.K. (1994). The role of purchasing in a partnering relationship. *European Journal of Purchasing and Supply Management*, 1(1), 19-25.
- Marshall, A., Mueck, S., & Shockley, R. (2015). How leading organizations use big data and analytics to innovate. *Strategy & Leadership*, 43(5), 32-39.
- Mathieu, V. (2001). Product services: From a service supporting the product to a service supporting the client. *Journal of Business and Industrial Marketing*, 16, 39-61.
- Matthyssens, P., & Vandenbempt, K. (2008). Moving from basic offerings to value-added solutions: Strategies, barriers and alignment. *Industrial Marketing Management*, 37, 316-328.
- Matthyssens, P., & Vandenbempt, K. (2010). Service addition as business market strategy: Identification of transition trajectories. *Journal of Service Management*, 21, 693-714.
- Mendelson, H. (2000). Organizational Architecture and Success in the Information Technology Industry. *Management Science*, 46(4), 513-529.
- Mitchell, D., & Coles, C. (2003). The ultimate competitive advantage of continuing business model innovation. *Journal of Business Strategy*, 24(5), 15-21.
- Monczka, R. M., Handfield, R. B., Giunipero, L. C., & Patterson, J. L. (2015). *Purchasing and supply chain management (6th ed.)*. Cengage Learning.
- Morabito, V. (2015). Big data driven business models. *Big data and analytics*, 65-80. Springer, Cham.
- Morris, M., Schindehutte, M., & Allen, J. (2005). The entrepreneur's business model: toward a unified perspective. *Journal of business research*, 58(6), 726-735.
- Münster, M., and Meiren, T. (2011). *Internet-Based Services in Mechanical and Plant Engineering*. Stuttgart: Fraunhofer-Verlag.
- Oliva, R., & Kallenberg, R. (2003). Managing the transition from products to services. *International journal of service industry management*, 14(2), 160-172.
- Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons.
- Osterwalder, A., Pigneur, Y., & Tucci, C. L. (2005). Clarifying business models: Origins, present, and future of the concept. *Communications of the association for Information Systems*, 16(1), 1-25.
- Parida, V., Sjödin, D., & Reim, W. (2019). Reviewing literature on digitalization, business model innovation, and sustainable industry: Past achievements and future promises. *Sustainability*, 11(2), 391.

- Patel, R., & Davidson, B. (2019). *Forskningsmetodikens grunder: att planera, genomföra och rapportera en undersökning (5.ed.)*. Lund: Studentlitteratur.
- Penttinen, E., & Palmer, J. (2007). Improving firm positioning through enhanced offerings and buyer-seller relationships. *Industrial Marketing Management*, 36(5), 552-564.
- Porter, M. E. (1985). *The competitive Advantage: Creating and Sustaining Superior Performance*. NY: Free Press.
- Porter, M. E., & Heppelmann, J. E. (2014). How smart, connected products are transforming competition. *Harvard business review*, 92(11), 64-88.
- Pfeffer, J., & Salancik, G. R. (2003). *The external control of organizations: A resource dependence perspective*. Stanford University Press.
- Raddats, C., & Kowalkowski, C. (2014). A reconceptualization of Manufacturers' Service strategies. *Journal of Business-to-Business Marketing*, 21, 19-34.
- Raddats, C., Kowalkowski, C., Benedettini, O., Burton, J., & Gebauer, H. (2019). Servitization: A contemporary thematic review of four major research streams. *Industrial Marketing Management*, 83, 207-223.
- Reck, R. F. and Long, B.G. (1988), Purchasing a competitive weapon, *Journal of Purchasing and Materials Management*, 24(4), 3-6.
- Schüritz, R., Seebacher, S., & Dorner, R. (2017). Capturing value from data: Revenue models for data-driven services. *Proceedings of the 50th Hawaii International Conference on System Sciences*.
- Seelos, C., & Mair, J. (2007). Profitable business models and market creation in the context of deep poverty: A strategic view. *Academy of management perspectives*, 21(4), 49-63.
- Shafer, S. M., Smith, H. J., & Linder, J. C. (2005). The power of business models. *Business horizons*, 48(3), 199-207.
- Sheth, J. N. (1996). Organizational buying behavior: past performance and future expectations. *Journal of Business & Industrial Marketing*, 11(3/4), 7-24.
- Sheth, J. N., Sharma, A., & Iyer, G. R. (2009). Why integrating purchasing with marketing is both inevitable and beneficial. *Industrial Marketing Management*, 38(8), 865-871.
- Smith, D.J. (2013). Power-by-the-hour: the role of technology in reshaping business strategy at Rolls-Royce. *Technology Analysis and Strategic Management*, 25(8), 987-1007.
- Sorescu, A. (2017). Data-driven business model innovation. *Journal of Product Innovation Management*, 34(5), 691-696.
- Stewart, D. W., & Zhao, Q. (2000). Internet marketing, business models, and public policy. *Journal of public policy & marketing*, 19(2), 287-296.
- Svahn, S., & Westerlund, M. (2009). Purchasing strategies in supply relationships. *Journal of Business & Industrial Marketing*, 24(3/4), 173-181.
- Svensson, G., & Grönroos, C. (2008). Service logic revisited: who creates value? And who co-creates?. *European business review*, 20(4), 298-314.
- Tassabehji, R., & Moorhouse, A. (2008). The changing role of procurement: Developing professional effectiveness. *Journal of purchasing and supply management*, 14(1), 55-68.
- Teece, D. J. (2010). Business models, business strategy and innovation. *Long range planning*, 43(2-3), 172-194.
- Timmers, P. (1998). Business models for electronic markets. *Electronic markets*, 8(2), 3-8.
- Tsang, E. W. K., (2006), Behavioral assumptions and theory development: the case of transaction cost economics, *Strategic Management Journal*, 27(11), 999-1011.

- Ulaga, W., & Reinartz, W. J. (2011). Hybrid offerings: how manufacturing firms combine goods and services successfully. *Journal of marketing*, 75(6), 5-23.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17.
- Van Weele, A. J. (2018). *Purchasing and Supply Chain Management (7.ed.)*. London: Cengage Learning.
- Viscusi, G., & Batini, C. (2014). Digital information asset evaluation: characteristics and dimensions. *Smart Organizations and Smart Artifacts*, 77-86.
- Wallén, G. (1996). *Vetenskapsteori och forskningsmetodik (2nd ed.)*. Lund: Studentlitteratur.
- Weill, P., & Vitale, M. (2001). *Place to space: Migrating to eBusiness Models*. Harvard Business Press.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*, 5(2), 171-180.
- Windahl, C., & Lakemond, N. (2010). Integrated solutions from a service-centered perspective: Applicability and limitations in the capital goods industry. *Industrial Marketing Management*, 39(8), 1278-1290.
- Witell, L., & Löfgren, M. (2013). From Service for Free to Service for fee: Business model innovation in manufacturing firms. *Journal of Service Management*, 24, 520–533.
- Zott, C., Amit, R., & Massa, L. (2011). The business model: recent developments and future research. *Journal of management*, 37(4), 1019-1042.

Appendices

Appendix 1 - Interview Templates

Interview Template HR

The competence model in general

- Where are you with this model now?
- What is the difference between hard and soft skills?
- How do you define the necessary competencies?
- Do you do anything to ensure that the competencies are realized? (Do you measure it?)
- How has digitization impacted the competence model?
- How do you develop new competencies?
 - e.g. ecosystem
- Which of the competencies are most challenging to develop? Why?

Specific competencies

- *(Soft skill) Delivering customer value; understand the customers of tomorrow to deliver these customer values - how do you do this in practice?*
- *(Hard skill) Customer and brand knowledge; knowledge on how the components/parts/services connected to ones purchasing role impact CX's customers - how do you do this in practice?*
 - Where in the development of this competence are you?
 - How are you working to ensure that you enable this?
- As we understood it from XX, negotiation is one of the stronger competencies that PU has, do you think this competence will change if PU should negotiate with other purposes than just reducing price?

Interview Template PU

General information

- What is your role and responsibilities? How long have you worked in this area?
- From your perspective, how do you view a BM? What are the main components?
- How would you define a DDBM generally?
- What connection do you see between digitized service offerings and DDBMs?
- What's your experience with DDBM?

DDBMs in the company

- How would describe CX's digitized service offerings?
- Assuming that a general BM has four components; offering, customer type, value delivery and revenue/cost, how would you relate these to CX's existing service offerings?
 - What does the offering to the customer look like?
 - Who is the customer?
 - How do you create and deliver this offering to the customers?
 - What does the cost and revenue structure look like?
- What do you want to achieve with you current and future DDBMs? (customer satisfaction, more customers, new markets etc.)

- What are the main challenges with DDBMs for CX?
- How do you envision CX's future DDBMs?
- To operate this type of DDBM, what competencies would you say are necessary? *
- Which of these competencies do you have and what competencies do you need to improve or develop?

PU

- What is the role of PU with respect to customer markets in general (new services, innovation, etc.)?
- What role does PU have in the area of DDBM?
- The competencies you mentioned for a DDBM (repeat *), does PU have any of these competencies today?
- Is this something that PU can develop in the future?
- Do you consider that the role of PU in CX has changed during the years?
- Do you think that PU have some roles and competencies that you can benefit from considering DDBMs?
- How do think that DDBMs will affect PU?
 - Is there any interfaces with other departments/ functions that PU will need to develop further?
- DDBMs are from what we have seen very customer oriented and can also open up for new types of customers, i.e., selling data to other companies and industries. Traditionally, purchasing only works with the supplier market. In regard to this, what role do you think purchasing will have when it comes to the customers of DDBM?
- Can you name **three** key contributions or roles that purchasing has/can have when it comes to DDBM?
 - What activities would this imply?

Interview Template PD

General information

- What is your role and what does it imply? How long have you worked in this area?
- From your perspective, how do you view a BM? What are the main components?
- How would you define a DDBM generally?
- What connection do you see between digitized service offerings and DDBMs?
- What's your experience with DDBM?

DDBM in the company

- What data do you generate today?
- What do you use the data for?
- Some of the data that you do not use ?
- How would describe CX's digitized service offerings?
 - Which parts of these/this are built on data?
- Assuming that a general BM has four components; offering, customer type, value delivery and revenue/cost, how would you relate these to CX's existing service offerings?
 - What does the offering to the customer look like?
 - Who is the customer?
 - How do you create and deliver this offering to the customers?

- What does the cost and revenue structure look like?
- What do you want to achieve with you current and future DDBMs? (customer satisfaction,, more customers, new markets etc.)
- What are the main challenges with DDBMs for CX?
- How do you envision CX's future DDBMs?
 - To operate this type of DDBM, what competencies/activities would you say are necessary?
 - Which of these competencies do you have and what competencies do you need to improve or develop?

PU - *we are aware that you might not be very familiar with how PU works, but answer the questions from your point of view.*

- Have you worked with PU in any of your projects? if so, what role did they have and how did they contribute?
- Can you name three key contributions or roles that purchasing has/can have when it comes to DDBM?
 - What activities would this imply?
- Do you think that PU have some roles and competencies that you can benefit from considering DDBMs?

Interview Template XS

General info/Purchasing organization

- What is your role and what does this imply in terms of daily work tasks?
- How would you describe your purchasing organization?
- Strategic or non-strategic (i.e. focused on saving cost or also involved in company strategic work)?
- Is it transversal or specialized by segment (i.e., do you have any specific technical competencies)?
- Do you have any connection to the customer market?
 - if yes, in what way?
 - If no, why? Is this something that you will have in the future?
- Are your purchasing organization involved in NPD with your suppliers or do you have a separate entity that handles this?
 - If yes, how do you do this?
 - If no, is NPD and supplier innovation something that you are familiar with?

DDBM

- What is your experience of DDBM?
- How would you define a BM?
- How would you define a DDBM?

Involvement in the project

- In the project Connected Solutions, what were you involved in?
- Which activities did you participate in?
- What was your experience? (Did you feel like you could add value? Did you feel like you had the proper knowledge in the area to follow the discussions?)

- Do you think that you could have added more value? If yes, what? What prerequisites would it take for you to do that?
- What kind of activities do you think that you could be involved in? (Hypothetically)
- Do you feel like you have any constraints that hinders you from being involved in this topic?

The project affecting purchasing

- How did your involvement affect your daily work?
- Has the project affected the purchasing department so far? If yes, how?
- Do you think that the project will affect the purchasing department going forward? If yes, how?
 - (How do you think you can prepare for that?)

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