Leveraging Customer Information in New Service Development - An Exploratory Study Within the Telecom Industry

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Abstract

There is an increasing pressure on service firms to innovate and compete on new offerings. As our lives become more digitized through the ubiquitous connectivity by the usage of digital devices, companies are now able to collect vast amount of various data in real-time, and thus, know radically more about their customers. Companies could leverage on this growing body of data and developing relevant services based on customer demands accordingly. One industry compelled to benefit by utilizing customer information is the telecom industry due to fierce competition and a need of innovation in a saturated market. Hence, the purpose of this study is to investigate how telecom companies use customer information in their development process of new services by answering the research question: How do telecom companies use customer information within their New Service Development process? To illuminate this, a qualitative research was conducted on three Swedish telecom companies. The findings indicate that telecom companies possess a beneficial position since they are able to collect a vast amount of data about their customers due to the digital nature of their services. However, they struggle to efficiently integrate the data and seamlessly disseminate the obtained knowledge internally. Hence, leveraging customer information in new service development has not reached its full potential and how well it is incorporated is determined by the skills of key employees and their collaboration rather than deployed internal processes.

Keywords: New Service Development, Customer Information, Information Technology, Information Management, Knowledge Dissemination, Data-driven Decision Making, Telecom Industry
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Sebastian Beijer & Per Magnusson
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1. Introduction

The following chapter introduces the topic of the thesis by providing necessary background information about the research area and discussing a connected problem statement. Subsequently, presenting the purpose of the study which culminates in the study’s research question. Finally, the theoretical and empirical contributions will be presented.

1.1 Background Information

Industries and markets are constantly evolving, and the accompanying transformations often result in new conditions for contemporary organizations to relate to (Dobbs et al., 2014). Therefore, in the firm’s pursuit of achieving sustainable competitive advantages, it is important to be agile and able to react quickly to the changes occurring in the market (Brown & Eisenhardt, 1997). Extensive research (e.g., Day, 1992; Kohli & Jaworski, 1990; Narver & Slater, 1990; Slater, 2001) has proclaimed that market-oriented firms are more competitive and display a greater market performance. Unlike other marketing strategies concentrating on establishing selling points for existing products or services, market-orientation works in reverse, attempting to tailor the products or services based on customer demands (Slater, 2001). Hence, understanding the customers is an important driver to achieve sustainable competitive advantages (Edvardsson, 2006).

A dramatic development in the business environment which has changed the competitive landscape for most businesses during the past decades is the emergence of services. Modern Western economies have shifted from product-driven markets to information-based, service-driven markets. (Johnson et al., 2000) To illustrate this development, services often account for more than 70 percent of the GDP in today’s advanced economies (Biemans et al., 2016). Consequently, both academia and practitioners have directed their attention towards the process concerning how firms develop new services and stressed the need for a more thorough understanding of New Service Development (NSD) (Johnson et al., 2000). NSD is defined as the process of devising a new or improved service, consisting of several phases, i.e., from idea or concept generation to market launch (Biemans et al., 2016). Concurrent to the increased dominance of services, the deregulation and globalization of services, in addition to technological advancements afforded by information and communication technology (ICT), has led to an increased pressure on service firms to compete on new offerings (Menor et al., 2002). Several studies have made the argument that involving customers in the development process of new services is a major contributing factor to the success of the new services (e.g., Alam, 2002; Carbonell & Rodriguez-Escudero, 2014; Desouza et al., 2008).
Recent technological advancements will provide further opportunities for companies in their NSD process (Desouza et al., 2008; Macdonald et al., 20012), since emerging technologies offer better acquisition, delivery mechanisms and more accurate data analysis (EY, 2014). As our lives become more digitized through the ubiquitous connectivity enabled through mobile devices, data can be generated from an increased number of sources (George et al., 2014). Today, companies can incessantly collect both traditional, structured, transactional data as well as more contemporary, unstructured data about the customers’ behaviors in real-time (Erevelles et al., 2016; Macdonald et al., 2012). Due to the vast amount of data available today and refined technology, firms are now able to measure additional parts of their business, providing both opportunities and challenges (McAfee & Brynjolfsson, 2012). Simultaneously as managers know radically more about their businesses and thus improves their decisions and performance, there is also a risk that the firm could “drown in data”, struggling to extract valuable meaning from it (Cukier & Mayer-Schoenberger, 2013; McAfee & Brynjolfsson, 2012). Therefore, firms invest heavily in various information technology tools in order to gain insights about customers’ needs, preferences and behaviors in their pursuit to leverage the data and achieve sustainable competitive advantages (Erevelles et al., 2016). One remaining challenge is to utilize the obtained insights about the customers when developing new services (Carbonell & Rodriguez-Escudero, 2014).

1.2 Problem Statement

While existing technology provides companies with more data than ever before, new challenges emerge when managing its use in the NSD process (Carbonell & Rodriguez-Escudero, 2014; Said et al., 2015). Due to the characteristics of the data, i.e., its volume, velocity and variety, the data is highly complex (Erevelles et al., 2016). In order to generate meaningful insights about the market and its consumers and leveraging that information in the NSD process, the data needs to be processed and analyzed (Bell, 2013; Bughin, 2016). Thus, analysts, developers and managers are faced with the difficult task of efficiently and accurately transform and interpret the raw unstructured data about customers’ preferences and behaviors (Shaw et al., 2001). Not only in the quest of keeping up with market trends but also to predict future trends and innovating new services accordingly (Kim et al., 2008; Macdonald et al., 2012). If firms are successful in their endeavor to generate meaningful insights from customer information and utilize it in the NSD process, it could be a contributing factor to achieve customer-focused growth (Birckhead, 2014; Brown et al., 2017; Said et al., 2015). Accordingly, Carbonell and
Rodriguez-Escudero (2014) argues that involving customers in the NSD process enables improved decisions because these are based on customers’ needs and wants, resulting in a greater performance and customer satisfaction.

The introduction of the Internet and later social media has led to a shift in power, i.e., from firms to customers, suggesting a new form of consumer-firm relationship (Labrecque, 2013). Today, customers can easily compare prices and share their experiences online by commenting and assessing various products or services (Birckhead, 2014; Labrecque, 2013). Thus, firms need to meet their customers’ desires and develop new services accordingly, creating one-to-one experiences (Kelleher, 2018). Rarely will every customer use the service in the same way and understanding how users engage with the service can yield insights on possible enhancements and innovations (Desouza et al., 2008).

However, several studies suggest that most firms struggle to implement customer-information technology and efficiently make use of customer information (Mithas et al., 2013). Therefore, they are still not capitalizing on their customer insights (Brown et al., 2017). For instance, a study by Berchicci and Tucci (2010) showed that despite the rich amount of customer information acquired, the development team decided not to use the feedback when developing solutions, which had a negative impact on the NSD process. Firms usually do not have a clear understanding about the objectives they want to achieve through data optimization, resulting in that firms only use a fraction of the data they possess (Brown et al., 2017). Mithas et al. (2013) states that if firms are to be successful in their use of customer-information technologies in NSD, they need to assess their internal processes for information handling and develop appropriate governance systems to manage their internal knowledge and seamlessly integrate data from external sources. McGuire et al. (2012) reiterates this and states that firms need to carefully consider the allocation of resources since a problem is that a huge amount of the amassed data stays within departmental “silos”, e.g., R&D, engineering, manufacturing, etc. This prevents firms to form a coherent view of the market, trends and their customers (ibid).

One industry compelled to benefit from utilizing customer information is the telecom industry (Bughin, 2016). By the digital nature of the services, the telecom industry is awash in data about the customers. Subscribers are constantly connected to their networks and services which provides telecom companies with huge quantities of data. If managed correctly, it could lead to substantial benefits by improving their service portfolio. (ibid) According to Asamoah (2016),
taking the innovative lead in NSD within the telecom industry could be highly beneficial since the industry is characterized by its fierce competition and increasing churn rates and price wars. Firms that do not develop the resources and capabilities to efficiently use the technology and customer information in the NSD process will be challenged to achieve sustainable competitive advantages (Carbonell & Rodriguez-Escudero, 2014; Erevelles et al., 2016). Lastly, an emerging change that will affect telecom companies and their handling of customer data and information is the new EU regulation General Data Protection Regulation (GDPR), which becomes enforceable in May 2018. The regulation will for instance imply stricter processes for companies when handling information connected to an individual, e.g., customers.¹ (EU, 2018) However, how GDPR will affect telecom companies’ handling of customer data and information is yet to be answered.

1.3 Purpose of the Study
The innovation literature has been strongly biased towards products as New Product Development (NPD) has been studied for decades (Biemans et al., 2016). Due to the emergence of service-dominant economies, scholars have argued for the importance of service innovation and calls for further research on NSD (Biemans et al., 2016; Menor et al., 2002). Initially, many models of NSD have been based on NPD-models (Booz et al., 1982). However, given the inherent differences between the production of products and services, i.e., services’ intangibility, the specific customer contact and heterogeneity of demand, the application of NPD models to services might not be sufficient (Johnson et al., 2000). To address this issue, Johnson et al. (2000) developed a general model of NSD which is applicable on various industries. This study will apply that model as well by studying the telecom industry. However, it is important to emphasize that the focus of this paper is on how companies use customer information in their NSD process, where the telecom industry is used as a representation. There are several factors which makes the telecom industry interesting, presented more thoroughly in section 3.1.1. Thus, the purpose of this study is to investigate how telecom companies use customer information in their NSD process when developing new services.

¹ To read more about GDPR, please see: https://www.eugdpr.org/key-changes.html
1.4 Research Question

*How do telecom companies use customer information within their New Service Development process?*

More specifically, the use of customer information refers to several phases, and therefore, we aim to investigate (1) how telecom companies collect and process data about their customers, (2) how the obtained knowledge is disseminated internally within the organization to key employees, and (3) how or if decisions regarding new services within the NSD process is based on the amassed data.

1.5 Contribution of the Study

The contribution of this study is both theoretical and empirical. The theoretical contribution is twofold: (1) the study combines two different research fields, namely innovation- and information-management literature and (2) based on the previous literature, we constructed our own analytical framework. The empirical contribution is to test the analytical framework by studying how telecom companies make use of and leverage customer information in the different stages of the development process of new services. A comprehensive understanding of how information technologies are adopted and what benefits they provide in NSD for the telecom industry, is yet to exist (Bughin, 2016).
2. Literature Review

The following chapter provides a literature review where previous literature regarding market orientation, innovation, NSD and information management is presented and discussed. This concludes with a summary of the key points from the literature review. At the end, we present our own constructed analytical framework based on the literature which combines the two research fields innovation and information management.

2.1 The Need of Market Orientation in a Digital Age

For several decades, extensive research has argued that companies would benefit by applying a market-orientation business perspective in order to become or stay competitive (e.g., Day, 1992; Kohli & Jaworski, 1990; Narver & Slater, 1990). A market-orientation perspective means that a company (1) places the highest priority on the profitable creation of maintenance of superior customer value while considering the interests of other key stakeholders, and (2) provides norms of behavior regarding the organizational development of and responsiveness to market information (Kohli & Jaworski, 1990; Narver & Slater, 1990). Slater and Narver (1995) argues that market orientation is valuable because it focuses the organization on continuously collecting information about both current and potential target-customers and using this information to create continuously superior customer value. The authors elaborates and explains that market orientation enables organizations to learn about the customers’ needs, the influence of technology, competition and other environmental forces and acting on that knowledge in order to become competitive. Thus, market-oriented businesses have a competitive advantage in both the speed and effectiveness of their responsiveness to opportunities and threats. (ibid) Though, today’s complex environment requires another firm-customer interaction and new ways of collecting customer information (Desouza et al., 2008; Matthing et al., 2004; Slater, 2001).

2.1.1 Today’s Customer Information

There is no general accepted definition of customer information in the literature, though is commonly referred to as the information about customers’ needs, wants and buying behavior (Berthon et al., 1999; Kohli & Jaworski, 1990; Slater & Narver, 1995). A common denominator in the literature is however that customer information has been studied as the information generated by the customer either prior or after the purchase (Slater, 2001). Traditionally, market-oriented firms have gathered this type of information through verbal techniques such as focus groups and customer surveys to enhance the understanding of the expressed needs and then developing products and services to satisfy those needs (Dahlsten, 2003; Slater, 2001).
However, Harari (1994) argues that these techniques are usually insufficient and often result in minor improvements rather than innovative thinking and breakthrough services. Matthing et al. (2004) reiterates this and states that organizations simply cannot access, understand and meet latent needs of the customers by only using surveys and interviews.

However, advances in information technology allows firms to digitally track their customers’ behavior in real-time while interacting with a product or service. This enables firms to collect information about their customers with greater accuracy and quality, which could be used to create a clear understanding about the customers and deliver customer value. (Desouza et al., 2008; Macdonald et al., 2012) Simultaneously as the amount of available data increases in volume, the techniques used to analyze and store data continues to become increasingly sophisticated, accessible and affordable (Desouza et al., 2008). For instance, one technology which enables firms to collect additional information about the customers is the Internet of Things (IoT). IoT refers to when physical assets equipped with sensors provide an information system the ability to capture and transfer data over a network without requiring human-to-human or human-to-computer interaction. (Bughin et al., 2015; Manyika et al., 2013)

2.2 New Service Development

Innovation is the driving force behind superior business performance, with innovative firms reaping the benefits of increasing growth and customer satisfaction (Biemans et al., 2016). Through innovative product and service launches, firms like Apple and Amazon changes the terms and conditions of their markets and sets the direction for the future (ibid). Academic researchers have for long shown great interest in innovation. A combination of the emergence of services in today’s advanced economies and the strong focus on NPD in the innovation literature has led to scholars arguing for the importance of the relationship between services and innovation and calls for further research about NSD. (Biemans et al., 2016; Menor et al., 2002) Storey and Easingwood (1999) present several benefits that accrue from taking a market lead in developing new services. For instance, (1) enhancing the profitability of existing services, (2) attracting new customers to the firm, and (3) improving the loyalty of existing customers (ibid).
Before describing the NSD-process cycle, two important definitions should be made, i.e., *services* and *new service development*. The service-dominant logic argues that there has developed blurred lines between products and services, questioning the distinction between the two (Lusch et al., 2017). Today, products and services are to a large extent intertwined (ibid). Nevertheless, services could essentially be defined as a series of interactions between participants, processes and physical elements (Johnson et al., 2000). In this study, all of the offerings provided by the telecom companies will henceforth be defined as services. Furthermore, the NSD process can be defined as the process of devising services and includes all of the activities from idea or concept generation to market launch (Biemans et al., 2016). The NSD process can be roughly divided into two different categories based on the newness of the service. Either *radical innovations* (i.e., services not previously available to existing customers) or *incremental innovations* (i.e., changes to services previously available to existing customers). (Johnson et al., 2000) There has been an ongoing debate in the service-innovation literature on how services come onto the market. For a long time, a generally accepted principle behind NSD was that “new services just happen” rather than going through a formal development process. (Menor et al., 2002) In order to provide a greater understanding and to address the inconclusive debate, Johnson et al. (2000) developed a conceptual model of the NSD-process cycle (see Figure 1).

2.2.1 The New Service Development Process Cycle

In contrast to its predecessors, the NSD-process cycle recognizes the cyclic nature of non-linear processes deployed in NSD efforts due to the unique characteristics of services, i.e., the role of customer contact in service delivery, service intangibility, and heterogeneity of demand. Johnson et al. (2000) makes the argument that service design and service development should be incorporated in the same process due to the interplay between them. This means that the NSD process often result in a necessary iterative process (Johnson et al., 2000), a perspective that this study will apply as well. The model also incorporates a lot of different components important to the success of the NSD process. For instance, the NSD process is facilitated by a couple of enablers, i.e., *Teams, Tools* and *Organizational Context*, which consists of *People, Systems* and *Technology*. When functioning, the enablers will have a positive impact on the NSD-cycle time and contribute to efficiency which ease the flow of the NSD-process cycle. (ibid)
Furthermore, the model is divided into four different stages. The first two stages of the process cycle, Design and Analysis, represent the Planning phase where decisions of market viability, internal resources, and capabilities are considered. The design stage includes formulation, screening and testing of service ideas in order to develop guidelines for further progress. The analysis stage is when the new service is assessed based on profitability and marketability. The final two stages, Development and Full Launch, represent the Execution phase. During the development stage, the new service is refined since it is exposed to further tests where prototypes and pilots are being developed. Finally, during full launch, the new service is delivered to the market and becomes commercialized. Though the new service continues its innovation progress since customers provides feedback after the launch, which is commonly referred to as incremental service iterations. (Johnson et al., 2000) However, to fully optimize the NSD process, many researchers argue that firms should use the customer information they possess and based on those insights develop even more innovative services (Carbonell & Rodriguez-Escudero, 2014).

2.2.2 Customer Information in New Service Development

According to several research findings within the discipline of service innovation, utilizing and integrating customer information seamlessly in the firm’s NSD process is a major contributing factor to the success of new services (Alam, 2002; Kristensson et al., 2004). Witell et al. (2011) explain that this is due to the company’s ability of exploiting the rich insights generated by customer information about the expressed needs and developing innovative services.
accordingly. Hence today, companies are undergoing a transition phase where older innovation models with no or low level of customer involvement are replaced by models with higher customer involvement (Desouza et al., 2008). Thus, changing their innovation strategies from “innovating for customers” to “innovating with customers”. A main factor behind this transformation is dramatic advances in ICT which has influenced how organizations collect and analyze customer information. Firms’ ICT systems are becoming more affordable and sophisticated where the customer involvement in information gathering is minimal since most of the data needed to generate information are readily available. (ibid) Carbonell and Rodriguez-Escudero (2014) reiterates this statement, arguing that this results in less supervision and maintenance, and thus more efficient NSD processes.

Furthermore, there is a common assumption in the literature that involving customers in the firm’s NSD process ensures that the voice of the customers is heard within the decision-making process. Thus, the firm is more likely to act on the knowledge and insights generated. (Carbonell & Rodriguez-Escudero, 2014) However, a study made by Berchicci and Tucci (2010) disclosed the opposite. The study showed that despite the rich amount of customer information acquired, the development team decided to not use the information and feedback when developing solutions. The authors explained that the reason for this was that the information acquired did not correspond with the perceptions of the development team, having a negative impact on the NSD process. (ibid) Therefore, if customer information is to increase NSD performance, firms should make use of the new information that the customers bring to the development project. In order to do so, firms need to process the data and disseminate the obtained knowledge through the organization in an adequate way. (Desouza et al., 2008)

2.3 Information Management in NSD

2.3.1 Collecting & Processing Data

Today, data can be constantly collected from various types of data sources, providing organizations with massive data sets about their customers and an effective data management could lead to competitive advantages (EY, 2014; Shaw et al., 2001). For instance, Amazon uses an anticipatory shipping strategy based on their customers’ activities to predict when a customer will make a purchase and begins shipping the product to the nearest hub prior the actual purchase. This results in cost reductions due to faster speed-to-market and also greater customer satisfaction. (Erevelles et al., 2016) Thus, real-time data makes it possible for firms to be more
agile and respond to emerging opportunities or threats instantly (McAfee & Brynjolfsson, 2012). Broadly, organizations can collect two types of data, i.e., *structured* and *unstructured* data (King, 2017). Structured data often refers to the traditional data that is already organized and is used in certain formats ready for analysis. Unstructured data often refers to the data produced by the customers’ behavior when interacting with a product or service and comes in various formats. Organizations are faced with the challenge to filter and organize the unstructured data in order to draw relevant insights from it. (ibid)

Within data processing, Bierly et al. (2000) argues that an important distinction must be made between *customer data*, *customer information* and *customer knowledge*. Customer data is unprocessed and is either structured or unstructured. Customer information is processed data, i.e., when the data becomes meaningful. Finally, customer knowledge is when the information is used in a meaningful way and when there is a clear understanding on how the information can be used in order to obtain further insights. (ibid) When customer information is generated passively, e.g., when customers do not have to fill out a form or survey, it reaches the organization in the form of data (Stafford, 2009). In order to create meaning and use the information for decision making, the collected data needs to be filtered and analyzed (Campbell, 2003). Data alone will not generate any new insight, thus instead the data needs to be transformed into customer information and be integrated throughout the organization in order to create knowledge (ibid).

The process of analyzing data could be achieved through the concept of *data mining*. Data mining is defined as the process of searching and analyzing data in order to find useful information. Data mining refers to a broad set of computational methods including statistic algorithms to discover unknown patterns within the data, which could support the analyst to find hidden knowledge. (Ngai et al., 2009; Rygielski et al., 2002; Shaw et al., 2001) Before managing the incoming customer data, organizations must determine which data points that are relevant and should be collected and analyzed. Therefore, firms should consider which objectives to achieve by collecting data, since collecting data just for the sake of it serves no purpose. (Papachristos, 2015) In accordance, Eppler and Mengis (2004) argues that besides being costly, too much unnecessary information might lead to *information overload*. Information overload is undesirable for organizations since it creates a situation where the quality of individuals´ decisions and reasoning in general rapidly declines after a certain point of received information (ibid).
Another important aspect regarding the organization’s ability to obtain knowledge involves the storage of data and information, since research has shown that organizations easily lose track and forget what has been discovered (Alavi & Leidner, 2001). Thus, it is beneficial if the data is organized by some kind of structure so it can be easily recovered, searched for, and generally subjected to analysis of various kinds (Hand, 2007:128-130). These structures allow organizations to access pieces of data more rapidly (ibid). According to Alavi and Leidner (2001), the storage, structure and retrieval of customer information constitutes an important aspect of successfully integrating the information within the organization.

2.3.2 Knowledge Dissemination

Once organizations have acquired useful knowledge generated from its customers, it is vital that the knowledge is distributed to the right people within the organization in order to reap the benefits of the data (Kingston, 2012). The process of knowledge distribution within the organization is called knowledge dissemination (ibid). In his article, Kingston (2012) uses four formats to describe how firms disseminate information or knowledge internally. These formats are divided into two dimensions, first that knowledge is either written or recorded into a repository or that it is communicated directly between individuals. The second dimension distinguish the dissemination by either a predefined set of rules and framework or an unmanaged informal approach. (ibid) The process of efficiently and accurately disseminate knowledge is usually a challenge for organizations since there is uncertainty about what they actually know (Alavi & Leidner, 2001). In accordance, McGuire et al. (2012) argues that there is a risk that a lot of the amassed data stays within departmental “silos” due to an insufficient knowledge dissemination, preventing firms to form a coherent view of the market, trends and their customers. This could be explained by the argument presented by Alavi and Leidner (2001), arguing that many organizations have weak systems for sharing knowledge that has been previously acquired within the organization. Moreover, Slater and Narver (1995) argues that effective dissemination of knowledge facilitates the usage of data in decision making, increasing the value of the data. This allows organizations to respond quickly and in a more targeted way to changes and opportunities, enhancing customer satisfaction (ibid). For instance, real-time dissemination allows proactive services such as rectifying issues before the customers notice it (Papachristos, 2012).
Thus, it is important that organizations have functional processes in place when distributing knowledge, i.e., including some sort of system for gathering data, transforming it to useful knowledge and disseminate it to developers and relevant decision makers (Schrage, 2016). According to Cummings (2004), empirical evidence shows that dissemination of external knowledge such as customer information improves the performance of the organization, especially in NSD. Riege (2005) makes the argument that efficient knowledge sharing within the organization speeds up the development process while also contributes to better products or services, resulting in a faster speed-to-market and better market performance. This is because involving employees in knowledge sharing activities transfer individual tacit knowledge to organizational capacity (ibid).

2.3.3 Data-driven Decision Making

McAfee and Brynjolfsson (2012) states that if useful knowledge based customer data is effectively disseminated to managers and decision makers, it should affect and improve their decision making. However, the study made by Berchicci and Tucci (2010) opposed this and competent managers still ignores data, resulting in impaired decisions. In his Nobel Prize winning work, Herbert Simon tries to explain this and introduces the concept of bounded rationality (Bazerman & Moore, 2013:3-5). Bounded rationality implies that our decision making and judgment is often affected by factors such as lack of important information, time constraints, laziness, etc. Instead, decisions should follow a rational process, though research shows that it is not always the case for most of our decisions. (ibid) Furthermore, Stankovic and West (2000) makes a distinction between humans’ different decision making, referring to it as System 1 and System 2. System 1 thinking is based on intuition and these decisions are fast, automatic, effortless and emotional. Most of the decisions we make are made by using System 1 thinking. On the contrary, System 2 thinking is more of a reasoning which is slower, conscious, effortful and logical. For most of the time, System 1 thinking is sufficient but when making more important decisions, System 2 thinking should be used since it is argued that it leads to better decisions. (Stankovic & West, 2000)

According to research findings, when facing a complicated decision, experienced managers usually feel confident that they can trust their intuition and use their System 1 thinking (Bonabeau, 2003). The analysis becomes more as a supporting tool. Hence, important organizational decisions have traditionally relied on managers who sought to use their intuition
when faced with challenging issues. (ibid) Similar arguments are made by McAfee and Brynjolfsson (2012), stating that when data is scarce or not available in digital form, it makes sense to let well-positioned people base their decisions on intuition. A lot of the decisions taken within today’s companies are relying on “HIPPO” (highest paid person’s opinion) and their intuition (ibid). Even though intuition can be valuable for organizations, having too much faith in intuition might lead to less informed decisions than decision based on data (Salas et al., 2010).

As described by Bazerman and Moore (2013), human biases seems to be a problem in decision-making processes. For long there has been a perception that intuition becomes more valuable in highly complex and changing environments, however, the opposite is in fact true according to Bonabeau (2003). With more data and the supporting function of computer technologies, organizations can move from System 1 to System 2 thinking and hopefully make better decisions (Bazerman & Moore, 2013; EY, 2014). However, the information and knowledge acquired by organizations will bear little impact if it is not actually used in the decision-making process. Souchon and Diamantopoulos (1999) defines the use of information as taking information into account when making a decision, which consists of three dimensions; instrumental, conceptual and symbolic (Souchon & Diamantopoulos, 1999; Toften & Olsen, 2003). Instrumental use has been defined as the direct application of information to solve a particular problem or to make a particular decision, implying that information is acquired for immediate use and applied for a specific purpose. Conceptual use of information refers to the indirect application, in the sense that the acquired information is used for general enlightenment and development and the managerial knowledge base without serving any particular problem. Symbolic use is when information is used in order to support the decision makers’ opinions or to justify a decision made previously. (Souchon & Diamantopoulos, 1999; Toften & Olsen, 2003)
2.4 Summary of the Literature Review

Extensive research on the subject has led to the argument that market-oriented firms portray a greater responsiveness to changes occurring in the market, and hence, achieve a greater market performance. Instead of trying to establish selling points for existing products and services, a market-oriented approach works in reverse, and tries to tailor the products or services based on customer demands. A massive change in the business environment during the past several decades is the shift from product-driven markets towards information-based, service-driven markets. Due to the competitive landscape companies face today, there is increased pressure on service firms to innovate, delivering and compete on new services.

The innovation literature has been heavily biased towards NPD and scholars have called for further research on NSD as services becomes more dominated in business. Johnson et al. (2000) provides us with the conceptual model of the NSD-process cycle which acknowledges the non-linearity and iterative process when developing new services. The model consists of four stages; Design, Analysis, Development and Full Launch, describing the various steps in the NSD process. The model also includes so called Enablers (Teams, Tools and Organizational Context) with the aim to enable a smooth process. Furthermore, several research findings argue that utilizing and integrating customer information seamlessly within the firm’s NSD process is a major contributing factor to the success of the new service, due to the exploitation of rich insights about customer demands. Today’s companies are in a transition phase where the development moves towards a greater customer involvement in the NSD process. The combination of technological advancements and the fact that our lives become more digitized through incessantly connectivity enables firms to collect behavioral data when a customer is engaging with the service in real-time. Several research findings argue that this type of data provides greater insights than in comparison to traditional data such as survey answers etc.

However, if customer information is to increase NSD performance, companies need to manage the information more efficiently. First of all, the company needs to collect sufficient data and then process it in an adequate way. Hence, the company should establish a clear and well-communicated purpose and goal with the data collection and be able to store it and integrate it properly within the operations. Secondly, the obtained knowledge about the customers need to be disseminated smoothly within the organization. Thus, it is important that the information is accessible and later shared with the right persons in an intuitive way, where the enablers can contribute to achieve this. However, in order for the knowledge to be valuable and serve a
purpose, it should be used as basis in the decision-making process within NSD. Thus, firms should strive for a data driven decision-making process in order to mitigate and eliminate error derived from human biases. Roughly, there are three ways to use data in the decision-making process; instrumental, conceptual and symbolic. Instrumental use is when the information is directly applied to solve a specific problem or making a specific decision. Conceptual use is when the information is indirectly applied and is used for a more general enlightenment. The symbolic use refers to when the information is used to support an opinion or to justify previously made decisions.

2.4.1 Analytical Framework

Based on the previous literature review, we constructed our own analytical framework and conceptual model (see Figure 2). As an initial step, the framework captures the different forms of data, i.e., structured and unstructured. Although, the focus of this study is primarily on behavioral unstructured data, the structured is important to include as well in the analysis to gain a more comprehensive picture of the process. Furthermore, the research findings presented in the literature review states that information management consists of several phases and should not be studied separately since it is the whole process which indicates how the company manage its information. Thus, the framework captures both how firms acquire and process the data about its customers, and also how this obtained knowledge is disseminated throughout the organization. In order to gain a comprehensive picture of this, we examine if the company has any purposes and goals with the data collection and how the data is stored and later processed to useful information and knowledge. Subsequently, how the obtained knowledge is disseminated within the organization in terms of accessibility, targeting and format, where the so called enablers could have a supporting role. It is important to note that the enablers can be applied at other parts of the process as well. However, we categorized them under the knowledge-dissemination phase because we consider that phase as essential for a smooth and efficient process in general where the enablers contribute to that. Lastly, to truly gain a comprehensive picture of how well customer information is incorporated in NSD, it is vital to investigate how and when the information is used in decision making. It is also important to recognize that how the information is used might depend on its context, i.e., if it is used for completely new service or incremental innovations. To sum up, the analytical framework of this study combines Johnson et al. (2000) NSD-process cycle and previous research on information management and will thereby function as basis for analysis in this study.
3. Methodology

The following chapter outlines the methodological reasoning and discuss the choices made regarding how the thesis was conducted. The approach and design of the study is initially presented and discussed, followed by a description and discussion of how the data was collected and later analyzed.

3.1 Research Approach

The study’s purpose and research question should be taken into account when determining the appropriate research approach (Bryman & Bell, 2015). The purpose of this study is to investigate how telecom companies use customer information in their NSD process when developing new services. With this in mind, the chosen approach is an exploratory approach in order to gain insights about how do telecom companies use customer information within their New Service Development process? The innovation literature is relatively extensive, however, the use of advanced technologies to support the innovation process is a fairly new phenomenon due to the novelty of the technology. Accordingly, Bryman and Bell (2015) states that a more exploratory stance is preferable if there is less research on the topic. Therefore, an exploratory approach was perceived appropriate since our theoretical contribution combines two different research fields, i.e., innovation and information management, resulting in our own constructed analytical framework. In addition, the chosen approach is also compliant with our empirical contribution, since a comprehensive understanding of how information technologies are adopted in NSD is yet to exist (Bughin, 2016).

The next step of the process was to decide upon which research strategy most suitable to explore the study’s research question. A qualitative research strategy was considered suitable due to the novelty of the research area. In accordance, a qualitative research strategy provides an in-depth understanding about how customer information is used in the NSD process, since it allows respondents to elaborate on their reasoning (Bryman & Bell, 2015). Whereas the quantitative strategy is more suitable when the study intends to measure various elements, e.g., how much or what effect (ibid). Given that this study aims to investigate in what way (or even at all) customer information is used in the NSD process, and not measure for instance to what extent or number of innovations which used customer information in their development, the qualitative strategy was deemed more appropriate.
3.1.1 Study Context: The Swedish Telecom Market

When studying the telecom industry, an important initial step is to understand the various actors. The exact composition of the telecom industry varies when it comes to including or excluding certain business sectors. A general distinction presented by Czarnecki and Dietze (2017) includes a categorization of dimensions such as customers, value chain, business activities and network. Meaning, within the telecom industry there are actors involved in different business activities. However, in this study, the focus is solely on mobile operators offering wireless communication services to end-customers. Focusing on similar actors within the industry enables a more comprehensive and comparable analysis. In addition, mobile operators are interesting study objects due to the digital nature of their business, resulting in that they collect a vast amount of different kinds of data about their customers (EY, 2014). Hence, when referring to the telecom industry or telecom companies, it is referred to organizations which provides wireless communication services to both individuals and companies.

For most countries, the telecom industry has experienced significant changes during the last couple of decades. Most of the companies in the industry has been owned by the government and their business activities confined to their home markets through monopoly positions. (Schmid & Daniel, 2009) However, a wave of deregulation and privatization has changed the market conditions (Lindeskog, 2018). As a result of the deregulation and privatization of the Swedish telecom industry in 1993, new actors have entered the market which has led to increased competition (ibid). Nevertheless, the majority of the market share still belongs to the four largest actors, namely Telia, Hi3G (3), Tele2 and Telenor (PTS, 2017). According to the annual reports from three of these four companies, they are all exposed to fierce competition, expressed by new entrants, higher variety of customer offers and cost pressure on services (Telenor, 2016; Tele2, 2016; Telia, 2016).

The apparent competition is one contributing factor which makes the telecom industry interesting to study. Today, telecom companies need to accept and be managed by taking into consideration the general rules of competitive markets (Jain & Surana, 2017). For instance, consumers’ cost of switching mobile operator is relatively low where weak service experience could lead to high levels of customer churn (ibid). According to Jain and Surana (2017), this risk is more current and severe than ever for telecom companies. To respond to this threat, telecom companies need to realize new revenue streams through innovative services (Czarnecki
& Dietze, 2017). In accordance to this, the Swedish telecom companies emphasize the need of creating new innovations in their annual reports (Telia, 2016; Telenor, 2016; Tele2, 2016).

According to several studies, (e.g., Asamoah, 2016; Bughin, 2016; Cummings, 2004), telecom companies possess massive amount of data about their customer. Thus, it is interesting to investigate how or if they use and optimize this information since it could improve market performance and contribute to competitive advantages. Frisiani et al. (2017) elaborates on this, arguing that if firms like Google and Facebook can generate enormous value by knowing everything there is to know about their users, it should be no difference for telecom companies, since vast amount of data travels through the telecom companies’ network as well. Hence, the choice to study telecom industry was influenced by the desire to investigate service firms in a highly competitive, dynamic and technology-driven industry with access to vast amount of customer information.

3.1.2 Pre-study
As an initial step, a pre-study was conducted in order to gain a greater understanding of the Swedish telecom industry and which factors critical to consider. We interviewed three respondents (see Table 1) with insights about the Swedish telecom industry. Two of them are still active in the industry whereas the third person has left the industry after 20 years. During these interviews, we discussed our approach and purpose with the study and tested our analytical framework. Additionally, we read a lot of material in form of secondary data such as annual reports, company websites, press releases and etc. to familiarize ourselves with the industry and potential study objects. The pre-study revealed that the chosen research question was of high interest for the industry since telecom companies have struggled to make use of all the data they possess in an efficient way, transforming it into competitive advantages. This confirmed that the study was of both theoretical and empirical interest. Finally, conducting a pre-study was also beneficial since it provided direction regarding which informants to contact to ensure that the respondents were knowledgeable within the framework of this study.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Position</th>
<th>Interview</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecom</td>
<td>Head of Business Area (former employee)</td>
<td>Email</td>
<td>-</td>
</tr>
<tr>
<td>Analyst</td>
<td>Face-to-face</td>
<td>1h</td>
<td></td>
</tr>
<tr>
<td>Account Manager</td>
<td>Telephone</td>
<td>30min</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1. Pre-study*
3.1.3 Design of the Study
In order to explore the NSD process and investigate how customer information is incorporated, three telecom companies were selected as study objects, providing the data collection which serves as basis for the analysis. All selected study objects are located and active on the Swedish telecom market due to the convenience of geographical location when establishing contact and later conducting the interviews. This implies that the findings of this study are primarily applicable to other Swedish telecom companies. However, the findings could be valuable to telecom companies abroad due to the similarity of the markets. Moreover, findings that are not industry specific could be applicable to other type of companies operating in highly technological driven industries where it is possible to collect and use vast amount of customer information.

Nevertheless, the limitation by only using three organizations is that even though it is possible to draw conclusions for the industry to some extent, a full generalization for the entire industry requires a quantitative study with a larger sample size (Bryman & Bell, 2015). The main reason behind to include several companies in the study was to gain more of a comprehensive picture of how telecom companies use customer information in the NSD process. In addition, including several companies in the analysis allows a cross-examination of the findings and potentially discover patterns, similarities and differences within the industry (Bryman & Bell, 2015). A single case study would have been a more suitable alternative if the study aimed to fully understand and completely chart a company’s NSD process from start to finish, since it provides a more extensive in-depth analysis about that particular organization (Yin, 2009). However, due to the complexity of the processes and the organizations in relation to the scope of the study, the former alternative was deemed to be more appropriate.

To fulfill the purpose of this study, it was essential to interview the right persons with relevant knowledge about the topic. With the analytical framework in mind, the respondents were selected strategically based on their functional role. Within each organization, the respondents in the study represent various organizational levels and positions. Interviewing people from different levels and positions provided us with various perspectives of the process which increases the validity of the findings than in comparison to only explore the perspective of one role (Bryman & Bell, 2015). In addition, it enhances the authenticity of the study, i.e., an important criterion for qualitative studies, referring to the need of representation of various perspectives among the members of a social setting (ibid). However, it was challenging to get
access to the study objects due to high workload, resulting in a fairly small sample size of 3–4 respondents at each company and a total of 10 participants (see Table 2). A small sample size means that it is difficult to create a complete understanding of the process (Bryman & Bell, 2015). At the same time, an important criterion was that each respondent must be involved or have insights in either the development of new services or the data management—preferably both. The respondents fulfilled this criterion and provided us with sufficient information covering the various phases in our analytical framework. This meant that we could create a comprehensive picture of how the organizations used customer information in their NSD process.

### Table 2. List of Respondents

<table>
<thead>
<tr>
<th>Company</th>
<th>Position</th>
<th>Interview</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>CRM Manager</td>
<td>Face-to-face</td>
<td>1h</td>
</tr>
<tr>
<td>A</td>
<td>Value Proposition Manager</td>
<td>Face-to-face</td>
<td>1h</td>
</tr>
<tr>
<td>A</td>
<td>Manager Business Development</td>
<td>Face-to-face</td>
<td>1h</td>
</tr>
<tr>
<td>B</td>
<td>Group Head of Device Business Management</td>
<td>Face-to-face</td>
<td>1h</td>
</tr>
<tr>
<td>B</td>
<td>Digital Solution Architect</td>
<td>Face-to-face</td>
<td>1h</td>
</tr>
<tr>
<td>B</td>
<td>Head of Analytics</td>
<td>Face-to-face</td>
<td>1h</td>
</tr>
<tr>
<td>B</td>
<td>Digital Transformation, Strategy and Development</td>
<td>Telephone</td>
<td>40min</td>
</tr>
<tr>
<td>C</td>
<td>Manager CRM Analysis</td>
<td>Face-to-face</td>
<td>1h</td>
</tr>
<tr>
<td>C</td>
<td>Head of Business Development</td>
<td>Face-to-face</td>
<td>1h</td>
</tr>
<tr>
<td>C</td>
<td>Analyst</td>
<td>Telephone</td>
<td>30min</td>
</tr>
</tbody>
</table>

Lastly, the three telecom companies and all of the respondents will remain anonymous throughout the study, which was also communicated to all of the respondents when establishing contact. Thus, the studied companies will henceforth be referred to as Company A, B or C. The decision to anonymize the participants is based on two factors. Firstly, it was demanded from the respondents and thus was essential in order to gain access to the companies. Secondly, the anonymization could lead to more honest answers since the respondents might feel that they can speak more freely about a subject. Additionally, Bryman and Bell (2015) argues that it is often custom to anonymize records and reported findings in qualitative research in order to protect the participants. However, it is noted that the anonymity may decrease the credibility of the study to some extent (ibid).

### 3.2 Data Collection

The data collection for this study consists of both primary and secondary data. The empirical material for the study consists mainly of primary data in the form of the answers given during the interviews and is presented in chapter 4. The choice of mainly use primary data as empirical material was perceived to be a more suitable alternative in order to obtain insights about the
The secondary data, consisted of annual reports, company websites and press releases, was used to gain a greater understanding of the industry and as a complement to the respondents’ answers. Using various data sources increases the validity of the study (Yin, 2009).

To relate previous literature regarding NSD, customer information and information management to the empirical research, an operationalization were made to ensure that we collected relevant findings for the analysis. The interview questions were constructed based on our analytical framework. The questions were both explanatory and exploratory in order to gain insight about the NSD process and the role of customer information when developing new services. The first questions were of a more general character. The remaining questions followed the different phases in information management, concerning areas such as data collection and processing, knowledge dissemination and data-driven decision making (see Appendix 1).

3.2.1 Semi-structured Interviews

The chosen method for the collection of primary data was qualitative interviews with employees from each organization. Qualitative interviews were deemed appropriate for this study since it enables to explore the area in more in-depth, e.g., including the respondents’ elaborations and reasoning (Qu & Durnay, 2011). The form of the interviews were semi-structured interviews since its structure serves an exploratory study well. Saunders et al. (2016) states that semi-structured interviews are suitable for an exploratory study because there is a higher degree of flexibility if there is a need of changing the direction due to the uncertainty of an undeveloped research area. Furthermore, when studying a complex area, the semi-structured interview form is beneficial since it allows open-ended and follow-up questions where the respondents are free to elaborate on their answers (Bryman & Bell, 2015). This was desirable for the study because we wanted the respondents to reason and discuss different concepts and the relationship between NSD and customer information. Using semi-structured interviews allowed us to steer the discussion towards topics and issues more interesting for the study and within the analytical framework, increasing the value of the results (Qu & Dumay, 2011).
3.2.2 Data Collection Procedure

Given the uncertain nature of a relatively novel research area (Saunders et al., 2016), we used our analytical framework to support us during the data-collection process, providing us with structure in order to counteract uncertainties. Furthermore, the same questions were used in each interview in order to ensure comparability between the organizations and a comprehensive analysis. If demanded, the questions were sent to the respondent prior the interview. We also formulated a few potential follow-up questions in order to ensure an informative discussion and to receive sufficient information. However, the order of the questions and length of the answers varied, therefore flexibility were needed in order to achieve a smooth interview process.

Most of the interviews were face-to-face and took place at the respondent’s office respectively and varied between 30-60 minutes each. Due to practical reasons two of the interviews was conducted via telephone (as shown in Table 2). Face-to-face interviews allowed us to create a better contact with the respondent, e.g., discuss the purpose of the study, summarizing the answers and assuring that the summary was adequate, thus avoiding biased interpretations (Saunders et al., 2016). The location of the interviews was decided together with the respondent with their convenience in interest to assure that they felt comfortable.

Furthermore, several ethical aspects were carefully considered before conducting the study to ensure that the research would not harm the participants (Bryman & Bell, 2015). For instance, each respondent was briefed about the study, their role and how the collected data would be used. It was also made clear to the respondents that their participation were voluntarily and that they could at any moment withdraw their consent and stop the interview. Finally, all of the interviews were audio-recorded after approval from the respondents. It was essential that transparency was achieved between us and the study’s participants.

Because all the respondents’ first language was Swedish, all of the interviews were conducted in Swedish and later translated to English. The reasons for this was to decrease the risk of language barriers and to improve the quality of the discussion. In case of any ambiguities, the translation was sent back to the respondent for clarification and approval. This also increases the credibility of the study since the respondents get a chance to go through the results of the findings (Bryman & Bell, 2015).
However, it is also important to acknowledge some limitations with the chosen method. A limitation by mainly using interviews for empirical material is that the processes are described through the view of the respondents and there is a risk that the findings might be influenced by some degree of the subjectivity (Qu & Durmay, 2011). Interviewing several employees with various positions at each organization is a way to counteract this. Even though the chosen method was deemed sufficient for this study and serves the purpose well, it is important to emphasize that being able to exactly describe the NSD process and customer information role in it requires a more thorough investigation, with more interviews but also observations and relevant documents describing the process.

3.3 Data Analysis

One challenge important to consider when conducting a qualitative research is how the collected data should be analyzed (Qu & Durmay, 2011). This issue is also recognized by Bryman and Bell (2015) stating that the vast amount of data makes it difficult for the researcher to find analytical patterns. In accordance, Patton (2002) argues that since there is no shared ground rules for drawing conclusions, it is challenging for the researcher to make sense of the vast amount of data. In order to overcome these challenges and to analyze the collected data in an adequate manner, we applied our own analytical framework and analyzed as followed:

Data was obtained through interviews with the respondents which were later transcribed, supported with our own notes, which provided us with the material for our analysis. As an initial step, the material was thoroughly read in order to obtain an understanding of each organizations’ use of customer information, NSD processes and the connection in between. The second step included the constructions of bullet points concerning key findings from the empirical material, using the analytical framework for structuring and ensuring that we extracted relevant information. This allowed us to compress the vast amount of text and withdraw meaning from the material. The bullet points were later processed into a text using the same structure as the analytical framework and is presented in chapter 4. In the following step, the empirical findings were analyzed with the support of the previous literature in the analysis chapter which follow the same structure, i.e., our analytical framework. Using the same structure allowed us to compare the findings between the organizations, recognizing patterns and deviations, resulting in a more comprehensive analysis.
4. Empirical Findings

The following chapter presents the empirical findings based on the interviews from the three telecom companies. First of all, findings regarding the telecom industry will be presented. The chapter then follows the phases in our analytical framework where each company provide insights about how they use customer information in their NSD process.

4.1 The Swedish Telecom Industry

All of the respondents expressed that the industry is on a brink of a major digital transformation and a shift that will fundamentally alter the market conditions within the industry. The transformation consists partly of the technological shift from 4G to 5G (5th generation wireless network). The 5G network will enable a lot more opportunities for telecom companies. For instance, it will be possible to connect existing services with technology such as IoT, resulting in more customized and advanced services which will make life easier for the customer. However, the shift also entails challenges. The respondents explained that they are in a phase where they must modify their existing business models and services in order to prepare their service portfolios for this approaching shift. There is a lot of discussions internally regarding what market position the company should take in the new landscape. Consequently, the companies conduct benchmarking activities continuously, assessing other telecom companies but also targeting other type of technology-driven companies such as Google, Spotify, and Facebook as an attempt to keep up with the external technological advancements. The respondents explained that there is a risk that the telecom companies end up as merely a bit pipe and lose their position in the value chain, i.e., losing the billing and customer relation. For some of the services, e.g., mobile plans, the market is highly saturated making innovation more difficult, resulting in that the telecom companies need to find new revenue streams. Hence, there is a great focus on entering deals with third parties.

Furthermore, the respondents described that another major change that will affect the telecom market in several ways is the new data regulation GDPR from EU. The regulation will mean much stricter procedures and processes for companies in their handling of personal data which will affect the telecom companies to a large extent. Companies need to act within the framework of the GDPR or risk being subjected to severe fines. For instance, companies need a clear and legitimate purpose of why they need the collected data, and this must be done with the individual’s consent. Companies must also have clear procedure of how they handle and store the data and being able to delete it if the individual request it.
In these times of change, the telecom companies are in an interesting phase in a market which is difficult to navigate in. The respondents argued that one way to be successful in the market and stay competitive is to provide relevant services based on customer demands. To achieve this, it is vital to have a clear process on how to handle and optimize the data they already possess about their customers.

4.2 Collecting & Processing Data

4.2.1 Company A

According to the respondents from Company A, they collect all data they can muster, and therefore, possess a lot of data about their customers. With the GDPR in mind, they are reviewing the process of collecting data. An example of this is that today there is an explicit purpose regarding what data they collect and how it could be used, which was not the case prior the regulation. The collected data is described as both structured and unstructured. Collection of structured data refers to a more traditional approach, such as focus groups and different kinds of customer surveys. These kinds of analysis are more expensive and conducted by a separate unit within the company. The unstructured data is collected automatically in real-time and refers to the customers’ integration with the services i.e., behavior, position, network traffic, consumption patterns, etc. The unstructured data is collected through different systems and stored in a data warehouse and from there the data is processed using several different systems.

Furthermore, it is the data analysts that are responsible for retrieving, processing and analyzing the data from the data warehouse using various analytical tools and systems. However, the decision regarding what to analyze is made by the service manager. Hence, when a development team has discovered a need, they request an analysis from the analysis team, which supports the whole organization. One of the respondents explained that this structure results in a heavy workload for the analysis team since the demand for data and analyses are greater than what the analysts can provide. The reason for this is that the data and systems used to analyze it are highly complex which means that other employees lacks the competencies required to conduct the analysis and there is no chance that they can do this without help from the analysis team. In addition, the employees do not always understand how much effort their requests mean for the analysis team.
4.2.2 Company B

At Company B, the respondents expressed that they possess a lot of data about their customers and collects similar type of data as Company A, i.e., behavior, position, network traffic and etc. The collection is done by using both automatic processes and through focus groups, surveys and other qualitative research methods. According to Company B, they always have a predetermined purpose regarding what data to collect. Furthermore, the unstructured data is collected through a lot of different systems. One respondent explained that the company has over 100 systems for collecting data of various kinds, resulting in a highly fragmented system infrastructure. Although extensive efforts and initiatives have been made during the last 10 years, they still struggle to compile all data to one overall system. A reason behind the fragmented infrastructure is that the current systems derives from different contexts, e.g., billing, CRM, and how customers interact with the device, which means that the systems do not fully relate to each other and “speaks different languages”, i.e., customers are coded differently depending on the systems. One of the respondents elaborated on this and explained it as problematic since it is difficult to grasp the customer’s involvement with the company. For instance, if a customer uses four different service offerings it results in four different invoices, making it difficult to analyze the behavior of that particular customer.

One respondent explained that once the data has been collected through the various systems there is an initial step to manually select what relevant data to process and store in a data warehouse. The same respondent believes that this process would benefit by being automated because the manually selection process requires a lot of resources. Within this selection, some kind of data is more important, e.g., customer behaviors, and therefore receives more attention, being more thoroughly used and analyzed. Similar to Company A, the service managers request resources from the analysis team who extract data from the data warehouse for further analyses. In addition to respond to requests, the analysts also conduct predictive models to anticipate trends and behavioral patterns. This information is mainly used for maintenance or strengthen the customer relationship—mitigating churn rate.
4.2.3 Company C

Company C is no different to the other companies and collects all kinds of data about their customers and uses both automatic processes for unstructured data and qualitative methods for structured data. According to the respondents, Company C puts a lot of emphasis on the unstructured data and have anonymized and accumulated it to individuals of five. This was done to ensure the customers’ integrity and that the company’s acquisition process is aligned with the framework of GDPR. The constant flow of the unstructured data derives from their customers’ interactions with the digital devices and the services connected to them. Company C makes a distinction between personalized data, e.g., age and gender, and behavioral data where the latter is of more importance for analyses.

As an initial step, all the collected data end up automatically in several data warehouses. The analysts process the data in two different ways. Either directly in the data warehouses for simpler analyses and reports, e.g., financial- and stock development or by manually extract relevant unstructured data into a “data lake” where it can be used as basis for more advanced predictive models. The latter alternative is referred to as “onboarding”. Before, the analysts onboarded as much data as possible into the data lake, partially because the technology was more affordable and easier, but also because there was no clear purpose with the data. Today, the analysts only onboard data they perceive as relevant and want to use as basis for analyses, maintaining a comprehensive structure.

At Company C, there are two different analysis units having different objectives and purposes. One unit is working with predictive models to improve and support all functions within the company by providing analysis based on customer data from the data lake. One of the respondents described these as internal consultants who educate and instruct other employees within various functions in the organization how to use data. The other analysis unit consists of several smaller teams and acts more as a resource by mainly respond to request from different services managers (similar to the other companies). One respondent elaborated further and explained that the analysis teams are exposed to a heavy workload, describing that the company has two units but work for 30 units.
4.3 Knowledge Dissemination

4.3.1 Company A

One of the respondents explained that it is possible for basically anyone within the company to gain access to the collected data. However due to the GDPR, the process of being authorized access has become rather complicated and strict where the employee must state a legitimate reason why the data is needed. Consequently, all of the respondents explained that if you are not an analyst gaining access to the data warehouses is not worth the time. One respondent elaborated further and explained that even if granted access, the data and the systems used are so complex that it would not be of any use. Hence, other employees beyond the analysts lacks the competencies to extract meaningful information and insights from the data. Instead the developers request resources from the analysts who have both access and the competencies to extract knowledge from the data.

The analysts go through the information extracted from the data with the developers at so called briefing meetings with the purpose to create meaning. At these meetings, the data is visualized by using several tools, e.g., PowerPoint and Click to make it more comprehensible. However, the respondents expressed that the information presented at the briefing meetings is still highly complex and difficult to grasp. Furthermore, the respondents explained that the company has done many mergers and acquisitions, resulting in a fragmented organizational structure. This has led to that the systems have followed the same fragmented structure where the company do not have a central system for disseminating knowledge. Instead, the information and knowledge extracted from the data is to a large extent “trapped” within the individual data analyst. An example of this was when one of the developers needed insights about customers who had not paid their invoices on time. This was perceived as a fairly simple request, though proved to be an incredible difficult and time-consuming process to extract the right kind of information.

The respondents feel that knowledge dissemination is an area of improvement and would like to see the data more incorporated with the daily operations. One respondent stated that Company A must achieve a higher degree of transparency and understanding regarding data, i.e., how to extract meaning and share it. The respondents would like that the company decides on which KPIs to focus on over a period of time and then use data to follow the development on a dashboard in real-time.
4.3.2 Company B

At Company B, the process of extracting data from the warehouse is similar to the one described at Company A. The access to the data warehouse is strictly limited and is mainly granted the analysts. For the rest of the employees, it is an extensive process to get authorized the access where the employee needs a strong business case or reason for retrieving the data. Instead, developers request resources from the analysis team and the analysts retrieve relevant data and process it for them. Several of the respondents at the organization believes this is a good thing because people should not have access to data they do not need. For instance, one respondent elaborated and explained that there is a risk that wrong conclusions could be made if people without the necessary competencies handles the data. The processed data reaches the service manager in various forms of compilations and reports, which serves as basis for efficiently manage their work in NSD. The service managers then disseminate the obtained knowledge further within the development team.

One of the respondents explained that disseminating knowledge based on data within the company has been one of the major challenges historically for the company. It has been extremely difficult to extract the right kind of data and therefore draw correct and meaningful conclusions due to the fragmented system infrastructure, mitigating a seamless knowledge dissemination. However, this was perceived as a more severe problem a few years ago. Today, there is a more structured process to ensure that the right information reaches the right person due to lot of initiatives and investments. The respondents explained that company still has a long way to go when it comes to knowledge dissemination based on data but states that there is a strong ambition that everyone within Company B should understand data and how to use it in a meaningful way. One respondent elaborated and explained that it is important to continuously review the internal processes to ensure that the employees receives relevant information but also mitigating information overload. Most of the knowledge based on unstructured data is disseminated in a formal and structural way using various systems and tools, presented in dashboards and reports. One of the respondents explained that the analysts also invites developers to workshop to create meaning of the data and to ensure that it is used in an adequate way. However, the respondent believes that this does not happen often enough. Minor analysis is shared in a more informal way, e.g., by ad-hoc meetings and even emails.
4.3.3 Company C

The same explanation about access was given at Company C, i.e., all of the employees could be authorized access by going through a process, however, there is no incentives for the other employees than the analysts to do it. So far, no one from outside the analysis teams has ever requested to extract data. At the same time, each service manager is responsible to acquire all necessary information, doing so by making requests to one of the analysis teams about what data deemed to be relevant. The other analysis team, referred to as internal consultants, works more proactively in order to improve different functions within the company.

One of the respondents explained that the managers have various levels of “data maturity” and sometimes there is a need of guidance on how data can be used. According to another respondent from Company C, the greatest challenge when it comes to dissemination is to incorporate a “data mindset” in the daily operations. Hence, the managers do not always understand the data and have difficulty to know how to use and incorporate it. The same respondent stated that most managers only understand a fraction of the potential of data the company possess. There is however an explicit ambition at the company that everyone should be able to understand the data, referring to it as an internal “data democratization”.

Furthermore, the dissemination of knowledge occurs mainly through various systems and applications, both manually and automatic. However, how seamless the dissemination is will depend on the individual manager who retrieves the data. Because, once the data has been processed and analyzed the service managers have the possibility to use certain platforms to integrate and make simpler analyses themselves. One system that is used to visualize data is Click, which supports the managers in their work to make data more comprehensible, and thus, create meaning together with the development team. Some managers are more “old school” and work with the data in Excel. Additionally, there are weekly management meetings where both service managers and analysts participating and discuss data and the insights extracted from it in order to create and disseminate knowledge about the company’s customers.
4.4 Data-driven Decision Making in NSD

4.4.1 Company A

All of the respondents at Company A expressed that there is a greater interest in data today than before within the organization. The ability to integrate data with the daily operations is becoming increasingly essential for moving forward in today’s digital business landscape. The respondents believe that the usage of data for decisions could be a way to optimize the operations, making the work more efficient. Furthermore, the respondents all agreed that it is vital to use customer information in the process of developing new services and there is an explicit ambition to become more data driven. One of the respondents explained that the company has quite recently begun to use the techniques necessary to extract meaning from vast amount of unstructured data. Another respondent elaborated on the subject and stated that it is essential to use data in the decision-making process in order to develop services that the customers demand. Still, the company only use a fraction of all the data the company possess and where one respondent further argued that the integration and processes to use data needs to be refined.

An example of when Company A used information about their customers in the NSD process was when they developed and launched their top-up service. The top-up service refers to customers’ option to add mobile data when running out. Based on the information they received, the managers could distinguish a need and then develop a service accordingly. Furthermore, the company use customer information and historical data as basis for calculations and analysis when assessing the the profitability and marketability of a new service. Thus, the data serves as a critical input if the new service gets a “go” or “no go”. The respondents explained that customer information is primarily used in the beginning of the development of the new service. One respondents elaborated on this and expressed that they should be better at employing iterative processes and continuously monitor and adjust with the support of data, i.e., trial and error. Another respondent explained that customer information could also be used in situations when there are several people involved in the decision process and discussions are prominent regarding course of action. In these cases, information could be very useful to support one’s opinion.
However, there is a distinction between developing completely new services and improving existing ones in the service portfolio. According to one of the respondents, the company is better at using customer information when it comes to incremental improvements and has a lot to improve when it comes to using customer information in the development process of completely new services. Additionally, Company A has no formal structure on how to make decision regarding new service developments. Hence, the process will highly depend on the person in charge and those involved. Some service managers will rely more on intuition whereas others rely more on data.

4.4.2 Company B
The respondents from Company B believes that it is important to base their decisions on customer information when developing new services as well. However at the same time, emphasized that to what extent depends heavily on what type of service being developed. One of the respondent described it as making predictive analysis based on historical data is more important when improving existing services and in the maintenance of those services. For instance, the company use advanced machine-learning and algorithms to follow market trends and patterns and then modify their services based on that information. This is an important part of creating greater customer satisfaction and mitigating churn, i.e., being able to detect what it is in customer’s behavior that indicates that the customer is about to leave the company. In contrast, the company rely more on qualitative research methods as basis for decisions when developing completely new services where the respondents explained that this is due to the limited available data.

Hence, it varies how much customer information Company B use when developing new services. Sometimes the data is crucial and steer the development process, sometimes it is merely used as a support and in some cases, they do not use data about their customers at all. The respondents explained that a reason for this is that what amount of customer information to use depends a lot on the manager in charge of the service. Although a common denominator for Company B is that the greater the risk, the more data-driven decisions. One example of this was when they developed their service *Unlimited Data* as an option to their mobile plans. A lot of analysis and calculations on historical data were made in the development in order to know how many customers would buy it. This was important since if all of their customers would choose that option, the business would plummet. Similar to Company A, the respondents
explained that they look at customer information primarily when assessing the business case of the service. Furthermore, they look at data to some extent when running further tests and piloting. When designing a completely new service, there is a greater focus on soft values, derived from qualitative research and sometimes even developers’ gut feeling.

However, there is an ambition that Company B should become more data driven. The company has proclaimed in their overall strategy that from now on, all of the decisions regardless of what area it concerns should be data-driven. At the same time, one of the respondents stressed that Company B is also a company that acts on their gut feeling. Thus, it must be a balance between data-driven decision making and creativity and entrepreneurial spirit, arguing that if one use too much data too early in the process, there is a risk of becoming reactive and lose innovative power.

4.4.3 Company C
According to the respondents the idea with the analysis team conducting predictive models is to ease the transformation to become more data driven both in strategic and operational matters. The ambition is that all decisions should be based on the available data and that algorithms should make the decision instead of one person’s opinion. However, this transformation is still in its cradle and since the analysis units are still relatively new it will take some time before the company becomes completely data driven. The same respondent also explained that the transformation is facilitated by the fact that people at the company are interested in their data and the possibilities it brings. However, the respondent continued to explain that some of the developers are not comfortable with data. Which means that the data is still not used to its full potential and there are still some issues with changing the behavior of a manager who do not trust that the algorithms have taken all possible outcomes into account.

When improving an already existing service, customer information is of great importance explained one of the respondents. It supports the company in identifying what aspects of their services they need to improve, and it also provides them with an indication of how to do it, making decisions accordingly. The respondents elaborated that if they want to improve customers’ experience when interacting with the services they can use the information to twist and formulate new solutions to that service.
This process is different from when developing completely new services because it is not as simple to define what aspects to improve. Instead the process is more agile and creative. One respondent explained that one way of using customer information is to find certain need of the customers. The respondent continued to elaborate on one example when the company developed a new service for a certain segment in which they wanted to increase their presence. By interviewing people from this segment, the company found out that these people made a lot of calls abroad and were experiencing problems finding a good option on the market and their quantitative data verified this. Hence, the new service was developed based on insights from the qualitative interviews and the verifications of the quantitative data. The respondents explained that in these cases, the data usually determines the direction of the development process. However, when historical data is scarce, the creativity of the developers becomes more important.
5. Analysis & Discussion

The following chapter use our analytical framework to connect the empirical findings to previous literature. Initially, an analysis on the industry is conducted to illuminate the current conditions. This followed by an analysis divided into the three phases of information management to understand how the companies use customer information in their NSD process.

5.1 An Industry in Change

The telecom industry has constantly been exposed to changes (Schmid & Daniel, 2009), and today is no different. All of the studied telecom companies acknowledged an emerging digital transformation. One of the driving forces for this transformation involves the transition from 4G to 5G network which will alter the market conditions within the industry. The more powerful 5G network will contribute to the ubiquitous connectivity enabled through various mobile devices discussed by George et al. (2014), since the network is better suited for new advanced technology such as IoT. Hence in accordance with Macdonald et al. (2012), IoT will enable telecom companies to track their customers behavior in real-time and with even greater accuracy and quality, potentially resulting in more customized and advanced services. Thus, if telecom companies are successful in their implementation of the new advanced technology, it could contribute and develop the telecom companies’ responsiveness to market information and thereby applying a “market orientation 2.0”.

Furthermore, the implementation of GDPR is another change occurring in the industry at the moment. The new regulation implies stricter processes for companies when handling personalized data with the purpose to protect the integrity of the individual (EU, 2018). The empirical findings of this study indicate that GDPR is affecting the studied telecom companies to a large extent since telecom companies in general possess a lot of data about their customers. The studied companies explained that they put a lot of emphasis on being within the framework of GDPR. The regulation forces the companies to revisit and review their internal processes regarding how they collect and process the data about their customers. The findings also indicated that the regulation affect the knowledge dissemination as well since access to the data has become stricter. However, GDPR could at the same time be beneficial for the companies. Examining internal routines and processes might result in a greater awareness about data and how the company work with it. Thus, even though GDPR means a lot of work for the companies initially, it could potentially lead to a more efficient data handling and accelerate a company’s transformation of becoming more data driven.
5.2 Collecting & Processing Data

The first phase of our analytical framework concerns how companies collect and process data about their customers. Market orientation implies that organizations continuously collects data about current and potential customers, using this information to learn about customers’ needs to create value. (Slater & Narver, 1995) All the studied companies display the same characteristics and collects all kind of data about their customers, both through qualitative methods such as focus groups and interviews, and through digital systems in real-time concerning position, behavior and network traffic. In accordance with Shaw et al. (2001), the studied companies collect this data with the aim to use it in order to develop relevant services that the customers demand. According to King (2017), all data that firms collect could be categorized into unstructured or structured data. The study showed that the data collected through qualitative methods is defined as structured since it is already organized and ready to be analyzed. In addition, general data about customers’ age, resident and gender is considered structured data as well, whereas unstructured data referring to e.g., network traffic and behavior, needs to be processed before being analyzed.

Furthermore, Papachristos (2015) argues that organizations should have a clear determined purpose before collecting data. Respondents from all companies expressed that they have purposes and goals regarding why they collect data and what data to collect due to GDPR. However, the empirical findings suggest that these purposes are not very specific, instead the organizations collect all data possible. Thus, the organizations appear to apply a “more the merrier”-thinking which might enhance the risk of information overload as described by Eppler and Mengis (2004). However, none of the respondents expressed that the problem regarding information overload is apparent in the organization. A reason behind this could be explained by that the data is collected to a large extent automatically and when later on being manually processed, the analysts have clear purpose and objectives of what to search for. Another aspect which could counteract information overload is the skills of the analysts, being comfortable with handling vast amount of data.

Furthermore, the findings indicate that the studied companies struggle to integrate the data in an efficient way. To successfully integrate the acquired data into the organization and generate useful insights, Alavi and Leidner (2001) argues that the storage, structure and retrieval of customer data constitutes an important aspect of integrating the information within the organization. Thus, a reason behind the struggling data integration could be ascribed to the
companies’ internal infrastructure for collecting and processing data. A similarity between the companies was that the systems for collecting data are fragmented as data is collected through different systems. This results in that the data is coded differently when it ends up in the various data warehouses, making it problematic to analyze the data. In addition, the systems for processing data is very complex, therefore, in all companies the competence of data mining is limited to the analysis teams. Hence, the companies’ internal infrastructure does not fulfill the condition presented by Hand (2007) that companies need to have organized structures in order to easily analyze the data.

As explained by King (2017) all companies are faced with the challenge of extracting relevant insights from their collected data. The same is applicable for the companies in this study and they explained a similar process of how they integrate data into the organization to create insights from it. The managers and developers request resources from the analysts based on what they believe is relevant. Thus, the findings suggest that the companies have a rather ad-hoc approach towards data and what is important to analyze. The analysts are then responsible for retrieving, analyzing and presenting the data for the development team, creating an immense pressure on the analysts to deliver. The heavy workload could be a contributing factor to the struggling integration since the analysts lacks the resources to respond to all requests.

Different systems are used for mining, processing and visualizing the results. These are all important aspects in the process of turning data into insights as described by Bierly et al. (2000). According to the empirical findings, it appears as the value of the data is to some extent bounded to the individual analyst who processed it. This statement is supported by the fact that different parts of the same organization have different success of integrating the data, hence the success is ascribed to certain key employees rather than the organizations’ internal processes.

5.3 Knowledge Dissemination

The second phase of our analytical framework concerns how companies disseminate meaningful knowledge and insights extracted from the acquired data. In order for an organization to reap the benefits of processed data, the obtained information and knowledge needs to be disseminated to the right persons within the organization (Kingston, 2012). Hence, the knowledge-dissemination phase in information management is crucial because data alone do not serve any purpose, it needs to be used in a meaningful way. In accordance with Schrage
(2016), the studied companies acknowledged the importance of sharing knowledge and to have functional processes in place to support a seamless knowledge distribution. For instance, all companies explained that there is an ambition that everyone should be able to understand the data about the customers and how to use it efficiently to improve decisions and the daily operations, e.g., what Company C termed as an internal data democratization. However, in accordance with Alavi and Leidner (2001) who states that most organizations struggle with disseminating knowledge, the empirical findings indicate that the companies struggle with their dissemination of knowledge generated by customer data as well. Thus, the studied companies would like to see a greater transparency and incorporation of the data in the daily operations and routines.

Johnson et al. (2000) proclaims that when the various enablers, i.e., teams, tools and organizational context works, it has a positive impact on the NSD process, contributing to an efficient process where knowledge dissemination has a vital role. This could be one of the reasons behind why the firms struggle with their knowledge dissemination since they have insufficient tools to support it, derived from their organizational context. For instance, all of the companies explained that the systems used for collecting, processing and distributing information and knowledge is highly fragmented, resulting in a complex IT infrastructure where the systems are not sufficiently integrated with each other. Thus, the absence of an overall system overviewing the process from start to finish results in that the companies do not have a coherent view over all the data they possess, making it difficult to find applications and optimize the data. Furthermore, the companies’ fragmented IT infrastructure was explained by their organizational context such as legacy related issues, e.g., conducting a lot of different mergers and acquisitions which has led to a disintegrated organizational structure as well.

Another reason behind the struggling knowledge dissemination could be the various competencies the employees possess regarding data. For instance, the study showed that the employees have various degrees of data maturity where the employees besides the analysts find it difficult to grasp the data and the system used to process it. Hence, the developers and managers do not always know what kind of data to use and how to proactively use it in order to optimize the NSD process. Additionally, the complicated process of being granted access to the data do not contribute to a common understanding of the amassed data. Instead, they request resources from the analysts based on detected needs. The empirical findings also showed that the process of disseminating knowledge is similar for all the companies. As described by
Kingston (2012) all formats are used to some extent when sharing knowledge within the organizations. When it comes to unstructured customer data it seems to exist formal processes and systems to store the data and disseminate it. Other formats are also used, when for example the analysts and developers are having a briefing about the collected data. Thus, our findings suggest that there are no central system for sharing knowledge inside the organizations which is proven to problematic when it comes to efficiently disseminate knowledge, making it difficult to overcome departmental barriers.

Hence, the empirical findings suggest that the insufficient knowledge dissemination results in what McGuire et al. (2012) address, namely that some information ends up in departmental silos. During the interviews, it was stated that some information and knowledge is trapped at either the individual analyst or the analysis team. Furthermore, Riege (2005) states that efficient knowledge dissemination speeds up the NSD process, resulting in faster speed to market. Thus, the current insufficient knowledge-sharing and the departmental silos could mitigate this which also the empirical findings suggest when the respondents argued that it was time consuming and complicated to extract the right kind of information needed for an analysis.

5.4 Data-driven Decision Making in NSD

The final phase of our analytical framework concerns how companies make use of customer information in decision making within NSD. Johnson et al. (2000) argues that the NSD process can be divided into two different categories based on the newness of the services, making a distinction between radical innovations and incremental innovations. The empirical findings indicated a difference regarding how the companies used customer knowledge based on what kind of services they were developing. When developing completely new services, qualitative data was more prominent. A reason for this might be ascribed to the fact that little or no digital data is available regarding that service. At the same time, the companies do not appear to use customer data, as a basis for decisions, from other areas either in the development of completely new services. This could imply that the managers lack adequate competencies regarding data, resulting in neglected requests to the analysis team. Therefore, qualitative research methods is described as crucial when innovating new services in combination with intuition, creativity and the experience of the developers. This is aligned with the argument provided by McAfee and Brynjolfsson (2012) who states that managers should make decisions based on intuition when digital data is scarce. However, given the arguments presented by Carbonell and Rodriguez-
Escudero, (2014), customer information should have a greater role since it results in more innovative services. The empirical findings suggest that the companies do not feel completely comfortable to solely rely on quantitative unstructured data in order to understand the customers where the qualitative methods works as a compliment. Combining the two methods is in line with the arguments by Harari (1994) and Matthing et al. (2004) who states, that qualitative methods are insufficient to understand the latent needs of the customers and creating breakthrough services.

Concerning incremental innovations, unstructured data has a more significant role and is used for daily maintenance and minor improvements on existing services. The companies track their customers’ behaviors in real-time in order to adjust and modify the services based on the customers’ need. This is aligned with the statement by Desouza et al. (2008), proclaiming that companies change their innovation strategies to “innovating with customers”. Furthermore, all companies expressed that they are striving to become more data driven in their processes of improving their services but with some differences. For instance, Company C explained that their ultimate goal is to let algorithms make most of the decisions as an attempt to mitigate human biases. This is in line with the arguments presented by Bazermann and Moore (2013) and Stankovic and West (2000) who states that managers should move from System 1 to System 2 thinking and rely more on available data. At Company A, there were a general mindset of becoming more data driven as well, however, lacking any explicit guidelines to implement it. On the other hand, Company B emphasized that the creativity of the developers is highly important as well and relying too much on data might hamper innovative thinking.

Connecting to the stages in the NSD-process cycle described by Johnson et al. (2000), the empirical findings suggests that customer knowledge based on unstructured data is mainly used for decisions in the first two stages, namely design and analysis. For instance, the developers used knowledge and insights to detect certain customer needs in order to formulate and screening ideas for improvements. Besides using customer knowledge in the design stage, the companies also used a lot of historical data as a basis to assess the services’ marketability and profitability in the analysis stage. Thus, the empirical findings suggest that customer knowledge based on unstructured data is primarily used in the beginning of the NSD-process cycle.
Finally, how the companies mainly use customer knowledge could be defined as instrumental (Souchon & Diamantopoulos, 1991; Toften & Olsen, 2003), since it is applied directly to solve a problem or find a solution. In addition, customer knowledge could also be used for supporting opinions, which is characterized as symbolic by Souchon and Diamantopoulos (1991) and Toften and Olsen (2003). This could be necessary when there are several people involved in the NSD process since customer knowledge could strengthen one’s arguments.
6. Conclusions

The following chapter presents the findings of the study by reconnecting it to the purpose of the study and the research question. This is followed by a presentation of our theoretical and empirical contributions. Lastly, limitations of the study’s findings are presented and suggestions for future research are given.

6.1 Findings

This paper set out to explore how companies within the telecom industry leverage customer information in their NSD process by answering the research question: How do telecom companies use customer information within their New Service Development process? The purpose was achieved by investigating several aspects of information management, namely: how companies collect and process customer data, how companies disseminate the obtained knowledge internally within the organization and how they use this knowledge in their decision-making when developing new services. The findings indicate that the telecom companies have recognized the value of using customer information when developing new services but needs to adjust and refine their internal processes in order to fully reap the benefits of the data.

Based on previous literature and the empirical findings, the Swedish telecom industry is currently in a transition phase, undergoing a digital transformation. In order to stay competitive in today’s business landscape and keep the position in the value chain, the findings suggest that telecom companies have shifted the mindset towards becoming more data driven. The pursuit of becoming more data driven is explained by the combination of new advanced technologies and the need to understand the customer in more depth in order to developing relevant services in a saturated market. At the same time, the findings indicate that the telecom companies are merely at the beginning of their transformation journey to become data driven, reaching its full potential regarding incorporating customer data in the NSD process. Struggling with issues related to their legacy. For instance, the findings showed that the telecom companies have quite a unique and beneficial position regarding tracking and collecting customer data due to the digital nature of their services. This results in that telecom companies collects and possess a vast amount of data about their customers. However, the findings suggest that they face difficulties to use and optimize it in the NSD process. The challenges originate primarily from difficulties when integrating the data, and later on, disseminating the obtained knowledge internally in the organization. The findings suggest that the reasons behind the struggling integration and knowledge dissemination is fragmented systems and various competencies not aligned with the complexity of the amassed data. Consequently, this results in that extracted
information and knowledge is trapped within the individual analysts or analysis team and end up in departmental silos. Therefore, the companies still rely on other costlier techniques such as qualitative research methods in their endeavor to understand the customers. Hence, the findings indicate that the incorporation of customer data in the NSD process has not reached its full potential and the success is not credited to the internal processes. Instead, what determines the success is the individual skills of the analysts and developers and how well they collaborate in order to make sense of the complex data that is customer information.

Previous literature regarding NSD has not paid attention to how information technologies are adopted and implemented in the NSD process. The findings of this study contribute to research regarding NSD by connecting information technologies with NSD. Thus, this paper provides a theoretical contribution within innovation- and information-management literature by using the telecom industry as an example. Furthermore, we constructed our own analytical framework to test it empirically. The framework was to a high degree normative presenting an ideal state when it comes to information management. However, the findings suggest that the empirical reality is more complex. Nevertheless, the study provides an empirical contribution of how companies in the telecom industry leverage customer information, providing practitioners with insights about the process of using customer information in NSD. Hence our findings might serve as basis or guidance to organizations when improving and facilitating their information management regarding integration, dissemination and use.

6.2 Limitations & Suggestions for Future Research

Since all studied companies are active on the Swedish telecom market, the findings are mostly applicable on organizations within the same context, however could be generalized to the telecom industry in general to some extent. Additionally, the findings that are not industry specific is to some extent applicable to other highly technological driven markets. Another limitation with the findings is that the process of how the companies handle the data in the NSD process is described by individuals, resulting in some degree of subjectivity. Hence, a more extensive in-depth study, including observations could have provided the study with more objectivity. Lastly, including more organizations and respondents could further illuminate the research question of this study.
The findings showed that the companies struggled to disseminate the obtained knowledge from customer data. Thus, a suggestion for future research is to delve into the issues regarding efficient knowledge sharing connected to data, with the aim to provide guidelines to achieve it. Another suggestion is to study how companies use customer information in their NSD process within different industries and to cross-examine the result between the industries. Thus, it would be interesting to compare our findings with the findings from other industries similar to telecom but also industries that are completely different. Moreover, studying this phenomenon over a longer time period would enable a comparison over time which would be interesting since according to the findings, telecom companies have merely begun their digital transformation. One final suggestion for future research is to study how GDPR will affect telecom companies handling of customer data more in-depth which was not possible for this study due to the novelty of the regulation.
References

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Johnson, S.P., Menor, L.J., Roth, A.V., Chase, R.B., 2000. “A critical evaluation of the new service development process: integrating service innovation and service design”. In:

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Appendix

Appendix 1 – Operationalization Table

<table>
<thead>
<tr>
<th>Area</th>
<th>Interview Question</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>1. Introduce yourself and the company.</td>
<td>Being introduced to the company and the respondent.</td>
</tr>
<tr>
<td></td>
<td>2. At what stage do you consider the Swedish telecom industry to be at right now?</td>
<td>To understand what is happening within the industry at the moment and how the company adapt.</td>
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<tr>
<td></td>
<td>3. What issues are most pressing?</td>
<td></td>
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<td></td>
<td>4. How important is it to use customer information when developing new or improved service offerings?</td>
<td>To understand the role customer information in NSD.</td>
</tr>
<tr>
<td>Collecting &amp; Processing Data</td>
<td>5. What type of data is collected about your customers?</td>
<td>To understand how the company collects data about their customer. What kind of data do they search for and if there are any predetermined objectives prior the data collection.</td>
</tr>
<tr>
<td></td>
<td>6. Are there any clear and predetermined purpose and goals on what type of data to collect?</td>
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<tr>
<td></td>
<td>7. How do you collect data about your customers?</td>
<td></td>
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<tr>
<td></td>
<td>8. How is the data stored?</td>
<td>To understand how the data is stored and analyzed, then how well it is integrated within the operation.</td>
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<tr>
<td></td>
<td>9. How do you turn data into knowledge?</td>
<td></td>
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<tr>
<td></td>
<td>10. Do you consider your company to be successful in your data collection and processing?</td>
<td></td>
</tr>
<tr>
<td>Knowledge Dissemination</td>
<td>11. How do you share the obtained knowledge about customers within the company?</td>
<td>To understand how the obtained knowledge is disseminated within the organization.</td>
</tr>
<tr>
<td></td>
<td>12. Who has access to the obtained knowledge?</td>
<td></td>
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<tr>
<td></td>
<td>13. What is done to ensure that the obtained knowledge reach the right person?</td>
<td>To explore how they work to ensure an efficient knowledge dissemination.</td>
</tr>
<tr>
<td></td>
<td>14. How is the obtained knowledge presented?</td>
<td></td>
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<tr>
<td></td>
<td>15. How do you collaborate to ensure an efficient knowledge dissemination?</td>
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<tr>
<td></td>
<td>16. Do you use any tools for supporting the knowledge dissemination?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17. Do you encounter any obstacles when disseminating knowledge?</td>
<td>To understand their view of the knowledge dissemination.</td>
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<td>Data-driven Decision Making in NSD</td>
<td>18. Who are involved in the process of developing new or improved services?</td>
<td>To understand who are involved and how decisions are made regarding NSD (the dynamics).</td>
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<td>19. Who make the final decisions on how the new or improved service will look like?</td>
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<td>20. At what stage of the NSD process do you use customer information?</td>
<td>To understand when customer information is used in the NSD process. If it differs.</td>
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<td>21. What type of information is more important when developing a new or improved service?</td>
<td>To understand the developers' perception of the customer data and what kind of data they want.</td>
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<td>22. Do you consider the information about customers as trustworthy?</td>
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<td>23. How do you decide on what information to use or not to use when developing a new or improved service?</td>
<td>To understand how developers use customer information (Instrumental, Conceptual, Symbolic) and when they use it.</td>
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<td>24. Exemplify when you decided to use customer information when developing a new or improved service.</td>
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<td>25. Exemplify when you decided not to use customer information when developing a new or improved service.</td>
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<td>26. What are the biggest challenges to use customer information when developing new or improved service?</td>
<td>To understand perceptions of how well the company incorporate customer information in the NSD process.</td>
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<td>27. Do you consider yourself to be successful about how you incorporate customer information in your NSD process?</td>
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