



The Shock That Doesn't Hurt (yet)

A case study of how the second Payment Service Directive is changing the Norwegian banking industry

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Abstract

This thesis investigates the competitive implications of the newly implemented Payment Service Directive II (PSD2) on the Norwegian banking industry. Specifically, it investigates how 1) the technological shock created by PSD2 affects competition in the Norwegian banking industry, and 2) how incumbents have responded to this shock. I use data from ten in-depth interviews with key actors in the banking industry, thorough document analysis, and quantitative text analysis of market reports. In my analysis, I find that new and innovative solutions in the markets for Payment Providers and Aggregator Banks represent strong substitutes for important parts of banks' product portfolio, leading to increased value creation in the industry. Simultaneously, PSD2 is believed to increase transparency, reduce customer loyalty, and decrease negotiation power towards suppliers, leading to a reduction in value capture in the market for "Total Banks". In the new positions arising as a result of PSD2, value creation is expected to further experience an increase as PSD2 is implemented and platform services are introduced to the market. However, in terms of value capturing in these new positions, I expect it to initially be low as firms compete intensively to win over customers, while it will be high in the longer term as "winner takes it all"-outcomes materialize and only a few players manage to dominate the market through data-driven platform services. My findings also show that the majority of traditional banks did not start to respond to the shock until 1.5 years after the announcement of the regulation. Factors such as uncertainty, the paradox of success, organisational structure, regulatory focus and fear of cannibalization may explain why measures were not taken until mid-2017.

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I was first introduced to the topic of open banking and the second Payment Service Directive through the course "Strategy with Finance" held by Eirik Sjøholm Knudsen and Lasse Lien at NHH. As I saw great interest in investigating the topic on a deeper level, I approached Eirik with the request of having him as my supervisor while writing my master thesis.

Although a new and narrowly studied subject is exciting, it clearly comes with its challenges and limitations. Taking into account that this is an ongoing process of regulation and implementation, one cannot look back at historic data when using economic theories to explain happenings in the process. During the semester, potential questions and research topics that could be of interesting matter appeared. Still, due to the time and extent of the thesis, I had to set limitations.

I would like to express my greatest gratitude to supervisor, Eirik Sjøholm Knudsen, for his insightful and helpful feedback. Writing the thesis with support from such an engaged counsellor has really given this thesis an academic boost. I would also like to thank Gisle Andersen for his helpful contribution to the text mining analysis.

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1 Introduction

In October 2015, the European Parliament adopted the revised Directive on Payment Services (PSD2) with the intention of making it easier, faster and more secure to pay for goods and services. By promoting innovation, enhancing payment security and standardizing payment systems across Europe, PSD2 was first and foremost created to benefit the end consumer (Folcia & Firnges, 2017). One of the most important innovation-promoting measures taken through PSD2 is the Access to Accounts (XS2A) regulation. By requiring banks to provide qualified third-party providers with access to customer account data and enabling them to provide customers with account-information services and performing payments on customers' behalf, PSD2 represents a significant step towards commoditization in the banking sector (Alessio, Digiacomo, Höll, & Oakes, 2018). If the user consents, these third-party providers can provide services previously reserved for banks. Consequently, banks will no longer only compete against each other, but against all companies licensed to offer financial services in Europe.

PSD2 mainly introduces two new types of players in the banking industry; the Payment Initiation Service Provider (PISP) and the Account Information Service Provider (AISP). The PISP is a provider that can initiate a payment on behalf of its user. This solution involves fewer parties in the payment process and does not require customers' card details or other sensitive information. Vipps and Danske Banks's Mobile Pay are both examples of existing PISPs providing payment services for consumers and peer to peer transfers. AISPs are platforms using aggregated data to provide services such as spending and saving overviews across multiple bank accounts. Platform service companies such as Tink and Dreams are examples of young fintech companies that have launched AISP solutions competing in the Scandinavian market for savings and account overview. In addition to the plethora of young fintech companies that are launching new services, the GAFAs (Google, Amazon, Facebook, Apple) already have many of the resources and capabilities in place to exploit network effects and utilize big data to be highly competitive in the new positions created by PSD2.

Despite being implemented in January 2018, the real implications of PSD2 in Norway is yet to be seen. First when the implementation of Regulatory Technical Standards (RTS) is completed in the second half of 2019 will we see how the effect of PSD2 plays out (Finans Norge, 2018). Banks need to have both legal, operational and technical compliance systems

in place by this time, requiring them to make substantial investments just to comply with the new regulations. However, being compliant is not enough. PSD2 implies that banks must challenge their own business models to avoid being beaten by companies managing to create a closer and more personalized customer relationship through its platforms.

Although PSD2 is a regulatory shock, its main effect is to put a major technological shock in motion, causing an expectance of change in demand for new and existing banking services. In a time when technological uncertainty rules the market, demand for new and existing services may change rapidly. On the other hand, developing solutions that fit new customer demand is time-consuming. This requires banks to take measures before the effects of the shock hit the top or bottom-line. “The winner takes it all” dynamics of a more digital banking industry tend to favour the fast movers and punish the ones choosing to sit on the fence.

In this thesis, I study the implications of the technological shock created by PSD2, and how it affects the competitive landscape in the Norwegian industry for banking services. Moreover, I analyse how existing players are responding to this new competitive landscape based on resources they possess and the timing of the technological shock. The overarching research question is therefore presented as following:

How has the technological shock, caused by PSD2, affected the competitive landscape in the Norwegian banking industry, and how are banks responding to the regulation?

To answer this question in a more specific manner, I developed the following questions to be studied:

- 1) How has the technological shock affected the traditional competitive landscape in the Norwegian banking sector in terms of value creation and value capturing?
- 2) How is the new competitive landscape formed by PSD2, and what resources are necessary to compete in this new market?
- 3) When did the technological shock created by PSD2 occur in Norway, and how are banks responding to it?

Both the research question and the three sub-questions are grounded in theory on technological shocks available in works of literature on strategy and innovation economics. To shed light on the research questions, I rely on several different data sources. I have collected primary data

by interviewing 10 key individuals with expert knowledge on PSD2 and the banking industry in Norway, and studied industry reports, regulatory descriptions and news articles about PSD2 and banks responses to it. Additionally, I have performed a quantitative textual data analysis of 27 market research reports covering the Norwegian financial sector in the period from January 2016 through March 2018. These reports were produced by Cicero, a Norwegian product and analytics company with special competence towards bank and finance. As reports from Cicero are very informative and objective, these may be used to extract meaningful, non-trivial, quantitative patterns that may confirm or question findings from the interviews.

My main findings are as follows. The first sub-question aims to explain how the technological shock has affected the industry and the players within it by looking at value creation and value capture. In my analysis, I find that new and innovative solutions in the market for Payment Providers and Aggregator Banks will become strong substitutes for parts of banks' product portfolio. This increases value creation in the market as a whole, while the value created by existing banks may be reduced. Simultaneously, PSD2 will lead to increased competition in the market for "Total Banks" as substitutes challenge different parts of banks' current business models. Aggregator Banks are believed to increase the transparency in the industry and thereby lower customer loyalty. Supplier power is also believed to increase as IT suppliers gain negotiation power towards banks that are required to comply with new regulatory requirements and changed customer needs. In sum, these factors lead to a decrease in value capturing in the industry.

In the second sub-question I further ask how the competitive landscape is formed by PSD2, and what resources banks need to possess to compete in this landscape. As my analysis shows, things are believed to be different in the new positions that arise in the aftermath of PSD2. Value creation is believed to increase drastically as new entrants are able to provide customers with valuable and innovative solutions. Value capturing is first expected to be low, as there will be an intense competition to attract customers towards different platform solutions. In the longer term, however, value capturing is expected to increase as "the winner takes it all"-effect occurs and only a few players end up dominating the market with data-driven platform services. The competitive landscape changes as these substitutes end up challenging the traditional way of banking services, and new resources become necessary to compete in the new landscape. By combining platform services with big data, Aggregator Banks can create value in ways previously not possible, often through new B2B business models where customer data is an important factor. Norwegian banks have shown, through the example of

Vipps, that they possess resources necessary to compete in the market for Payment Providers. However, my findings show that Norwegian banks seem to lack the necessary resources to compete in the market for Aggregator Banks due to their lack of abilities to combine platform services with the use of big data.

In the third sub-question, I aim to present when the technological shock took place in Norway, and how banks are responding to it. Although the official statement regarding PSD2 was announced already in 2015, a technological shock first takes place when the majority of players in the industry expect a drastic change in demand for certain products or services as a result of PSD2. Building on this, I finally present how banks have responded to the technological shock. Despite the announcement of PSD2 in 2015, findings show that the majority of traditional banks did not respond with strategic measures until 1.5 years after the announcement. Reasons for this may have been uncertainty, the paradox of success, organisational structure, regulatory focus, or fear of cannibalisation. From mid-2017 and onwards, the majority of banks have, however, taken measures to gain the necessary resources to compete in the coming market for banking services. The level of collaboration between banks has increased, both in terms of innovation, strategy, and regulations. In addition, strategic acquisitions and investments have been performed. Banks have also started experimenting through open banking sandboxes to gain experience and create ideas on how they can create value through data and account aggregation.

This study has its assumptions and limitations. One assumption worth mentioning is that I mainly focused on the implications PSD2 has on “Total Banks” in Norway; banks providing basic banking services to consumers such as user accounts, savings accounts, mortgages and other loans. This being said, my findings may also relate to other types of banks as PSD2 affects their business models to a certain extent. In terms of limitations, the reader should be informed that this paper is written in the spring of 2018. Relevant information appearing after this is therefore not included in the analysis. Taking into consideration the current relevancy of this topic and the importance of staying updated, I strived to edit the analysis every month throughout the writing period to include recent relevant findings. This research also limits itself to the period between the announcement of PSD2 in October 2015 and today. It was not until after the official statement from the European Parliament that the topic of the regulation was discussed among banks and other relevant companies.

The study is divided into six chapters. In Chapter 1, the topic of the study is introduced together

with the research question and study limitations. Chapter 2 outlines relevant theory forming the foundations for the further analysis presented. In Chapter 3, I present the methodological approach used in this study, while Chapter 4 presents the analysis. In Chapter 5, I answer the research question, provide some recommendations for further research in addition to a few manager implications, and lastly discuss the limitations of the study. An explanation of concepts and abbreviations related to PSD2 can be found in Appendix A1.

2 Theory

In this chapter, I introduce the relevant theory forming the foundation for the thesis. The theory mainly comprises two parts; firstly, theory explaining how and why differences in profitability, both *in* industries and *within* industries, exist. As the importance of platform competition increases in the banking industry, central theory covering platform markets is also presented in this part. Secondly, I present theory explaining technological shocks and the resulting consequences on industries and players involved. Together these theoretical parts explain how technological shocks affect industries, and how this challenges companies within the industry.

2.1 Creating and capturing value

Differences in profitability between industries are usually caused by structural differences, causing a change in average profitability (Porter, 1980). For an industry to be profitable, value creation is necessary, but not sufficient. Parts of the value must also be captured by the players for the industry to be profitable.

2.1.1 Value creation

Value creation is a measure of all value created in an industry, and consists of the value created per unit times the number of sold units (Lien, Knudsen, & Baardsen, 2016). In other words, value creation can be defined as the difference between the customer's and the seller's reservation price; the customer's reservation price being his or her highest bid, and the seller's reservation price being his or her lowest offer. If the customer's reservation price changes, the value creation per unit will likewise change (Lien et al., 2016). There are two reasons why a customer's reservation price could change, the first being his or her perception of the quality/price relationship of the product/service. If, for example, a close substitute has a positive development in value (quality/price) compared to another product within the industry, the customer's reservation price for that other product will fall. This will result in a decreased value creation for that certain product. Conversely, the customer's reservation price increase if the development of the existing product increases relative to its substitutes, leading to an increased value creation. The second factor affecting value creation relates to price and quality of product complements. By increasing a customer's benefit through a complementary

product, the customer's reservation price for the original product will increase, thus leading to value creation. Number of units can further be decomposed into number of customers multiplied by number of units sold per customer (Lien et al., 2016). If any of these factors change, value creation also changes. The size of this market may change because of population growth or changes in preferences among customers.

2.1.2 Value capturing

For an industry to be profitable, value creation alone is insufficient. The value created is distributed among the industry's players, suppliers and customers, demanding some degree of value capturing for the industry to become profitable. Value captured by the companies in relevant industries depends on negotiation power towards customers and suppliers. Negotiation power, in turn, mainly depends on two general factors; rivalry and barriers to entry (Lien et al., 2016).

Rivalry among players exists when the industry offers its customers competitive consumer surplus (Porter, 1980). This can be done by lowering prices or increasing quality while keeping the price at a steady state level. Industries with a high level of rivalry are often recognized by its high customer surplus and low profitability. If the players are competing on quality, they attempt to increase their customer's willingness to pay instead of lowering the price. If the players' increase in market share exceeds the costs of increasing quality, most players are tempted to compete on quality.

There are a number of factors deciding the degree of rivalry in an industry, the main reason being the number of players competing (Porter, 1979). Another factor which may impact the level of rivalry may be the difficulty of differentiation as products or services may be homogenous. If players can differentiate their products or services, customers often gain personal preferences and have different views on what they perceive as high quality. If this is the case, the market is horizontal differentiated. On the other hand, if customers have different willingness to pay for quality, the market can be categorized as vertical differentiated.

A barrier to entry is "an advantage of established sellers in an industry over potential entrant sellers, which is reflected in the extent to which established sellers can persistently raise their prices above competitive levels without attracting new firms to enter the industry" (Bain, 1956). If an industry consists of high profitability and low barriers to entry, new entrants are

usually attracted leading to lower profitability (Porter, 1979). The rivalry increase, and customers capture a greater part of the value.

Two different types of entry barriers exist; structural and strategic barriers (Lien et al., 2016). Structural entry barriers are barriers which cannot be controlled by existing players, but recognized by structural characteristics such as technology, irreversible investments, patents, economies of scale or economies of scope. Strategic barriers to entry, on the other hand, are made by existing players in the industry with the intention of making it hard for newcomers to establish. Examples of strategic entry barriers are creation of excess capacity, aggressive response, vertical integration or contracted deals (Lien et al., 2016). Strategic entry barriers are only relevant if two criteria are fulfilled, the first being that the profitability among existing players is higher before the entry than after. The second criterion is that the actions done by existing players in the industry must change potential intruders' expectations of the level of competition and profitability after entrance.

2.2 Performance differences within industries

Having explained how differences in profitability between industries can take place, I will further elaborate on the performance differences *within* industries. Performance within industries is mainly dependent on a player's combined activities. "The essence of strategy is choosing to perform activities differently than rivals do" (Porter, 1996). To perform a chosen set of activities, a company also needs the right mix of resources. As the usage of big data becomes more attractive across industries, companies find new ways to create and capture value, often through platform services in two or multi-sided markets. In this sub-chapter, I also aim to present theory covering platform markets, and connect it to performance differences between and within industries.

2.2.1 Activities and resources

All differences between companies in cost or price derive from the activities needed to produce, sell and deliver their products or services (Porter, 1996). One way for a company to gain a competitive advantage is to perform the same activities as other companies more efficiently. Operational efficiency means performing similar activities better than rivals. In contrast, strategic positioning means performing different activities than rivals, creating an opportunity to deliver a unique product or service and therefore increase the customer's

reservation price. Operational efficiency is only a short-term solution, mainly because competitors can quickly “imitate management techniques, technologies, input improvements or superior ways to meet customer needs” (Porter, 1996). Through cost efficiency, the company aims to increase the consumer surplus through lower prices, while through differentiation, the company instead aims to increase the customer surplus through increased reservation price. Companies managing both have the greatest chance of gaining and keeping a long-term competitive advantage.

To perform various activities, companies need to possess a certain mix of resources. The conception and implementation of strategies employ from various firm resources (Barney, 1991). A resource can be defined as inventories of inputs, such as tangible and intangible assets (including employees’ individual skills), affecting a company’s relative ability to implement product market strategies (Lieberman & Montgomery, 1998; Lien & Jakobsen, 2015). From a resource-based perspective, one can argue that firms possess certain resources enabling them to achieve short or long-term competitive advantage, depending on the combination of resources possessed (Peteraf, 1993). This combination of resources may not be easily imitated, creating long lasting competitive advantage the more complicated this combination is. To create a ground rule for lasting competitive advantage, a resource must be rare, important, non-imitable, mobilized and appropriated (Barney, 1991; 2007).

Crook, Ketchen, Combs, & Todd, (2008) found, through meta-analysis research on the topic of resource-based theory, that organisations’ performance is enhanced to the extent that they possess strategic resources. The identification, development, and distribution of value from these strategic resources should be the primary considerations for scholars, managers and shareholders. Cool and Schendel (1988) further argues that there are differences within narrower confines of groups within industries when it comes to performance as a result of strategic resource possession. Together these findings point towards the possible effect resources can have on long-term performance also within industries. Although an industry can be profitable as a result of high value creation and capture, there may exist substantial performance differences within this particular industry, all depending on a company’s ability to perform the right set of activities based on available resources.

2.2.2 Performance landscapes

Performance differences within industries can be visualized in a so-called performance landscape. A performance landscape is a two or multidimensional space in which each dimension represents the values of a particular choice a firm can make and a final dimension that indicates the performance value (Levinthal, 1997; Siggelkow, 2001). In this paper, a two-dimensional performance landscape is applied (Knudsen, 2017; Nygaard & Tuv, 2017). The x-axis in figure 1 represents all combinations of the relevant competitive parameters in a market, whereas the y-axis represents how profitable each combination is in terms of results.

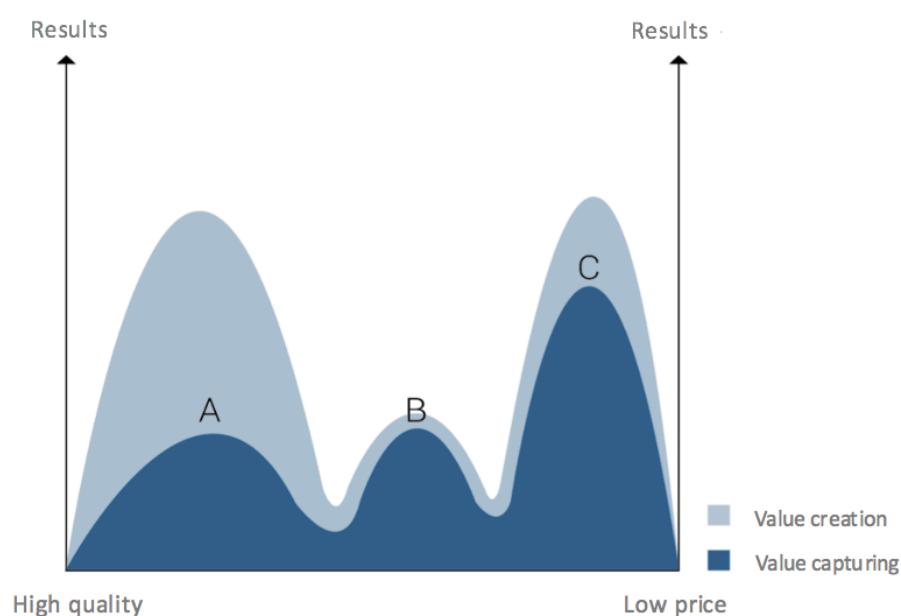


Figure 1 - Performance landscape: three strategic positions and the weighing between them. Adaption by Nygaard & Tuv (2017) from Knudsen (2017).

Performance landscapes illustrate the concepts of external and internal fit. The external fit represents the appropriateness of a set of choices given environmental conditions represented by the height of a certain point on the landscape (Siggelkow, 2001). The tops in the landscape represent different market positions and depend on the position's ability to create and capture value. As seen in figure 1, position A creates a high amount of value, but the players located on this top are only able to capture a small part of the value. Position C, on the other hand, creates almost the same amount of value, but the players located on this top manage to capture most of this value, making it a much more profitable top.

Customer preferences, available technology and competitors' actions together decide where the tops are in the landscape. If a company is located at a top, it is running with operational efficiency. This can also be described as internal fit, as a change in any element (all other elements fixed) within a consistent set of choices leads to a decline in performance (Siggelkow, 2001). Stronger connection between this set of choices (the steeper the peak is) means that few companies manage to combine the right activities to perform at an optimal level. From figure 1, one can see that position C is steeper than position A, indicating that the difficulty of combining the right set of activities is relatively higher at position C.

2.2.3 Multi-sided platforms and network effects

Two-sided or multi-sided platforms (MSPs) have experienced a growing interest in recent years. MSPs enable direct interactions between two or more sides on board (e.g., ebay, Livvin, Airbnb, etc.) where all parties retain control over their key terms of the interaction, such as pricing, way of delivery, quality, etc. (Rochet & Tirole, 2003). Essentially, multi-sided platforms serve two or more customer bases and facilitate transactions between participating parties.

Considering value creation in two-sided and multi-sided platform industries there is a mutual dependence between the multiple sides for the platform to be successful as a business model (Rochet & Tirole, 2003). A platform's value to one participating party is directly correlated to the level of engagement exhibited by the other customer segment(s). This is also known as the network effect (Katz & Shapiro, 1985). Direct network effects occur when the value of a service directly depends on the number of service users (Belik, Knudsen, Lien, Pandey, & Timmermans, 2018). Snapchat, for instance, has a strong direct network effect and is directly dependent on a big user mass to create value for all parties. The company's stock closed down 6 % on the 23rd of February as a result of a tweet from the American Celebrity Kylie Jenner saying "...does anyone else not open Snapchat anymore?.." (Shen, 2018). This clearly expresses the direct link between user mass and the value of the platform service. Indirect network effects occur when the value of a service is indirectly dependent on the number of users of the platform through improving compatibility or increasing access to compliments (Katz & Shapiro, 1985; Rochet & Tirole, 2003). The Norwegian start-up Fjong, a "digital closet" connecting dress owners with users wanting to rent dresses for special occasions, is an example of a platform service indirectly dependent on users to gain value. The more potential "renters" using this platform, the more valuable the platform will be for dress owners. Conversely, the

more dress owners that use the platform, the more dresses will be available for rent, making it more attractive for renters to join the platform.

Considering network effects from a competitive perspective, in an early life cycle, the market may consist of intense competition where an advantage is only short lasting. Entry barriers may be low, leading to an increase in value creation due to new digitalized technologies entering the market. Value capturing in the market, on the other hand, is reduced as a result of this competition, often leading to great economic losses in a short-term perspective.

However, when a company first gains an advantage, the opposite often tends to be the case (Belik et al., 2018). Unless followers are able to offer something extraordinary through its technology or exclusive partnerships, the market leader tends to enhance and strengthen its advantage (Eisenmann, Parker, & Van Alstyne, 2011). For rival firms to gain market power when an established player already dominates, they must recreate the network effect that the leader has gained when building its own base. This can be very challenging taking into account users switching costs when fearing they might lose access to other users or valuable complements of the service they are using already (Farrell & Klemperer, 2007). As a result, entry barriers tend to increase while the intensity of competition decreases. The value creation in the market may still be high, and the value capturing again increases. As an example, we can look towards Vipps which ended up as the leading P2P transfer platform after an intense competition from Mcash and Mobilepay (ANB-NTB, 2017).

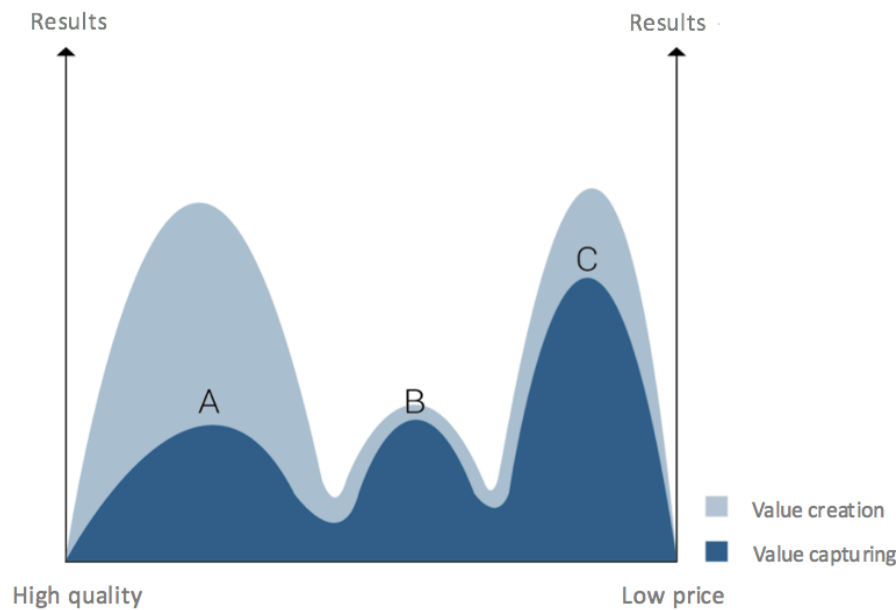


Figure 2 - Performance landscape: three strategic positions and the weighing between them. In platform markets, value capture tends to be high in a long-term perspective, indicated by position C. Adaption by Nygaard & Tuv (2017) from Knudsen (2017).

With reference to figure 2 (similar to figure 1) and peak “C”, we see that the value creation is high, and the profitability in this position is significantly higher than for position “A”. This may illustrate how platform markets tend to capture more value in the long-term perspective. We can also see that peak “C” is slightly steeper than peak “A”, indicating more difficulty in combining right activities to perform optimal in this specific position. These activities are again dependent on the resources companies have at their disposal.

Firms with strong network effects have unique opportunities to accumulate data not available to competitors. Big data itself has the potential of creating a self-reinforcing process of increasing competitive advantage. By knowing more about customer habits and preferences, companies can provide them with better and customized services, in turn leading to increased customer bases and more data. It is this ability to exploit the complementarity between network effects and data accumulation and processing that creates the ability to provide customers with high-quality services which competitors struggle to compete against. By constantly upgrading and enlarging available data through a growing customer base, these firms have a high chance of both creating and capturing value, resulting in a “winner takes it all” state in the market (Belik et al., 2018).

Building and maintaining a winning platform is however difficult. Successful MSPs are the exception rather than the norm (Hagiu, 2014). The well-known chicken-and-egg problem can be challenging to solve. No side will join without the other(s). Incorrect pricing strategies is a common trap MSPs can fall into when trying to solve the chicken-and-egg problem. Commonly, multi-sided platforms need to offer their services for free to one side of the platform to prevent the chicken-and-egg problem and instead derive profits from the other side(s). It would also be a mistake to assume that pricing decisions should be made in favour of the current most profitable side of the platform. Instead, MSPs should take into consideration the trade-offs in favour of the participant group that is most important regarding long-term success (Hagiu, 2014).

Another factor an MSP must consider is how many sides it wants to bring aboard to its platform. More sides of a platform lead to increased cross-side network effects, larger scale and often diversified sources for revenues. LinkedIn, for example, generate 20% of its revenues from premium subscriptions, 30% from advertising solutions and 50% from recruiting solutions (Hagiu, 2014). However, more sides of a platform also come with its challenges. Firstly, it can be hard for all individual sides of a platform to remain profitable in a long-term perspective. This may lead to situations where one side pulls out, which in turn may significantly reduce the total value of the platform significantly. Secondly, the more sides of a platform, the more complex the platform gets. It becomes more complicated to satisfy all sides of the platform, and the various resources necessary to handle this complexity may be challenging to attain.

2.3 Competitive advantage in unstable environments

In the previous, an overview of differences in profitability between and within industries was presented. This theory is however built on the prerequisite of a stable environment with fairly predictable changes. In the following, the theory will focus on the implications of unstable environments; more precisely the consequence of technological shocks. Companies constantly risk being exposed to radical changes in their business environment, and drastic changes in strategies are sometimes necessary to secure future profitability. In this sub-chapter, I present theory concerning technological shocks for the reason to investigate measures companies take when central prerequisites in the theory of strategy do not count any longer.

2.3.1 Technological shocks

Technological process constitutes an evolutionary system punctuated by technological shocks, where a new product or service experience a sharp increase in expected demand (Argyres, Bigelow, & Nickerson, 2013). One can define technological shocks as changes in a company's external environment creating a discontinuity in the situation of competition by having an immediate effect, either positive or negative, on the majority of companies in the industry, and where the source of the shock is exogenously given for the majority of the established companies in the industry (Lien et al., 2016). A technological shock enables companies to either deliver existing products or services with a higher quality and/or lower price than before or to deliver value to customers that has not been possible before. In both cases, there is an increase in expected value creation in the industry. However, despite increased value creation in an industry, a technological shock may reduce the value captured by the existing players in that certain industry, sometimes leading to a lowered profitability in the industry as a whole. Additionally, while some companies within the industry may capture great parts of the value created, others may struggle to capture this value.

Technological shocks can be classified as competence-destroying or competence-enhancing, meaning the shock either destroys or enhance existing competence within a firm (Tushman & Anderson, 1986). A competence-destroying shock requires new skills, abilities, and knowledge within the company as existing resources are fundamentally different from what is required to operate in the new market. These major changes in competence, skill sets, and production processes are associated with changes in the distribution of both control and power within industries and firms (Barley, 1986; Chandler, 1977). A competence-enhancing shock, on the other hand, builds on know-how embodied in the technology that it replaces (Anderson & Tushman, 1990).

One way to illustrate the development of technological shocks is to consider the performance of a technology in an industry as a function of time (Christensen, 1997). In figure 3 below, the y-axis is further developed to show the price/performance relationship of the technology. This is done to clarify that consumers are price sensitive and therefore care about not only the performance of a technology, but the value it serves (Knudsen, 2017). "*Established technology*" represents the technology originally used by the mass market, whereas "*New technology*" represents new technology entering the market at time t . The dotted, red lines illustrate expected development of the performance/price relationship while the solid, red lines

represent real price/performance relationship. First, new technology is expected to perform worse than established technology. Before a technological shock hits the market, companies tend to ignore the potential of new technologies (Christensen, 1997). The technological shock takes place at point $t = t + 1$, where the expected demand for new technology changes significantly (Argyres et al., 2013). Different versions of the new technology may appear with different expectations on how they will capture value in the market.

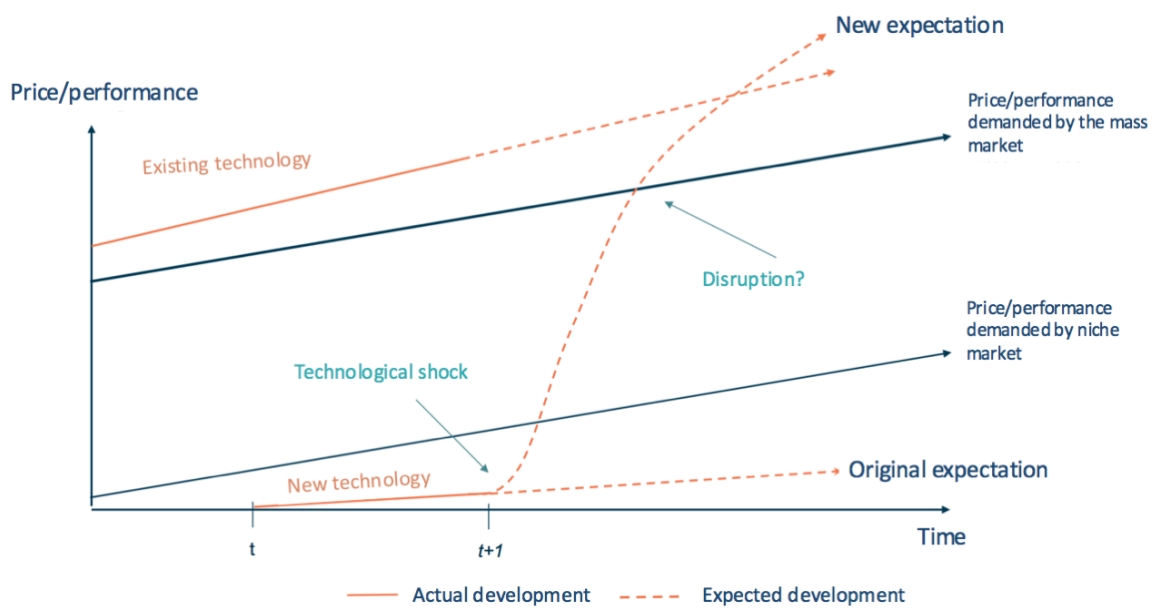


Figure 3 - Technological shock: New technology appears and may disrupt existing technology. Adaption by Knudsen (2017) from Christensen (1997).

As seen in figure 3, new technology can be expected to grow into becoming a mature substitute to the dominant technology. If the development continues as expected, with the price/performance ratio of the new technology exceeding the ratio of the existing technology, the substitute might outperform existing products in the market.

2.3.2 Change in value creation and value capture

When new technology enters the market, customer's reservation price for existing products tends to decrease. New products or services might be cheaper than existing services, and/or introduce new product dimensions which meet customer demands in new ways, creating even bigger threats to existing services (Christensen, 1997). In both cases, the demand for existing products is reduced while value creation in the market is decreased unless the new products

add more value to the market than what was reduced by the fall in demand for existing products. On a company level, there will be a significant increase in value creation among new players using new technology. Existing players using new technology might also experience value creation if the new products lead to greater reservation prices than before the technological shock. Existing players using existing technology will experience a reduction in value creation because of lowered reservation price for their products.

Technological shocks also tend to change value capturing in a market. With new technologies, new companies usually also enter. Rivalry between companies may increase, thus leading to lower prices for the end consumer and a reduction in value captured by companies. Markets containing a high number of competitors further imply that each player competes against a higher number of close rivals, making it easier to capture customers from a rival through a minor price reduction or quality improvement (Lien et al., 2016). This effect is even more significant if the market has a high degree of transparency and small changes in prices are observable. On a firm level, new companies with new technology tend to capture parts of the value previously in the hand of existing players using existing technology. If existing companies manage to change their set of activities and resources before new entrants gain too much power, they may prevent value from being captured by competitors and instead keep their positions as market leaders.

New entrants in a market affected by a technological shock do not necessarily have to be start-up companies. If market entry barriers are reduced due to the technological shock, existing companies in other markets may use their existing technology-base to tap into this new market. This often happens if the technological shock is competence-enhancing for new entrants, and competence destroying for existing companies (Anderson & Tushman, 1990). New entrants may also have low irreversible costs relatively to established companies and are therefore better positioned to succeed (Lien et al., 2016). For instance, when an industry experiences a technological shock and the market opens for platform services, companies in other markets may use their existing platform network and competence to enter this new market. In addition, entrants from other industries often have a strong capital base relative to start-up companies, making it harder for established players to threaten with price competition if these companies consider entering.

2.3.3 Change in performance landscape

A technological shock causes changes in the performance landscape, both on market level and company level. The profitability of a certain position in the landscape is a result of value creation and value capturing (Knudsen, 2017). Where in the landscape companies in a market decide to establish depends on both customer preferences and the way activities and resources are combined to create new products demanded by the technological shock.

A change in the performance landscape leaves existing companies with two choices; local or global repositioning. Through local repositioning, a firm attempt to perform some adjustments in activities to climb up to the peak where the local profitability is the highest. In cases where the new technology is already established, a firm usually reacts quickly since its financial performance probably has deteriorated and internal misfits can be identified (Siggelkow, 2001). However, if the technological shock is caused by an *expected* change in demand, a higher grade of uncertainty rules and internal misfits are harder to identify. It may be challenging for the existing company to be aware of which activities to change to climb back up to the local peak. In figure 4 below, the height of peak A remains the same, implying that the profitability in the new position is at the same level as before. The Company at peak A may regain its position at the top of the peak by making incremental changes in activities.



Figure 4 - Local adjustment: moving towards the new peak through incremental changes in activities. For simplicity's sake, the distribution between value creation and value capturing is not presented. Adapted from Lien et al. (2016).

In other cases, a local repositioning is not sustainable. If the shock is competence-destroying for a company, and existing resources are fundamentally different from what is required to operate in the new market, global repositioning is necessary. Only by rearranging a large part of its system of choices, a firm has the chance to achieve performance improvement (Siggelkow, 2001). A company must then change fundamental activities, and therefore often resources, to reposition itself to another peak. These radical changes demand significant changes for the company and are often the hardest (Audia, Locke, & Smith, 2000). If the new position requires a combination of, and interaction between, a great number of unfamiliar activities, it may be challenging to imitate a new position in the performance landscape (Rivkin, 2000).

Because of the uncertainty of how a new technology will affect the market and the players involved, companies tend to wait until expectations regarding the new technology are confirmed. By then it might be too late, and first movers may have gained an advantage and therefore capture larger parts of the value created in the market.

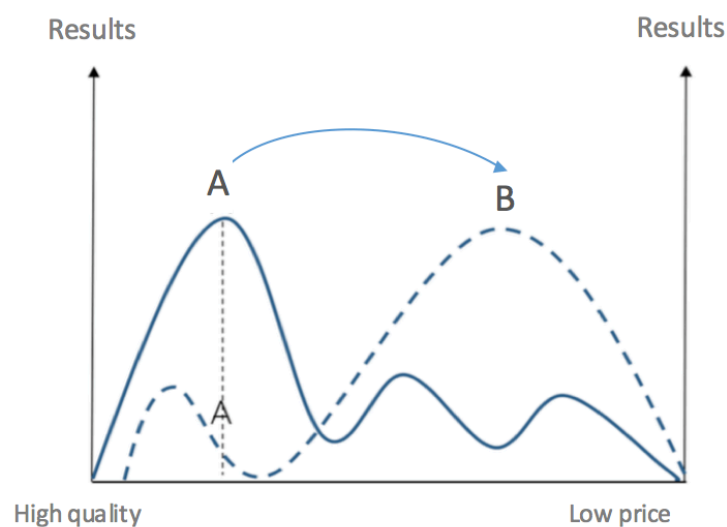


Figure 5 - Global repositioning vs local repositioning. For simplicity's sake, the distribution between value creation and value capturing is not presented. Adapted from Lien et al. (2016).

From figure 5 we see that a company at peak A does not have an internal fit any longer and is therefore forced to change. A new profitable position has appeared in position B in the lower-price segment, and the company at position A must choose between a local and a global

repositioning. In this scenario, company A has a greater incentive to choose a radical, global repositioning ($A \rightarrow B$) because it has received signals from the market that the traditional set of activities does not work any longer (Lien et al., 2016). We can also see that profitability in the high-quality segment is significantly lower than before, making it much harder for companies to survive without a global repositioning.

2.3.4 Uncertainty

Regardless if the technological shock is competence-enhancing or competence-destroying, uncertainty evolves as firms struggle to understand a new product or process introduced to the market (Tushman & Anderson, 1986). Therefore, forecasting of demand and prices becomes significantly more challenging, both for existing and new products or services. If established companies in a market choose to apply new technology in their strategy, there is a chance that allocated resources and changes within the structure of the organization may turn out to be unreasonable if the technological shock turns out to have a different outcome than expected (Tushman & Anderson, 1986). On the other hand, if companies choose to sit on the fence and spectate the fast-changing performance landscape, they risk missing out on great opportunities by changing too slowly. The decision regarding repositioning must be taken before the technological shock affects the top or bottom line of the organization in order for the company to be able to respond quickly enough (Tushman & Anderson, 1986).

When considering the definition of uncertainty, one must distinguish between uncertainty risk and genuine uncertainty. Uncertainty risk is when players are aware of potential outcomes in advance, and often the probability of each outcome to occur (Knight, 1921). When knowing the odds of different outcomes, managers can calculate possible outcomes and devise new strategies for their companies. Genuine uncertainty, in contrast, occurs when players are not aware of the possible outcomes in advance, let alone their probabilities. When a technological shock occurs in a market because of an expected change in demand for a technology, genuine uncertainty usually takes place. In this case, it is not a question of uncertainty modelling where one merely expands the standard distribution around a mean value in order to account for the uncertainty estimated (Bettis & Hitt, 1995). Instead, decision-makers can only make decisions through an informal understanding of the situation and intuition. Despite the decreased ability to forecast, genuine uncertainty also creates real opportunities for profit, promoting high rewards for companies willing to take risks (Knight, 1921). For companies to succeed with innovation, dealing with uncertainty is not sufficient; they need to seek it out.

In this uncertain environment, strategies and investments cannot be based on forecasting. However, forecasting can still be useful as long as it is not a driver for strategic choices (Bettis & Hitt, 1995). A turbulent and fast-changing competitive landscape does not mean that all variables become unpredictable. For instance, an announcement of a new technology is likely to quickly alter the industry structure. It is therefore valuable to have a thorough understanding of industry economics and dynamics to be able to predict certain outcomes as a result of this announcement, and from there come up with a fast response. With the ability to quickly identify change at the earliest possible moment and analyse how the performance landscape will change as a result of this new technology, companies are better positioned to be a part of the innovation instead of becoming a victim of it (Bettis & Hitt, 1995).

When an industry or a company is experiencing a technological shock through an expected change in demand for certain products and services, the “paradox of success” may be a reason why companies are uncertain of where to go forward (Audia et al., 2000). Organizations achieving success tend to continue exploiting the strategies that have worked in the past, frankly because these strategies typically lead to lasting success (March, 1991). The uncertainty appears when a technological shock suddenly challenges existing business models. After a period of success through a competitive advantage and high grade of value capturing, a company may lose its ability to recognize when it's necessary to change strategy. Also, actors within the organization may have incentives to hold back on new strategies. Investors enjoy their dividends and may vote against strategies leading the company into uncertainty and not-yet explored business areas. In addition, managers, who often receive bonuses based on yearly results, may be hesitant to change direction in fear of short-term losses in personal revenues. As a result of this, some companies tend to wait even longer before adapting to a possibly new competitive landscape when uncertainty exists.

2.3.5 Further implications of the technological shock

Strategic responses

A technological shock forces rivals to consider three main strategic responses; imitation, repositioning, and exit (Cusumano, Kahl, & Suarez, 2008). Firstly, rival firms face economic and strategic pressure to quickly respond to a technological shock created by the innovating firm. If imitation is done correctly and fast enough, high returns may still exist in the new market, and a quick response may, therefore, help the imitator to capture a high amount of

value created in the innovated market. Secondly, by quickly imitating the innovating company, the follower gains early customer insights and can build on these insights to quickly specialize in different customer segments and experimenting with new products and services based on the new technology. Thirdly, investing in low-cost production, a robust supply chain, developing distribution channels, brand capital, and other complementary assets takes a lot of time, and imitators may take advantage of this time to establish in the market while the first mover builds up these assets (Markides & Geroski, 2004).

Taking into account that the innovator seems to have identified substantial demand through an expected technological breakthrough, rivals could choose to avoid direct competition by instead positioning itself far away from the innovator (Argyres et al., 2013). Considering figure 5 again, the best option could perhaps be to perform a local repositioning towards the left and try to capture as much value as possible instead of competing in the new peak at location B. The final choice of the rivals also depends on its resources and abilities to change. Because of the technological shock, existing companies incapable of imitating the innovator or repositioning themselves towards another segment, will be selected out and thereby forced to exit the market.

In an era of continuous technological change and resultant unforecastability, sustainable competitive advantages are more likely to come from organizational resources, capabilities or competencies than from long-term strategic planning (Barney, 1991). When the future cannot be forecasted, companies must have resources providing an ability to move fast and flexible when surprise occurs. There are three ways companies can obtain resources; acquisitions (Barney, 1986), accumulation (Dierickx & Cool, 1989), or alliances (Dyer & Singh, 1998). Material resources can be acquired through strategic factor markets. However, the particular resource price usually reflects the value it provides the acquiring company and will therefore not result in a lasting competitive advantage (Barney, 1986). If the market is imperfect, however, a material resource might have more value for the buyer than can be understood by the seller due to imperfect information. Immaterial resources, on the other hand, can only be obtained through strategic alliances or accumulation over time. A company may only change its inventory of immaterial resources through its activities. Companies possessing high valuable immaterial resources are therefore harder to imitate, especially in the short-term. Building the same immaterial resources is not only time consuming, but also complicated due to difficulties for imitating companies to understand the different combinations of activities necessary to perform to build the same resources. Building a new reputation as a company is

an example of how an immaterial resource may be both time-consuming and complicated. Through alliances, companies can share and exchange information and knowledge, and thereby together create a stronger competency within both companies, giving them a competitive edge towards competitors outside the alliance.

Manager mindset

Companies' response to technological shocks highly depends on its managers and their mindset. Traditional manager mindset often leads to employing formal strategic planning which is not sustainable in a market with unstable environments and changing competitive landscapes (Bettis & Hitt, 1995). Due to rapid changes in technology and customer expectations, companies are forced to use a flexible process of strategic decision making to maintain flexibility in the deployment of critical resources (Sanchez, 1995). The mindset of managers must change from a focus on a vertical organization structure to a horizontal structure, and a radical reconception of organizational structure is necessary (Mitroff, Mason, & Pearson, 1994). When a technological shock occurs, strategic decisions need to be both taken and implemented in a very short period of time. Traditional hierarchical structures put a brake on the speed of decision-making and implementation and prevent companies to adapt to changes in the competitive landscape. Therefore, companies should aim towards horizontal structures with decision making decentralized to cross-functional teams in order to stay innovative and flexible (Halal, 1994).

Managers also need to be aware of possible value creation through cooperation with competitors. Strategic cooperation may be a necessity for existing firms to survive a technological shock because of the need to pool resources to develop more and better technology in order to stay competitive (Bettis & Hitt, 1995). Strategic alliances may take place between domestic and foreign competitors, or between domestic competitors to increase the entry barriers and making the domestic market less attractive for foreign companies.

A managers' mindset also depends on his/her experience and background. If an industry is disrupted by a technological shock, one would perhaps assume that a manager with a technical background is preferred over a generalist or an entrepreneur. However, managers with technology experience emphasize fewer opportunity dimensions than those with a generalist experience such as management or entrepreneurship (Folta, 2007). Although a technological shock may create a demand for more technical-oriented labour, companies should be aware of

the value an entrepreneur or a manager could have in a leadership role when it comes to seeking out new ways to create and capture value.

2.4 Summary of theory

As a result of a technological shock, an industry faces great uncertainty about how it will look in the future and how players should adapt to changes followed by the shock. As a technological shock is a result of a drastic change in expectancies of how new services will be demanded in the market, incumbents are forced to rethink their business models. In industries where platform services appear because of a technological shock, the competitive landscape often changes significantly. Entry barriers may be lowered in the early stage of the shock, before they again may rise as one or a few players outcompete the rest through platform services, and “the winner takes it all”. For existing players to prevent losing market share to new entrants, decisions need to be made quickly, which is challenging when the demand for a technology is very uncertain. Great measures are often hard to take if the technological shock is based on expectations only, and the top/bottom line has not yet seen any decline. New strategies to adapt to an uncertain market might be costly and the consequences may be severe if these strategies fail. However, for incumbents to stay competitive in a different landscape, they need to invest in new resources before it is too late, and competitors have gained a significant advantage in the new market. This creates an investment dilemma for leaders who stand responsible for future profits and often need to choose between doing nothing or doing something risky. Potential returns are high for those who succeed, while the potential downside may be severe for those who fail.

3 Methodology

In this chapter, I describe the methodology used to answer the research question outlined in Chapter 1. The research approach, the data gathering, and data analysis are presented. Moreover, I evaluate the quality of the methodological approach used, looking at both reliability and validity of the data. Finally, I discuss ethical challenges in relation to this study.

3.1 Research approach

Research design describes how one should gather and analyse data to best answer the research question (Saunders, Lewis, & Thornhill, 2016). Due to the research question and the nature of the topic of this thesis, a deductive approach is a natural fit. Through this analysis, existing theory regarding technological shocks was applied. Additionally, the interview guide has been created from a theoretical perspective. However, when analysing how the technological shock has affected the industry, and how the different players in the industry reacted on the shock, one can argue that this thesis also contains an explorative element when enlightening some aspects not previously touched upon. This mix of inductive and deductive research approach may have its advantages as it structures the problem in a systematic manner while also opening up for enlightening topics not touched upon before (Saunders et al., 2016). For instance, an advantage of using an exploratory research design is the flexibility arising from it. When researching a topic that is continuously changing, new information becomes relevant as time goes by.

This thesis includes a descriptive element as it provides a thorough presentation of PSD2 and its plan of implementation. To acquire a complete understanding of the external shock and how it affects its players, I find it essential for the thesis to include this descriptive element.

3.1.1 Research method

Based on the decisions made concerning research approach and research design, a qualitative method was selected. A qualitative method serves the purpose of diving deep into a chosen topic while providing flexibility for the researcher (Saunders et al., 2016; Thagaard, 2013). This flexibility gives me the possibility of having an interactive process by going back and forth between the data gathering and research question, making it possible to adapt the research question to new findings highly relevant for the topic of choice (Jacobsen, 2005). Considering

PSD2 and its implications on the banking industry in Norway, this research method creates the possibility of getting a deep understanding of the topic, while providing me with the ability to analyse how the industry and its players were affected by and how they responded to the regulation.

A qualitative research method also presents some challenges. The method can be very time consuming and, in some cases, quite complex if data gathered shows another reality than first anticipated. If the gathered material contains information of high complexity, there is also a chance of losing or misunderstanding information, requiring me to be precise and systematic in the research approach.

Looking towards research question number three, the timing of the technological shock, a quantitative method was applied using text mining analysis. Text mining is a process of extracting meaningful, non-trivial patterns or knowledge from a set of unstructured texts (Kim, Ohk, & Moon, 2017). In my study, I collected 27 market reports created by Cicero with the goal of identifying meaningful patterns and trends that can indicate the timing of the technological shock in the Norwegian banking market. By using R to compute and create unigrams and bigrams, my aim was to discover the trend in usage of certain words and phrases that could point towards big changes in the market regarding PSD2 and open banking. By combining quantitative textual analysis with qualitative findings from depth interviews, I believe the quality of this thesis is strengthened in identifying the timing of the technological shock in Norway.

An alternative to these research methods could have been to perform quantitative surveys in order to receive information from a bigger sample size. However, due to the complexity and explorative element of the research questions, I believe the combination of qualitative depth interviews combined with quantitative text analysis provides me with flexibility and data which enables me to answer the research questions in a good manner.

3.1.2 Research strategy

In this study, I performed a case study, mainly because the topic covers a real-life setting, requiring depth analysis to understand the relevant phenomenon (Yin, 2013). Arguments against case studies involve the fact that case studies provide little basis for scientific generalization as they are often very situation-specific (Weick, 1969; Yin, 1994). However, one can also argue that one should rather make interpretations to specific situations instead of

aiming towards generalization. Learning from one case should, therefore, be considered as a strength as opposed to a weakness due to the lack of generalization of the results gathered from the case study (Dubois & Gadde, 2002). Taking this into consideration, the case study aims to provide the reader with situation-specific learning, mainly in relation to the implications PSD2 has on the banking industry in Norway and the players within it.

3.2 Data and analysis

The thesis builds on three sources of data; secondary documents, primary data from interviews, and textual data. In this chapter, I aim to present the processes of data gathering associated with each of these three sources.

3.2.1 Document analysis

To gain understanding and empirical knowledge of the topic, document analysis requires that data is examined and interpreted in order to elicit meaning (Corbin & Strauss, 2008). For this study, the document analysis was performed first gain knowledge about the topic of open banking and PSD2, both from a technical and business perspective. These insights were further built upon when using document analysis again to get an understanding of how banks were affected by the regulation, and how they chose to respond. Overall, the findings from the document analysis provided me with significant knowledge about the topic of choice and the banking industry, creating directions for further data gathering.

The document analysis was performed by researching existing literature on the topic of the revised Payment Service Directive. To get an overview of the possible business implications of the regulation, I found it necessary to first research the technical aspects of PSD2. Official reports from the European Banking Authority (EBA) and the European Commission were studied to gain knowledge about the Regulatory Technical Standards (RTS) and guidelines followed by these standards. Secondly, to gain an understanding of both technical, regulatory and business implications this regulation might have on banks in Norway, literature from The Norwegian Government and Finance Norway was reviewed. Thirdly, reports from Norwegian and European banks and consultancy companies were researched, mainly to stay updated on further business implications of PSD2 by looking into strategic steps taken by banks and other relevant companies.

Information gathered from the document analysis can be defined as secondary data, as the retrieved data can be reanalysed for a different purpose to that for which it was originally collected, and thereby provide additional or different knowledge, interpretations or conclusions (Bulmer, Sturgis, & Allum, 2009; Saunders et al., 2016). Secondary data can be a helpful tool in research because it often provides a high amount of relevant data in a much less expensive and time-consuming way than primary data (Vartanian, 2011). In addition, using secondary data can strengthen the findings from primary data, either by confirming or questioning previous findings. Unlike primary data, secondary data also provide a source of information that can be readily checked and confirmed by readers of the research, opening up for public scrutiny and increased trust from readers (Denscombe, 2007). However, secondary data has been collected for a specific purpose differing from my research question, meaning that the data may be an inappropriate source to solve this specific question. It is also important to remain critical, and keep in mind that reports may be biased for an unknown purpose. For example, a consulting firm may publish a report covering implications of PSD2 to attract banking clients and can, therefore, be biased to present information in a more dramatic or positive way than what is the actual case. These possible biases are important to be aware of when looking into secondary data as it strengthens the research quality.

In my research for secondary data, I have carefully chosen trusted sources that I believe have a very low bias in their research and remained critical towards studies that may have been produced with a certain form of bias. Although secondary data have been very useful in my research, conclusions have not been made based on findings from these sources.

3.2.2 Qualitative studies

The primary data in this study was collected through 10 semi-structured depth interviews. A semi-structured interview is a mixture of a structured and unstructured interview consisting of planned questions and structure while allowing new inputs and topics to come up when questioning the interviewee. In situations where questions are complex or open-ended and where there is a need to understand the reasons for certain opinions and actions taken, semi-structured interviews are often preferred (Saunders et al., 2016). Semi-structured interviews also provide the option of “probing” answers. This creates opportunities for the interviewee to go into detail when talking about topics relevant to the research. When performing a semi-structured interview, one opens up for the possibility of moving into concepts and topics not yet touched upon (Saunders et al., 2016). With the ability to ask follow-up questions pointed

towards these new statements, the interviewee may provide valuable insights that else would not have been brought up. Taking into consideration the topic of this research, such approach is highly valuable as the key persons interviewed may sit on information that is not available through secondary research, but still relevant for the research question. These key individuals also have their own special competence in different areas of banking and PSD2, and it was, therefore, necessary to adjust the questions asked in interviews based on characteristics of the interviewee. This reaffirms the selection of semi-structured interviews.

To obtain relevant insight about the Norwegian industry of banking regarding PSD2, key individuals were carefully selected. Keeping in mind that PSD2 is a regulation leading to innovation and change within the banking industry, interviewing only banking experts would not suffice due to possible knowledge gaps in innovation/new business models and because of possible biases (e.g., presenting a more positive picture of a company than what is reality). Therefore, the interview sample consisted of both banking experts, leading consultants, and entrepreneurs. All individuals had worked with PSD2 in his/her own way, and they all brought their own value to this research. In total, I performed 10 interviews; 4 banking experts, 4 consulting leaders and 2 entrepreneurs. This combination of individuals having their own special competency brought much value to the research. The key individuals were extremely busy, and it was first hard to set the dates for meetings. Luckily, the first interviewee was willing to set me up with other experts, creating a way for me to meet with all individuals I wanted to interview.

Interview guide

An interview guide was prepared before the interviews were held, with the intention of providing overview and structure of the interview (Appendix A2). Although the guide was structured in a systematic way, it was important to bear in mind that these semi-structured interviews should be flexible if the interview required it. Therefore, the interview guide was used only as a guideline on how to perform the interview, not as a rule. The questions were also adapted to the interviewee, as some were working in a bank while others worked for several banks as consultants or for themselves as entrepreneurs. For simplicities sake, only 1 example of the interview guide is presented in the Appendix. To inspire the interviewees to answer freely without too much direction given, many questions had the intention of being quite open and exploring. This allowed respondents to define and describe the situation as wanted, and they could disclose interesting views and facts (Saunders et al., 2016). Another

way to discover new findings was to ask questions in a two-step approach; first, ask open questions, and then go deeper into the topic brought up by following up with specific questions relating to previous answers. This led to further findings not revealed before.

The interview guide was divided into three parts using relevant theory presented in Chapter 2. The questions had the intention of i) providing insights into when the technological shock took place and how the technological shock affected the industry and its players, ii) explaining how PSD2 changed the competitive landscape in the market for banking services, and iii) how the banks responded to the technological shock based on their resources. Lastly, the interview guide opened for new insights by giving the interviewee the possibility to add information he/she found relevant for the topic addressed.

Interview process

The value one receives from an interview highly depends on the preparations done by the interviewer. Considering how busy the interviewees were, it was important to not only meet and receive information from the interviewees, but also be able to provide some insights to the interviewed party. In my preparations for the interviews, I; i) stayed continuously updated on the topic of discussion, ii) sent a one-pager (Appendix A3) about me and the background for the thesis to the interviewee before going to the meeting, and iii) searched for information about the person I was about to interview to prepare myself for asking the right questions. These preparations helped me gain credibility with the interviewee and led to engaging conversations and fulfilling answers (Saunders et al., 2016).

Because of the personal data stored in this research, the project was registered at the Norwegian Centre for Research Data before any interviews were performed. All interviewed parties were informed by this before the interview took place, and in the letter that was sent out together with the one-pager (Appendix A4).

All interviews were held at the workplace of the interviewed party. The respondents were responsible for finding a fitting meeting room. The importance of having a quiet and undisturbed room for the interview was expressed in the mail sent out beforehand and was well received by all interviewed parties. This provided us with the ability to stay focused and undisturbed throughout the whole interview. Each interview lasted between 45 and 90 minutes, depending on the availability of the respondent and the interview process.

In most cases, the respondents spent a long time answering the introductory questions and often dived into topics planned to be presented later in the interview. Sometimes, the best response was to guide the interviewee in the direction of the relevant question. In other cases, it was best to let the interviewee finish in the direction he/she was going and then return to the opening questions after that part was covered. By letting respondents continue in the direction first started, I believe valuable information was obtained, mainly as it was often this information the interviewee had the most knowledge on. I also believe the flow of the conversation increased by letting the respondent talk more freely.

Since I was the only one performing the interviews, I saw great help in using a recorder. It helped me stay more active in the conversations leading to great flow throughout the whole interview. The recorder guaranteed that no information was lost, and therefore helped me save valuable information provided during the interview (Saunders et al., 2016). By recording the interview, I could also replay interesting conversations to make sure I got the right understanding of answers provided by the interviewee. In addition, it provided me with the possibility of using direct quotes in the paper subject to respondent approval. A possible downside of using a recorder may be the fact that respondents may be hesitant to express his/her thoughts about topics introduced. To prevent this, I assured that the recorder was only used to help me save information for later and that all data would be erased within 24 hours. The respondent could also choose not to accept the use of a recorder if preferred. All respondents were however positive about the use of a recorder, and I did not get the impression that the recorder caused any limitation to the conversation throughout the interviews.

Analysis of qualitative data

To analyse the qualitative data gathered, a thematic analysis was performed. Thematic analysis offers a systematic, yet flexible and accessible approach to analyse qualitative data, and is used to analyse classifications and present themes or patterns that can be related to the gathered data (Alhojailan & Ibrahim, 2012; Braun & Clarke, 2006). Further, a rich thematic description of the entire data can assist the researcher in getting a sense of the predominant and important themes from the collected data (Blacker, 2009). To categorize data into themes, the process of thematic analysis has included coding and noting patterns. The purpose of this approach was to identify themes or patterns across all data sets using certain codes.

First, all interviews were transcribed right after the interview took place. Although the interview was recorded, transcription was done immediately following the interview to make sure all information was fresh in mind. This helped me transcribe contexts such as laughter, hesitation and other non-verbal factors that affected the interview (Saunders et al., 2016). After the interviews were transcribed, summaries of each interview were created in order to obtain a clear overview of the most central findings. This further helped me compare all interviews and provide inspiration for the analysis. Secondly, codes were created to systemize all relevant topics for the analysis. Each code represented own topics I found relevant for the analysis, all based on a combination of theoretical material, findings from interviews and my own interpretations regarding the research question. Lastly, all codes were systemized in a table with a full overview of the chosen topics and the respondent's relation to each topic.

3.2.3 Quantitative text analysis

The data gathering was first initiated by contacting Cicero and informing the company about the research and the purpose of using their material as a valuable source of information for performing a quantitative textual analysis. Cicero approved my request for their material, and sent me the monthly market reports published between January 2016 and March 2018. The reports were sent in PDF format, meaning I had to perform a text conversion (.pdf→.txt) in order to continue with further analysis.

Secondly, I calculated *n-gram* statistics and *collocations* based on the text corpus. An n-gram is a word form or a combination of n-word forms in a corpus (Andersen, 2016). Andersen further explains the usage of n-grams in textual analysis as following: “a sequence such as *and stuff like that* consists of a set of n-grams of varying lengths: the 1-grams (unigrams) *and*, *stuff*, *like* and *that*; the 2-grams (bigrams) *and stuff*, *stuff like*, and *like that*; the 3-grams (trigrams) *and stuff like* and *stuff like that*; and the 4-gram (tetragram) *and stuff like that*” (Andersen, 2016). Collocation is closely tied to n-grams. Word A and word B are collocating if they occur in combinations more often than expected given their individual frequencies (Andersen, 2016). For instance, the bigram “open banking” occurred 12 times, while *Open* occurred 15 times and *banking* occurred 26 times, which makes it a relatively strong collocation (Appendix A5).

In the calculation, I used computer tools written in the Perl programming language. The tools were developed by professor Gisle Andersen at NHH and Specialist Consultant Knut Hofland

at Uni Computing. These tools simply count occurrences (tokens) of each word form (types) and of sequences of words from $n=1$ to $n=3$. The statistics made was first accessible as a set of files per month. Collocation statistics were calculated by using alternative measures of association (Pearson's chi-square, Log-Likelihood, Dice, Jaccard, Logarithmic Odds Ratio, Z-score, Pointwise Mutual Information, Poisson Stirling, T-score). Each measure calculates the relation between observed and expected frequencies of words $A+B$, given the individual frequencies of words A and B , in order to identify strong collocations (Andersen, 2016). This is a useful method for term extraction and is used in the analysis of these data.

The next step of the data collection was to post-process the frequency data and compile aggregated data from monthly statistics using these in-house Perl scripts. The data was both frequency-sorted and alphabetically sorted before it was manually inspected with the goal of exploring and identifying trends and relevant concepts. Considering accumulated frequency-sorted and alphabetically sorted lists, $n=1$ to $n=3$, I found the alphabetical lists useful for observing the contexts of use and, importantly, the inventory of compounds that contain a concept such as *fintech*. The raw data revealed that it would be beneficial for me to filter the data by removing some n-grams that are not relevant to this study. These were n-grams that only occurred once in the dataset, meaning they were of little significance to the statistical analysis of trends.

Based on this inductive and manual search for trends and patterns, I finally selected three interesting key concepts for further analysis which are indicative of trends that characterise the data material investigated. These three concepts were further analysed through linear modelling using R and linear regression modelling. The aim of linear regression is to model a continuous variable (Y) as a function of one or more variable(s) (X). We can thereby use this model to predict the Y when X is the only known variable. The mathematical equation is generalized as follows:

$$Y = \beta_1 + \beta_2 X + \epsilon$$

Where β_1 is the intercept and β_2 is the slope. They are collectively called regression coefficients. ϵ is the error term, meaning that it is the part of Y the regression model is unable to explain.

In the further analysis, I used monthly frequency statistics of unigrams including all compounds containing concept (e.g. *FinTech-incubatorer* 'fintech incubators',

fintecheksperter ‘fintech experts’, *fintech-miljøet* ‘the fintech environment’, etc.). I further produced a scatterplot in order to visualize any linear relationship between the dependent variable and the independent one. In this analysis, the 27 separated reports are presenting the independent variable on the x-axis, while the frequency of chosen unigrams is the dependent variable on the y-axis.

In the final part of the quantitative analysis I checked for statistical significance of my findings. A linear model is only statistical significant if the p-values are less than my pre-determined statistical significance level (0,05). When using p-value to look for statistical significance, the null hypothesis, in this case is that the coefficients associated with the variables are equal to zero. The alternative hypothesis is that the coefficients are not equal to zero, meaning there exists some kind of relationship between the reports analysed at certain dates and the frequency of certain unigrams.

3.3 Evaluation of research design and research approach

In this sub-chapter, the quality of data material and the methods used in the research are evaluated in regard to the reliability and validity of the thesis. Ethical challenges of the study are also discussed.

3.3.1 Document analysis

The document analysis is based on reports from the European Banking Authority, Finans Norge and from different actors in the industry such as banks, consultancy companies and, IT companies. These are sources I find reliable in the way they present the reality of the current situation of technology and banking in Norway. However, taking into consideration that the secondary data gathered is not created specifically towards this study, it has been necessary to remain critical when using these sources and connecting it to my research question. The relevancy of the information has therefore been carefully evaluated before used to confirm or question findings from the qualitative or quantitative analysis.

3.3.2 Qualitative studies

Reliability

In a qualitative research approach, the research depends on the actual context, and is therefore hard to replicate in other studies or interviews (Jacobsen, 2005). Therefore, in qualitative research, reliability refers to the extent of findings from the research are reasonable given the gathered data. Therefore, this research represents a transparent overview of the approach taken in gathering and analysing data.

In preparations for the interviews, a structured interview guide was created to gain full control of the planned topics to be investigated. Before starting each interview, the respondent was informed, both through email and orally on the day of the interview, about the background and goals for the research. The interviewee was also informed about the use of a recorder for the purpose of making sure no information was lost during the conversation.

By using a recorder, there is a chance that the respondent choose to hold back information he/she otherwise would have shared (Saunders et al., 2016). However, none of the respondents were negative to the use of a recorder when told that the interview would be anonymous, and that everything would be confidential. I also specifically pointed out that nothing would be published before they had approved all quotations used in this thesis. I believe this information helped me create a positive and trusting relationship between me and the respondents. By using a recorder through all interviews, I could focus on listening to the interviewee and thereby ask the right follow-up questions instead of taking notes in fear of losing important information. I believe this strategy helped me gain deeper insights into the respondents' thoughts about the presented topics. Additionally, I could be sure that all information would be saved for later, and thereby reduce the possibility of misinterpreting answers. By performing semi-structured interviews, I made sure that all respondents had the ability to add topics of their own interests to the conversation and thereby open up for inputs and views not prepared beforehand. I put a lot of effort into not asking leading questions in order to prevent biased answers that could have weakened the study as a whole.

Validity

Validity in qualitative research refers to the appropriateness of the measures used, accuracy of the analysis, and generalizability of the findings (Saunders et al., 2016). Developing validity

standards in qualitative research may be challenging because of the necessity to incorporate rigor and subjectivity as well as creativity into the scientific process (Whittemore, Chase, & Mandle, 2001).

To secure a high grade of internal validity, I made sure to always add follow-up questions to answers provided if any statement was unclear. By letting respondents check their own quotations after the interview, I could again confirm that we had the same understanding of what was being said. Additionally, using a recorder reduced the likelihood of any misinterpretations on what was originally said by the respondent.

External validity refers to which degree the findings of the research can be transferred to other contexts, meaning that results from the research are generalizable and can be applied in similar situations. In this study, I tasked a small, non-randomized group of key individuals to gather primary data for my research. With this in mind, one should be careful with generalizing based conclusions from this thesis. The information gathered is very situation-specific and is not meant to be transferable to other industries or situations.

3.3.3 Quantitative studies

Reliability and validity

In quantitative research, reliability refers to the question of the extent to which one's findings can be replicated by other studies. The more times the new findings can be replicated, the more reliable the findings are thought to be (Merriam, 1995). Considering the research question connected to the usage of text analysis, we can ask ourselves if other studies would have come up with the same conclusion when it comes to the timing of the technological shock. In the trend analysis, I was careful of investigating words or phrases that did not directly connect with the research question. For example, although PSD2 may have led to an increasing number of unigrams such as "*partnerskap*" 'partnerships', "*innovasjon*" 'innovation', "*start-up*" or bigrams such as "*open banking*" or "*Sbanken lanserer*" 'Sbanken releases', these unigrams and bigrams have not been included in the analysis in order to avoid falsely based conclusions. In addition, the data mining process has been replicated and double checked to assure that results were coherent and not caused by any coding mistakes or bugs. Together these measures have strengthened the reliability of the quantitative study.

The validity of this data mining analysis is the extent to which the analysis measures what it is intended to do (Saunders et al., 2016). As mentioned, the unigrams chosen were the ones I found most relevant for the topic of this study. Taking this into consideration, I believe the timing of the technological shock is best presented by the unigrams I have included in the analysis. An alternative method could have been to analyse a greater amount of data, and not only reports produced by Cicero. This may have increased the validity of the quantitative analysis. However, taking into consideration the objectiveness of the reports, their consistency, and high quality, as well as the time constraint of this thesis, I believe that the Cicero reports present a relevant and timely empirical data source.

3.4 Research ethics

Through the whole research process, I always strived to keep a high ethical standard. The research project was reported to the Norwegian Centre of Research Data to strengthen my credibility as a researcher. Theoretic material and methodology have been presented in the best way possible, with the correct use of trustable sources. When analysing primary and secondary data, I have been careful not to be affected by any biases towards any directions to remain neutral before drawing any conclusions. Before using direct quotations in the thesis, I have always assured they were said in the right context by confirming it through my respondents. Findings from all data gathered have been presented in a correct manner and has not been affected by expectations I have had before analysing the data.

When performing interviews, the respondents were all treated with respect and honesty in order to create good relations and trust (Saunders et al., 2016). They always had the ability not to be interviewed or to refuse to answer questions they might be uncomfortable answering. Their anonymity was highly respected, and through coding of every interviewee, I made sure that transcripts could not be connected to any individual. All information about the interviewed parties was always highly protected, both regarding record data, transcription data, and email correspondence. After the analysis, both transcriptions and recordings were deleted. For the sake of the thesis, one interviewee was asked to be identified, as the identification of and interview with him was necessary to gain relevant information about the new fintech-cluster in Bergen. He understood my request and had no issues with being identified by his name in this thesis.

4 Analysis

In this chapter, I perform an analysis with the intention of answering the earlier stated research questions grounded in theory presented in Chapter 2. In the first part of the analysis, I briefly present the competition in the banking sector in Norway before the payment directive was introduced to the market. Thereafter, I present the Payment Service Directive and analyse how it changes the existing competitive landscape in terms of value creation and value capture. Then, I look more closely at the new competitive landscape created by PSD2 and analyse how today's banks possess or lack the resources to compete in this landscape. Finally, I look at the timing of the technological shock and how players are responding because of their expectations towards this shock and the resources they lack/possess.

4.1 The competition before PSD2

The finance industry is a major industry in Norway. According to Finans Norge (2017), the industry comprises more than 2000 companies, with over 45,000 employees accounting for 2% of employment and 7% of value creation. The banking industry accounts for more than 60% of the employment and 58% of the value creation within the finance industry (Reve & Sasson, 2012). The banking sector in Norway consists of a large number of "Total Banks". Total Banks are banks offering mortgages, user accounts, saving accounts and BSU (Boligsparing for ungdom). Several Total Banks in Norway are relatively small, but most are today cooperating through different alliances. The Sparebank 1 group consists of 16 banks, while the Eika group consists of 69 smaller banks across the country.

Although consisting of over 100 banks, the banking market in Norway is very concentrated as seen in figure 6, with DNB having a market share of 28,6% in gross lending.

Gross lending (Norway) as of December 31. 2016,

	Banks	NOK mill	Market share
1	DNB Bank-konsernet	1 158 437	28,6
2	Nordea Bank Norge	473 006	11,7
3	Danske Bank Norge	257 343	6,4
4	Handelsbanken	229 000	5,7
5	SpareBank 1 SR-Bank	181 740	4,5
6	Sparebanken Vest	138 387	3,4
7	SpareBank 1 SMN	134 745	3,3
8	SpareBank 1 Nord-Norge	93 481	2,3
9	Sparebanken Sør	91 655	2,3
10	Statlige låneordninger (real estate loans)	87 045	2,2
	Others	1 202 477	29,7
	total gross lending	4 047 315	100

Figure 6 - Market shares, gross lending (Finans Norge, 2018)

From a European perspective, Nordic banks have for a long time been among the top banks in the world in terms of security, infrastructure and customer experiences. According to a report from the European Commission, Norwegian banks score among the highest in Europe regarding “user centricity and transparency” (Tinholt et al., 2017). Banks in Norway are also highly trusted by their customers. Finans Norge (2018) points at the fact that trust could be the determining factor in banks’ future position in the market for financial services. According to a survey performed in collaboration with Kantar TNS, Finans Norge shows that 61% of Norwegians trust their banks to provide them with overlay solutions, while only 1% would trust similar solutions offered by social media platforms (Finans Norge, 2018).

In general, there is not much separating the big Norwegian banks from each other when it comes to providing standard banking services for its consumers. The market is fairly homogenous with only minor differences separating one bank from another. Still, Total Banks manage to keep customers locked-in through complementary products and loyalty rewards. Surveys from Finans Norge (2018) show Norwegian banking customers are loyal, with only 7% switching mortgage to another bank in 2018 (Appendix A6). *“Although losing great amounts of money, Norwegians are extremely loyal towards their banks and insurance companies”* (Forbrukerrådet, 2014). This indicates that there exists switching costs that, at least partially, can explain customers’ loyalty. 40% of those who did not switch bank either did not believe it would help them save money or did not wish to spend time on comparing prices and contacting different banks (Appendix A7). Although Norwegian banks are among the most transparent ones in Europe when it comes to prices and fees, these findings show that

customers still find it stressful to compare prices between different products in case of switching banks.

Faithful customers contribute to raising the barriers of entry in the sector for Total Banks. If customers are not particularly price sensitive while simultaneously experiencing switching costs, this limits new entrants' ability to gain market share in this homogenous market. In addition, existing banks operate with both economies of scale and economies of scope. Through lowered average costs of production and through the ability to offer multiple financial services at one place, banks can keep their margins high. For new entrants, economies of scale and economies of scope may be challenging to obtain if they are not able to quickly gain new customers. Thirdly, strict regulations when it comes to capital requirements also contribute in making entry barriers high.

Due to increased digitalisation across industries, consumers are expecting their banks to head in the same direction in terms of digitalisation and user experience. To deliver digital services in the way that customers demand, banks are in greater need of technology services provided by system providers such as Evry and Nets. This leads to increased supplier power, with leading technology system providers capturing value from the banking industry. As of today, there are more banks than system providers, which again leads to high negotiation power among system providers who do not face the same level of competition as banks currently do.

In sum, the banking sector in Norway has until now remained concentrated and homogenous, providing very similar services without any high variation in quality or price. Still, customers are loyal, and not willing to do much effort to compare prices or change their banking relationship. Entry barriers are high as a result of loyal customers, economies of scale, economies of scope and strong regulations. In addition, suppliers have steadily increased their negotiation power towards banks because of the increased focus on digitalization technology in banking services.

4.2 Competition after PSD2

4.2.1 PSD2 in a nutshell

PSD2, the second Payment Service Directive, was adopted on October 8th 2015 by the European Parliament with the intention of making it safer, easier and faster for consumers to pay for goods and services. These goals were planned to be accomplished through promotion of innovation, standardization of payment systems across Europe and enhancing payment security. To support these objectives, the European Banking Authority (EBA) developed 12 Regulatory Technical Standards and Guidelines to specify detailed provisions in relation to payment security, authorization, passporting, supervision and more (European Banking Authority, 2017). In January 2016, the directive came into force, and banks had to prepare for significant changes in the banking sector, both in terms of technical compliance and in terms of competition. On January 13th 2018, PSD2 was implemented across Europe (Finans Norge, 2018). However, the implementation time of the Regulatory Technical Standards (RTS) was set to 18 months after the implementation of PSD2, meaning that consumers will not see the full effect of PSD2 before the second half of 2019. By then, banks must have, among other things, technical systems in place for Strong Customer Authentication (SCA) and give third parties access to their customers' accounts (Folcia & Firnges, 2017). A summarized timeline of the directive is presented in figure 7.

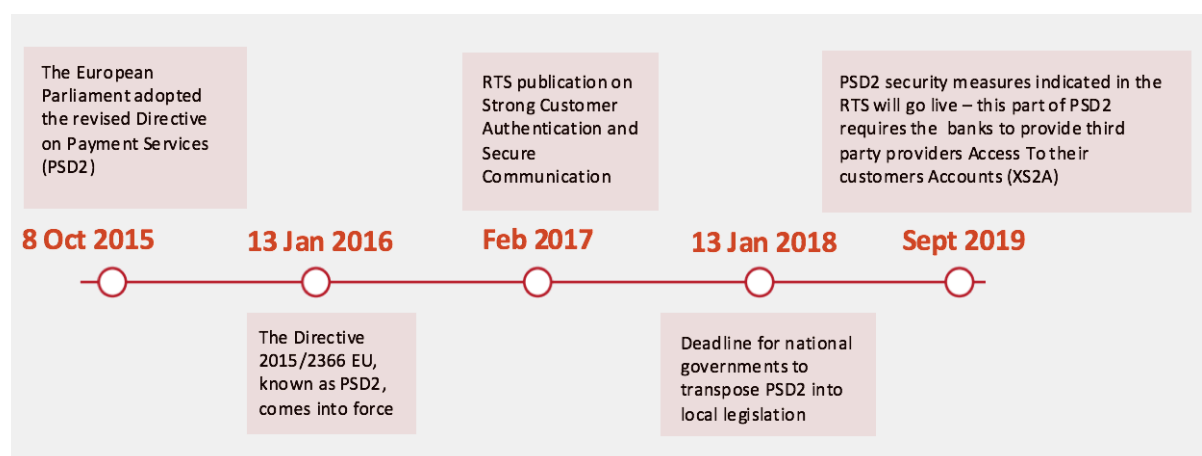


Figure 7 - Timeline of PDS2

As PSD2 requires banks to meet multiple complex regulatory standards, much of banks' focus has turned towards these requirements to secure compliance within the arranged deadlines. This was confirmed through the interviews with consultants, where all interviewees expressed the demand for regulatory consultancy had increased significantly among banks during the last year. However, becoming compliant is only a small part of the consequences that follow from PSD2. By enabling third-party providers to collect customers' account information and transaction data and letting them perform payments on customers' behalf, PSD2 opens up for new business models within the banking industry (European Banking Authority, 2017). This requires banks to think beyond compliance and focus on the strategic and competitive implications of the regulation (Folcia & Firnges, 2017).

Third parties may retrieve account information and perform payments by building services on top of banks' data and infrastructure through open Application Program Interfaces (APIs). In short, APIs allow developers outside of an organization's workforce to access data which in turn can be used to enhance their own applications. In other words, APIs make it possible for products or services from one company to connect with another company and thereby increasing value for the end users. By opening its data, a bank may expand its innovation capability to comprise an entire ecosystem of different partners (Folcia & Firnges, 2017). However, this requires a well-developed and prepared platform strategy from the bank before the implementation time is over and the APIs are available for competitors (Hagiu & Wright, 2015).

New positions emerge

As a result of the requirements of open APIs, PSD2 introduces two new types of third-party providers, namely the Payment Initiation Service Provider (hereby Payment Provider) and the Account Information Service Provider (hereby Aggregator Bank). The Payment Provider, presented in figure 8 underneath, is a retailer with the ability to initiate a payment on behalf of its user. The retailer would do this without requiring its' customer card details or other sensitive information, leading to both increased efficiency and security. In Norway, Vipps is a clear leader in the market for Payment Providers with over 2,9 million users. However, because of PSD2, new entrants will enter the market for payment services in Norway. Apple has announced its entering into the Norwegian market within the next months and is challenging Vipps' position as the dominant Payment Provider (Plikk, 2018).

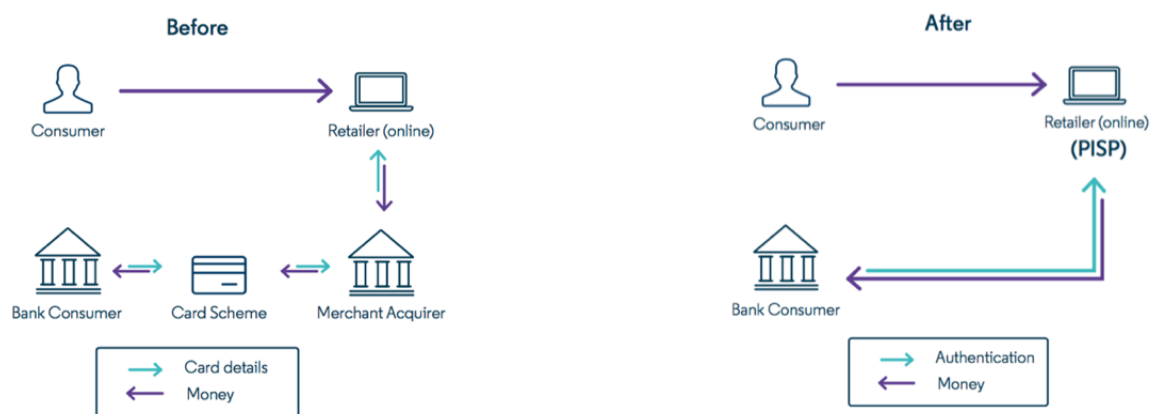


Figure 8 - Visualising the difference between payment today and payment through a PISP/Payment Provider (Evry, 2016).

As seen from figure 9 below, Aggregator Banks are service providers providing customers with an overview of total spending and saving across all banks and accounts they might have. Simultaneously, Aggregator Banks collect user data potentially beneficial both for the customer, the Aggregator Bank, and other companies potentially connected to this solution. By collecting account information across banks and providing it through its own seamless interface, Aggregator Banks could potentially remove the direct contact between the bank and its customers.

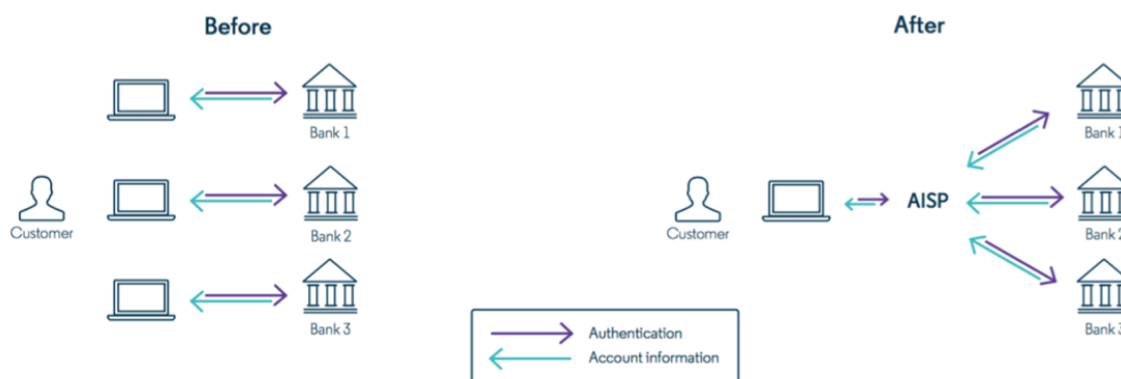


Figure 9 - Showing how AISPs/ Aggregator Banks may change the way customers check their accounts across banks (Evry, 2016).

Studies show that Norwegian consumers are positive to Aggregator Banks. According to Finans Norge (2018), 55% of those asked were interested in an aggregator solution where one can get an overview of all accounts across all banks (Appendix, A8). In Sweden, the

Aggregator Bank Tink has over 500 000 users on its platform. The company has made agreements with over 300 Nordic banks to be able to collect data from their users (as long as the user consents) (“Tink,” 2018). After the implementation phase of PSD2, such agreements are not necessary any longer, and both Tink and new entrants may collect data from whichever bank they wish, also in Norway (Finans Norge, 2018).

Despite being a consequence of regulations, PSD2 can be viewed as a technological shock for the banking industry. The regulation is externally given and enables Payment Providers and Aggregator Banks to challenge existing business models with new technologies that “experience a sharp increase in expected demand” (Argyres et al., 2013). The shock further creates a discontinuity in the situation of competition by having an immediate effect on the majority of the companies in the industry. It is difficult to predict how the industry will look in the PSD2 aftermath, and how value will be created towards new and existing markets. However, both banks and other players expect the competition to change. This technological shock is caused by these expectations of how new and existing players will change the competition in the banking industry.

4.2.2 Value creation

There are several reasons to believe that services provided by both Payment Providers and Aggregator Banks create considerable value in the future market for banking. One reason is linked to the success Tink has in Sweden with its Aggregator Bank, and the success of mobile payment application Vipps in Norway. Another reason is the insights from the survey from Finans Norge (2018) showing the positive attitude for Aggregation Bank services among Norwegians. This type of platform services, either offered by fintechs, bigtechs or banks, create value by attracting consumers wanting new and better banking services. In addition, new platform services attract companies either wanting customer data or sell their products to a segment identified through the platform service. For example, the Norwegian start-up Payr uses its customers’ data to provide users with better suited or cheaper alternatives from other companies (Payr, 2018). The company earns money through its B2B business by charging a fixed fee per customer it provides to the given company. Payr is a combination of a Payment Provider and an Aggregator Bank aiming to use its aggregated data to help its customers save money.

As Lien et. al., (2016) points out, value creation in a market depends on customers' and suppliers' reservation price, in addition to the number of customers. In platform markets, companies such as Tink and Payr have to provide value for both users and businesses to function as a business model (Hagiu & Wright, 2015). For a start-up such as Payr, charging a price to users highly limits the company's ability to quickly increase their user base, which is probably why the company has chosen a free-of-charge strategy towards its users (Hagiu, 2014). Payr is currently working on its chicken-and-egg problem, with 10 000 users on its platform. Instead of paying money, users pay with their data in which they are only willing to share if it benefits them in terms of better or cheaper products. As one of the interviewees said, *"money is only historic gold. The gold of the future is data"* – Partner, Consulting firm. Consequently, a platform service such as Payr depends on customer volume to gather enough data to provide value for its B2B clients. On the other hand, users need to get something back from sharing data, and Payr is therefore dependent on having enough offers from companies to provide customers with value. In other words, Payr depends on its indirect network effect in order to remain attractive as a platform service (Hagiu, 2014). Payr's B2B customers also have their reservation prices and are probably willing to pay an amount that is lower than their own current customer acquisition cost.

Considering other aggregation services previously mentioned, there is reason to believe there will be an increasing demand for services such as Tink that can aggregate accounts and provide a total overview of loans and funds. Furthermore, consumers will pay with their data, and companies similar to Tink may earn money through B2B business models. As a result of open APIs through PSD2, Aggregator Banks will be able to compare interest rates across banks at all times, and thereby either suggest users to switch bank, or switch bank on their users' behalf (European Banking Authority, 2017). Services like these will benefit the end consumers in terms of money saved/earned as it leads to a whole other level of transparency and easiness of switching banks (Folcia & Firnges, 2017).

Sub-conclusion

Based on the analysis above, value creation in the market as a whole increases as new substitutes with new business models arises and data starts becoming a central part of the banking service. Most value creation will come from the players creating data-based platform solutions managing to build up a significant amount of user mass.

4.2.3 Value capturing

In the market for Total Banks, there are two main effects standing out as a result of PSD2. First, lowered switching costs among banking customers will increase rivalry within the industry and reduce the value captured. Second, increased supplier power will decrease the value captured even further.

Switching cost

As previously described, over 40% of customers who did not switch banks either thought there was nothing to gain, or that it was stressful to switch banks. Because of new Aggregator Banks, these consumers may soon be able to easily compare prices and switch banks without doing the work themselves. The Aggregator Bank compares prices and switch banks based on a set of programmed rules, and the end consumer may end up behaving extremely price sensitive because of the technology provided through the aggregator. Due to this increased transparency, small changes in price is observable, making it easier for competitors to capture customers from a rival through only minor changes in quality or price (Lien et al., 2016). As a result, consumers are believed to become less loyal to their banks. Solutions like this could potentially lead to circumstances where a loan could be transferred between several banks on an hourly basis, leading to nearly perfect competition. This would first and foremost gain the consumers who end up always receiving the best offer in the market. For banks, however, it could potentially lead to a bloodbath as they are not any longer able to lock-in their customers and provide them with the current “full package” offered today. Customer loyalty will be reduced significantly, and banks’ margins will be heavily reduced as a result of increased price competition. If this turns out to be the case, value capturing in the industry would be reduced significantly.

As a result of increased transparency and lower switching costs, Total Banks will have to compete against an increased number of substitutes trying to create value in other ways than existing business models do. It will be challenging for Total Banks to lock in their customers without providing them with the best products available across the whole product spectre in the market. Norwegian consumers will probably increase their number of banking relationships, perhaps even without knowing it themselves, because the job of comparing and switching banks might be outsourced to an Aggregator Bank. As specialised substitutes extract

value creation on behalf of the traditional bank market, Total Banks will have to rethink their model and perhaps even specialise themselves.

Effects on the value chain

Considering the increased demand for technological services, it is natural to assume that system providers such as Evry and Nets will capture much of the value created in the market after PSD2. Traditional banks depend on top performing technologies to remain attractive to future customers. Therefore, banks' reservation price towards this type of technology may increase, especially in the short-term if they have trouble becoming compliant within the required time schedules. This might decrease the value capturing in the market in the short-term.

However, technology is not any longer only connected to the IT department in a bank. Instead, technology is to be the main resource for banks when innovating new business models. Rune Bjerke, CEO of DNB, have several times stated that *"DNB is about to become a technology company, not a bank"*. Although this statement might be questionable, it clearly paints a picture of banks changing focus towards technology. In total, the technology knowledge within companies providing banking services will increase dramatically. This requires suppliers of IT systems to rethink their business models to not lose negotiation power towards banks. Already, some banks experience that suppliers cannot provide the same value as before. One IT leader expressed: *"Both Evry, NETS etc. all try to offer some services, but we have experienced that they are often trying to sell something they don't even know how works. Sometimes we tend to know more than they do regarding what they are supposed to help us with."* This indicates that the knowledge gap between banks and IT providers is decreasing. For IT system and service providers, this means they must stay on top of their game to prevent losing negotiating power and future supplier contracts. Their customers are changing and so will the demand for different services. In the long-term, IT suppliers risk facing a drop in demand if not able to adapt to this change. If that happens, value capturing in the banking industry might again increase.

Sub-conclusion

Increased transparency and lower switching costs due to the emergence of Payment Providers and Aggregator Banks will lead to increased rivalry within the industry. This will decrease value capturing significantly and could potentially lead to a bloodbath for banks unable to

diversify and create new revenue streams. Additionally, IT system suppliers may capture much of the value created in the industry because of increased negotiation power towards banks required to comply with new regulatory requirements and changed customer needs. Together these two effects reduce the industry's ability to capture value. However, as technological competence within the banking sector improves, negotiation power towards IT supplier companies may increase if the technical knowledge-gap decreases. This, in turn, might increase the value capturing in the industry.

4.2.4 Changed market boundaries

As new services appear in the Norwegian banking landscape, market boundaries are changing. From being local and broad, banking services are believed to become more global and specialized as a result of two main reasons. Firstly, PSD2 opens the European market by making it easier to provide banking services across borders. This enables international players, both banks and tech companies, to tap into local markets with new and specialized products. Secondly, Aggregator Banks make it easier for consumers to compare products and pricing, “nudging” the end consumers toward banks providing them with the best option in different banking areas. Substitutes will challenge existing products in the market, and the level of rivalry will increase.

Changes in market boundaries can be visualized through a performance landscape. As described in Chapter 2, a performance landscape is a two or multidimensional space where each dimension represents the values of a particular choice a firm can make and a final dimension indicating the performance value (Levinthal, 1998; Siggelkow, 2001). In figure 10, a two-dimensional performance landscape is applied (Knudsen, 2017; Nygaard & Tuv, 2017). The x-axis represents all combinations of the relevant competitive parameters in the market while the y-axis represents value created and captured in each position. The profitability of a certain position in the landscape is a result of value creation and value capturing (Knudsen, 2017).

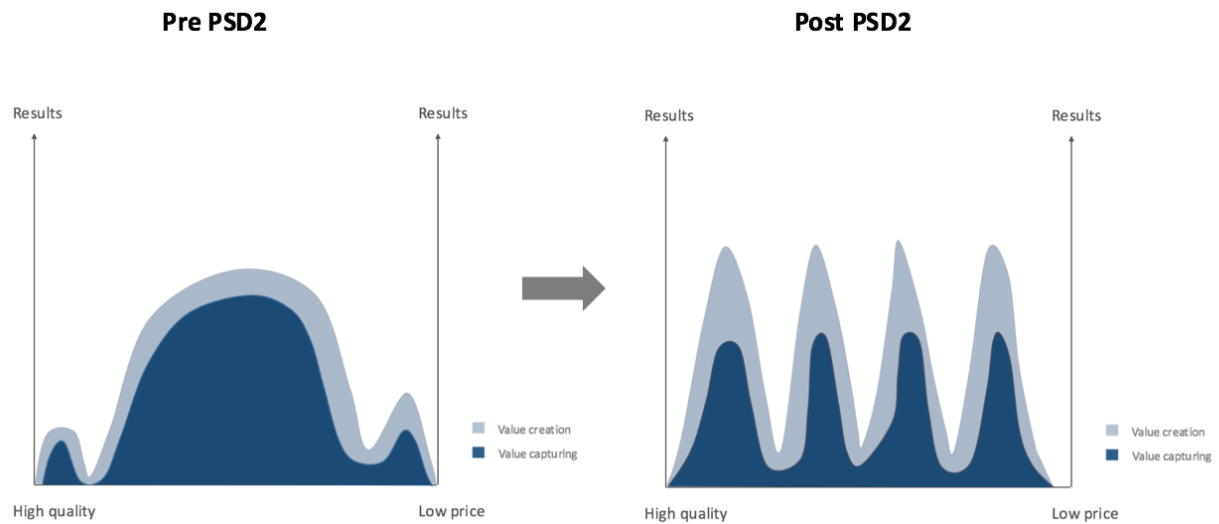


Figure 10 - Comparing the performance landscape before and after PSD2. Adapted from Lien (2016).

As seen in figure 10, banks are today (pre PSD2) providing a broad spectre of services to local customers. Existing banks capture most parts of the value created because of customers loyalty and strong negotiation power towards suppliers. Although there are some niches in the low price and high-quality segment, the majority of players in the industry are located in the middle, offering services to a broad customer segment. The set of activities necessary to perform traditional banking services are not very specialized, indicated by the stump top. After PSD2 implementation, however (post PSD2), the market becomes more specialized, requiring banks to reposition and perform new activities in order to run with operational efficiency and stay at a top in the landscape (Siggelkow, 2001). Internal positioning becomes harder as the combination of the right resources is more complex than before PSD2. Moreover, as the technological shock is caused by an *expected* change in demand, a higher uncertainty rules and internal misfits in the performance landscape are harder to identify (Siggelkow, 2001). If the misfits are significant, this requires significant changes for existing companies which can be very challenging as a shift in both resources and activities is required (Audia et al., 2000). As new players enter the market, market concentration decreases, and substitutes start challenging existing services. According to interviewees, this change in performance landscape will challenge existing banks providing a broad spectre of services to their customers: *“The worst position today is to be a bank that is supposed to provide **all** products.*

I believe DNB will survive, but other regular banks will have problems if they don't find their niches.” – Entrepreneur/investor.

Although the introduction of PSD2 leads to increased rivalry and reduced value capturing in the industry, studies of platform services and network effects indicate that markets often end up with one winner that “takes it all” (Belik et al., 2018; Hagiu & Wright, 2015). This indicates that in the long run, only a few companies will end up serving most customers, often because high switching costs among users create structural entry barriers within the market for Aggregator Banks. These switching costs appear as users might fear losing access to other users or valuable complements of the service they are using already (Farrell & Klemperer, 2007). Unless followers are able to offer something extraordinary through its technology or partnerships, the market leader tends to strengthen its advantage (Eisenmann et al., 2011). Consequently, rivalry within the industry may decrease, resulting in higher value capturing among the remaining players. This is illustrated in figure 11 which compares phase 1 and phase 2 in the PSD2 aftermath. We see that the market becomes more specialized, demanding a more complex set of activities to run with operational efficiency. Leading players in this market gain a lot of negotiation power and capture a greater part of the value created. This illustrates the “winner takes it all” scenario where a company is able to build a competitive advantage through its data-based platform service.

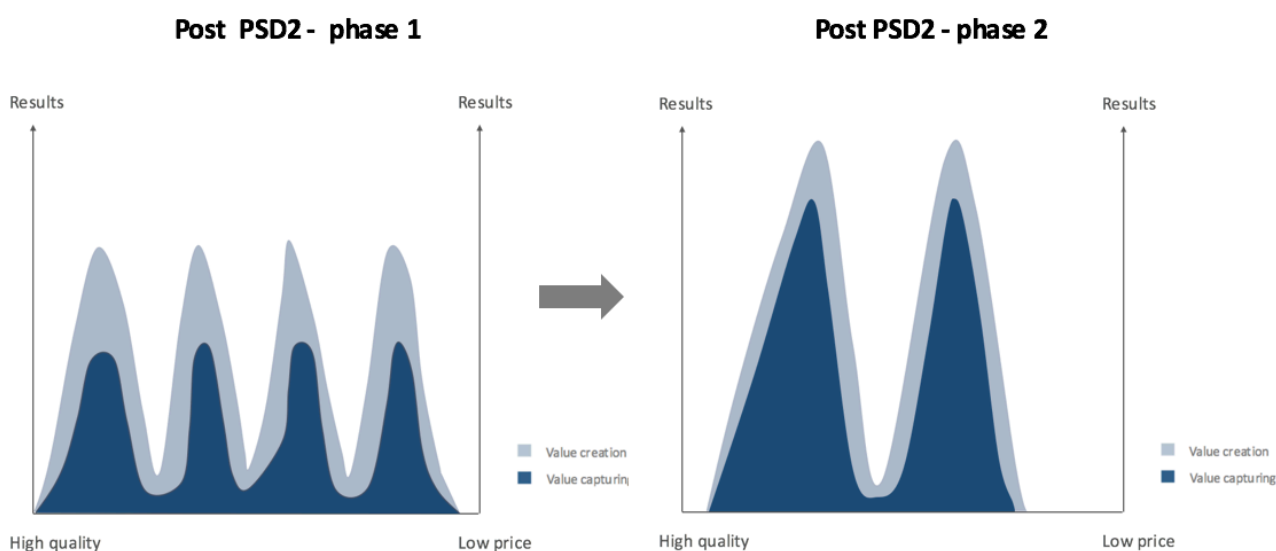


Figure 11 - Long-term effects of platform competition.

Competing in the market for Payment Providers and Aggregator Banks demand other abilities than what was demanded to compete in the traditional banking sector. As Bill Gates stated, *“Banking is necessary, banks are not”* (1994). To reposition themselves and be able to compete in phase 1 and 2 of PSD2, existing banks must look at their own resources and compare them to resources needed in the new market.

4.3 Competition in new markets

As described earlier, Payment Providers and Aggregator Banks both create new markets for banking services. However, these markets require different sets of resources from the companies competing. In the following sub-chapter, I compare these two markets and connect it to resources Norwegian banks possess today.

4.3.1 New market 1: Payment Providers

In relation to Payment Providers, PSD2 enables third-party providers to perform payments and transfers on users' behalf. This changes the value chain of payments, as merchants can become their own payment processors and payment platforms. At the same time, platform services such as Vipps contributes to moving payments away from established payment gateways in addition to its P2P transfer service.

Online merchants are given the possibility of becoming their own payment processor as a Payment Provider and connect to their customers account directly through APIs under the XS2A (Access to Account) rule. This eliminates costs for card schemes and other intermediaries in the payment card industry. However, becoming a Payment Provider is both complex and costly as merchants must comply to the directive's Regulatory Technical Standards provided by the European Banking Authority (Hernæs, 2016). Taking this into account, for merchants to become Payment Providers, it only makes sense if the cost reductions from processing fees and potential increased revenues from reduced friction outnumber compliance costs.

Payment Providers may also provide P2P transfer services through payment platforms. In the Norwegian market for payments, Vipps ended up as a clear winner in the competition with Mcash and Mobilepay. The main reason for Vipps' victory was its ability to gain a significant

number of users in a relatively short amount of time. This was done by launching the concept “payment for friends” which quickly attracted a great number of users. As a result of tough competition, the service ended up being free for consumers and was heavily marketed across the country with the goal of dominating the market for P2P transfers. Providing a service for free to one side of the platform is often necessary to handle the “chicken and egg” problem often arising in platform markets (Hagiu, 2014). Vipps succeeded with this strategy, and has today over 2,9 million users and is still growing (Vipps, 2018).

The market for P2P Payment Providers mainly requires its players to gain a significant number of users to win the competition. In other words, the product quality is a function of the company’s user base (Belik et al., 2018). Today, Vipps has network effects as the central part of the business model and puts lower importance on accumulating and utilizing big data. The network effect alone gives the company a competitive advantage because of its self-propelling increase in user base. For future rivals to gain market power, they must recreate the network effects that Vipps already has gained. This is challenging, especially if users experience switching costs. For instance, few users would be willing to switch towards another P2P Payment Provider if their friends are not already there. This is again a classic “chicken and egg” problem and will help Vipps keeping its market share in the aftermath of PSD2. However, technology companies from related industries which have already solved the “chicken and egg” problem might want to use their existing platform to tap into the market for payments. For example, Facebook, a platform already having its users, is currently providing P2P transfer services in USA, France and the U.K (Johnson, 2017). Facebook has low irreversible costs relatively to established banks in Norway and is therefore perhaps better positioned to succeed (Lien et al., 2016). Moving into the market for P2P transfers is a natural direction for Facebook, considering that users are already there, chatting with their friends.

Through the example of DNBs Vipps (although a separate company today), Danske Banks Mobile Pay and Swedish Swish (all examples of successful Payment Providers), Nordic banks have demonstrated their ability to use their resources to create and capture value in new markets. Through its funding from DNB, Vipps started off from day one with a significant capital base, a huge customer base, a strong and established marketing team and established distribution network. These resources together helped Vipps become the dominant player in the market for P2P transactions in Norway. However, platform companies in related industries, for example, Facebook may use its existing user base and challenge Vipps’ position when PSD2 sets in for real.

4.3.2 New market 2: Aggregator Banks

As PSD2 enables third-party providers to gather transaction and account information from its users, Aggregator Banks enter the market with its multiple sided platform services (MSPs). As mentioned, MSPs are technologies, services, or products creating value primarily by enabling interactions between two or more customer groups (Hagiu, 2014). The Aggregator Bank Tink is an example of a MSP that creates value by enabling interactions between banks, customers, and third parties interested in customer data (“Tink,” 2018). As mentioned in Chapter 3, Aggregator Banks highly depend on indirect network effects occurring when the value service indirectly depends on the number of users of the platform (Rochet & Tirole, 2003). Indirect network effects may, in the long-term, lead to high entry barriers if the leading platform company manage to overcome the chicken-and-egg problem and create value on multiple sides of the platform simultaneously.

However, as a result of open APIs and the Access to Accounts (XS2A) requirement, future Aggregator Banks will automatically be provided with one side of the platform, namely the aggregated bank accounts (European Banking Authority, 2017). Before PSD2, this has been a known challenge for companies such as Vipps and Tink that both have been required to strike individual agreements with all banks in order to create one side of the platform. Since this side now will be available for all competing Aggregator Banks, the main focus now shifts towards the customer side of the platform. To win the competition of the users, an Aggregator Bank must provide them with a higher consumer surplus than its competitors. While Payment Providers mainly depend on its network effect, Aggregator Banks consist of a business model where the combination of network effects and big data is crucial. Aggregator Banks must exploit the complementarity between network effects and data- accumulation and processing to create value for their users. The use of data accumulation becomes an even more important factor for Aggregator Banks as the focus on the user side of the platform increases. An Aggregator Bank therefore highly depends on its ability to provide its customer with excellent user experience and personalized services through data-driven aggregation.

Considering Tink again, we see that its aggregator service depends on the combination of its network effects and data usage. The strength of the complementarity between network effects and big data first depends on the extent the data usage improves the quality of the product (Hagiu & Wright, 2015). For Tink, the quality of the product highly correlates with the ability to use customer data to help them “make smarter decisions” (“Tink,” 2018). The strength of

the complementarity also depends on the extent to which users of the service contribute to generating this data (Belik et al., 2018). Users must continually use the platform service to enable Tink to learn from their behaviour and in turn provide services creating the most value.

A pertinent question is if banks are able to provide the best aggregator services in the future, or if fintechs such as Tink or bigtechs such as Amazon, will win this market. In a study performed by PwC in 2017, 39 leading banking representatives from 17 different countries in Europe were asked about the topic of PSD2 and Aggregator Banks. In the survey, 50% said their bank planned to become an Aggregator Bank as a result of PSD2 (Folcia & Firnges, 2017). However, we are still to see any clear signs of a Norwegian bank trying to enter the market with an aggregator solution. As mentioned, due to the implementation time of the regulatory technical standards, aggregator solutions today must make individual deals with banks to access their APIs. Both Vipps and Tink have done this for the last three years. In other words, new Payment Providers and Aggregator Banks can explore opportunities of open banking before regulations take place. Still, despite PwC stating that banks plan to become aggregators, there is still no public information about a Norwegian bank taking a clear approach in creating an Aggregator Banking service. As one of the interviewees put it; *“Every bank wants to become an Ecosystem, but none of them are prepared”*- Partner, Consulting firm.

As described earlier, Norwegian consumers appear sceptical in trusting fintech or tech companies to provide them with overlay solutions such as Aggregator Banks. However, Norwegians were also sceptical when first hearing about Vipps: *“In our focus group before launching Vipps, nine out of ten of those over 40 were negative to the concept”* – CEO, Vipps (Vipps, 2018). Consumers are often sceptical about services they are unfamiliar with. Still, when encountering a seamless and customer-oriented service, this scepticism often diminishes. When asked about security versus user experience, one of the interviewees said, *“I believe convenience trumps security right now. As long as everything is easy and convenient to use, people give Facebook the right to do whatever it wishes”* – CTO, Norwegian bank. According to a survey conducted by Finans Norge (Appendix A9), this might be correct. In this survey, the following question was asked: *“Imagine you had to change bank. Which of these capabilities are the most important for you when selecting your new bank?”* The top three capabilities reported were “user experience”, “pricing of services” and “simplicity”, indicating that convenience might trump security in the case of Aggregator Banks.

Considering this, existing banks should take care in relying on trust as a competitive advantage when stepping into the competition of providing the best Aggregation Bank.

Do Norwegian banks have the resources necessary to compete in the market for Aggregator Banks, or is this shock “competence destroying” for the industry (Anderson & Tushman, 1990)? Banks have resources to build platform services, such as Vipps, but to be an Aggregator Bank one must also master big data. According to the same survey from PwC, customer knowledge was reported as one of the most important competitive advantages banks have towards fintechs (Folcia & Firnges, 2017). But how much do banks really know about their customers? Banks have for a long time operated through a KYC (Know Your Customer) standard. However, this standard has mainly been a risk-minimizing tool for banks to prevent terrorist financing and frauds. To operate as an Aggregator Bank, real and useful data about its “normal” customers is necessary to know them as individuals. Today, this is not the case. Norwegian banks are not engaging with their customers. This was clearly conveyed when talking about banks’ data usage during the interviews; *“Why don’t I get any notification when I receive my salary or run out of money?”* - Investor/entrepreneur. Another interviewee said: *“I truly do not understand why my bank is not providing me with more information as a user. There must be so much information out there. At least they should give me the option to receive this information if I wanted to.”* - Partner, Consulting firm.

Sub-conclusion

As new positions arise in the aftermath of PSD2, the competitive landscape is about to change. Altered market boundaries open up for international competition, and new entrants are able to provide customers with valuable and innovative banking solutions. This is believed to lead to a drastic increase in value creation. The value capturing is believed to be initially low as a number of competitors try to win new customers towards their platform solutions. In the long-term, however, value capturing is believed to increase as “the winner takes it all”- effect occurs and only a few companies end up dominating the market with data-driven platform services. As these few players gain power in the market, this is believed to increase value capturing and creation in the industry. Through the example of Vipps, Norwegian banks have shown their abilities to create valuable Payment Providers. However, to become a powerful player in the aggregator service market, banks must combine data accumulation with network effects. Today, Norwegian banks seem to lack the necessary resources to compete in the market for aggregation services due to a lack of data usage towards customers. The technological shock,

therefore, has been competence-destroying in terms of banks' ability to provide competitive Aggregator Banks to the Norwegian market.

4.4 Responses to the shock

In the first part of this sub-chapter, I present my findings from the data mining/ text analysis to show when the technological shock took place in Norway. In the second part, I look towards banks' responses to the technological shock to gain the resources necessary to compete in the market for future banking services.

4.4.1 Timing of the technological shock

Although PSD2 was adopted by the EU parliament as early as October 2015, the regulation seemed to gain little attention by the Norwegian banks at the time. Despite some measures being taken, the regulation did not have an “immediate effect on the majority of the players within the industry” (Lien et al., 2016). Before a shock hits the market, companies often tend to ignore the potential new technologies offer. This was confirmed during the interviews, where the majority pointed out that the strategic consequences of PSD2 were not really discussed at the top management level until 2017. *“It would have been interesting to see how things would have been if we were compliant with open APIs already in the start of 2017”* – CTO, Norwegian bank.

As described in Chapter 3, 27 market reports were collected from Cicero with the aim of identifying meaningful patterns or trends indicating the timing of the technologic shock in Norway. Reports from Cicero were specifically chosen due to their objective way of describing what is currently happening in the banking industry. At the end of each month, Cicero publishes a report with the intention of providing readers with an overview of what has happened the last 30 days in the industry. In this study, I analysed reports from January 2016 to March 2018. During the research analysis, I found several lexical trends, in unigrams, bigrams and, trigrams, indicating when the technological shock took place in Norway. The three concepts I chose to focus more closely on in this study are the ones that can be strongly connected to PSD2, namely “*fintech*”, “*API*” and “*PSD2*”. During the analysis, the data processed in R included compounds containing these target words. For example, words such as “*fintech-selskap*” ‘fintech company’ were included in the counting of “*fintech*”, and words such as “*API-plattform*” ‘API platform’ were included in the counting of “*API*”. The results

from the text analysis are presented by the scatter plots underneath in figure 12. In this analysis, the 27 separated reports are presenting the independent variable on the x-axis, while frequency of chosen unigrams is the dependant variable on the y-axis.

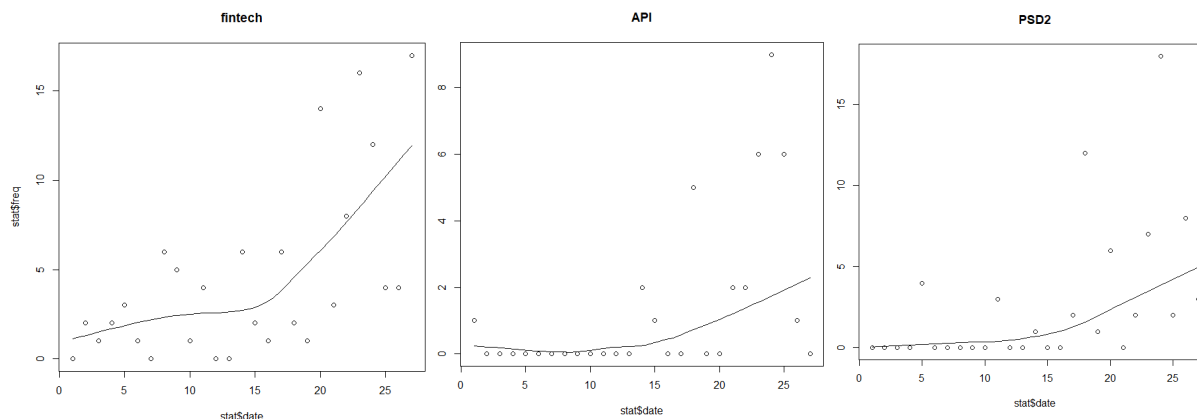


Figure 12 - Scatter plot presenting "fintech", "API" and "PSD2".

As seen from figure 12, all three scatter plots show, in various degrees, that there exists a statistically significant relationship ($p\text{-value} < 0,05$) between the timing of the reports and the frequency of the three concepts, indicating that there is a changing trend in focus in the financial market. The scatter plots clearly show a relatively sharp increase in the focus on PSD2 from mid-summer of 2017. For further information regarding the statistical results from the text analysis, see Appendix A10. If we combine the trend analysis from the three concepts chosen above and place them together in a summarized overview, we get the following graph:

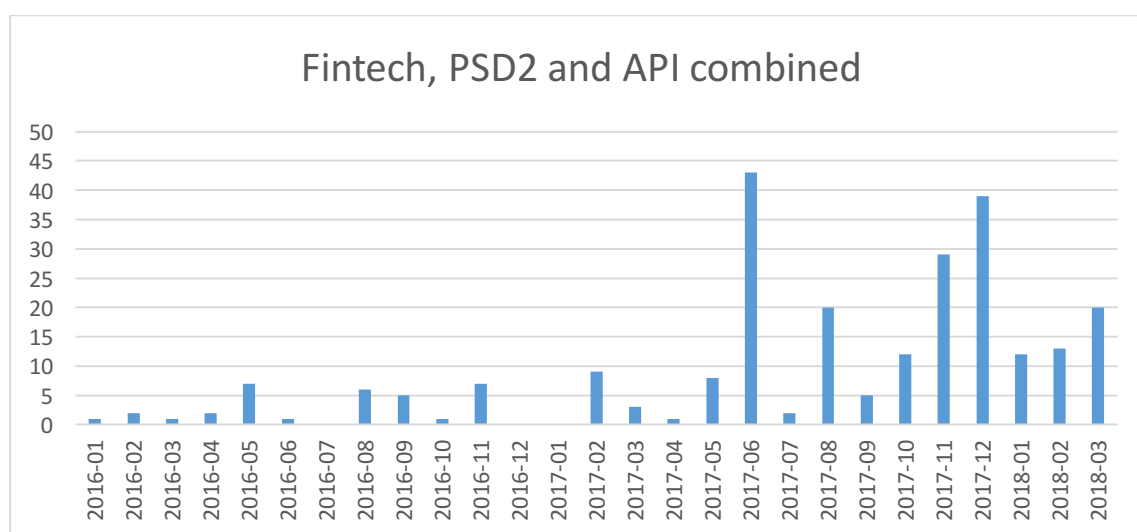


Figure 13 – Combined unigram trend analysis of the words "Fintech", "PSD2" and "API".

Looking towards figure 13, we see a clear trend indicating a very silent period in 2016. According to these findings, the focus towards PSD2 in the market in Norway first started to take place in the summer of 2017, as this is when the majority of banks started to respond to PSD2 in terms of different measures. All three concepts show a statistically significant growth in the period after summer of 2017. At this point, we see a clear trend indicating that the market is focusing a lot more on the implications of PSD2. Connecting this trend to the theory of technological shocks, we can say that, in the summer of 2017, there was a discontinuity in the expected demand for services appearing as a result of PSD2.

This trend can be confirmed through several of the interviews. One interviewee expressed: *“We worked with compliance already in 2015, but we didn’t do any strategic work on PSD2 until 2017.”* – Leader, Norwegian bank. In another interview with a partner from a Consulting firm, it was expressed that it was not until the spring of 2017 that the attention towards PSD2 started to grow: *“This is when I feel most banks started to focus on the regulation. Our seminars were always full of banking people, both leaders, and board members.”*

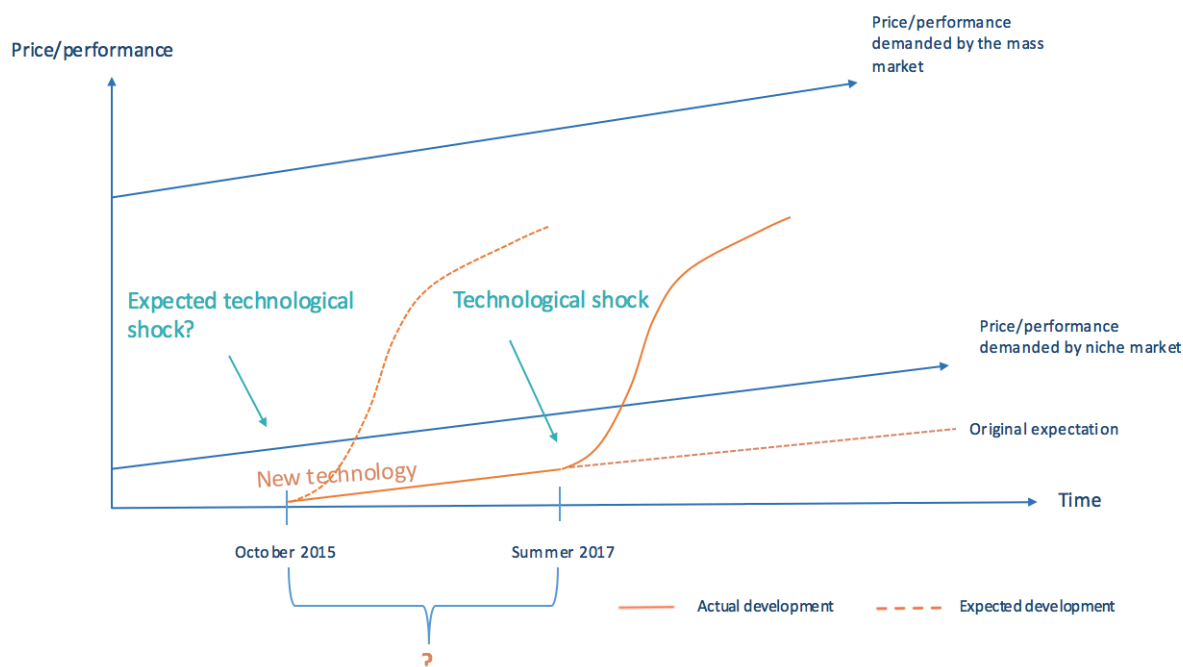


Figure 14 - Illustrating the technological shock vs expected technological shock in Norway. Adapted from Christensen (2013)

As seen in figure 14, although the regulation was externally given in October 2015, the shock itself did not occur before the summer of 2017. At this point, the expected demand for the technology increased, and players within the industry started taking measures to position themselves towards a new market in the aftermath of PSD2. It is still uncertain if the price/performance of new products can replace the old products offered to the mass market, but findings show that aggregator banking services are believed to increase in demand by more than the niche markets only when the market fully opens in 2019.

Based on these findings, we may question why the technological shock appeared so late in Norway. The implications of the regulation were publicly available from October 2015, and the industry already then knew that new services would appear and challenge existing business models. As seen in figure 14, there is a clear time gap between when we would expect the shock to happen and when it actually took place.

4.4.2 Response to PSD2

In this chapter, I first analyse why the industry did not respond to the new regulation after its announcement. Thereafter, I provide some examples of how banks have responded to the technological shock to gain the right resources and prepare for a new way of competing in the market for future banking services.

The silent period

Uncertainty in the market may be one reason why players within the industry have been hesitant in their response to the regulation. As mentioned, investing in new strategies might turn out to be unreasonable if the technological shock has a different outcome than expected (Tushman & Anderson, 1986). This is an example of genuine uncertainty, where players are not fully aware of the competitive consequences of the regulation (Knight, 1921). Although the market might be very uncertain, the decision regarding repositioning must be taken before the technological shock affects the top or bottom line of the organisation in order not to fall behind (Tushman & Anderson, 1986). In conjunction with the enormous cuts Nordea officially announced in October 2017, Hans Christian Riise, the steward of Nordeas Financial Federation, stated that *“We do not have a good enough overview of what competence our workers have, and neither do we know what competence is necessary to fill our customers’ needs in the future”* (Schwartzkopff & Magnusson, 2017). The statement from Riise is not only

a sign of uncertainty, it also proves how the technological shock may be competence destroying towards the banking sector. Existing banks are uncertain if they possess the right resources to cover the future needs of banking customers.

To predict a technological shock, one must understand the technology, the complementary technologies resulting from it, and how the demand of the technology will develop. Considering that the banking sector has not been exposed to a high degree of technologic innovation in the last decades, there is a chance that there has been a lack of technical competence within the leadership in banks. In other words, banks may not have been in possession of the technical resources necessary to understand when and how to act on the regulation. This lack of technical knowledge may again have resulted in scepticism and/or ignorance when it comes to PSD2 and its implications, especially since predictions are based on technical knowledge and innovation, and not numbers or straightforward facts.

This lack of technological competence can be very damaging for organizations consisting of a hierarchical structure, as most strategic decisions then are made by a small number of individuals at the top. These individuals are often the most experienced ones, and therefore also often those of high age. *“It would be very interesting to see how the average age of the board of a bank correlates with the banks’ strategy towards open banking”* – Investor, entrepreneur. The investor further explains he has held several lectures for boards regarding PSD2, and that the response has varied a lot. *“I see a lot of old men out there ready to retire and not willing to start any drastic projects to prepare for open banking.”* Hierarchical structures also often delay decision making, as ideas and suggestions must go through several vertical levels in the organisation before a decision can be made: *“I think the biggest challenge for banks today, both large and small, is the time it takes to make decisions. A lot of meetings are held without any decisions being made.”* – PSD2 specialist. *“If there is anything that prevents us from changing in the speed we should, it is definitely our slow decision making”* – Manager, Norwegian bank. In total, a hierarchical organisational structure among banks may have limited their ability to respond, both as a result of misaligned incentives among leaders who do not want to (or who do not know how to) change, and as a result of slow decision-making processes.

The paradox of success may be a third reason explaining why the technological shock did not occur straight after the PSD2 announcement (Audia et al., 2000). Norwegian banks can show towards high profitability both in the years after the financial crisis in 2008 and the drop in oil

price in recent years. When things are going well, it is challenging to convince leader groups and board members to invest in new strategies based on expectancy towards a demand for new technology (March, 1991). Some leaders may have incentives to hold the investment costs down, while others might not fully understand the real consequence of the PSD2. In cases where convincing leader groups take time, decisions are often postponed.

Banks, in general, are controlled by heavy regulations demanding a lot of focus not to breach any security rules. *“Poor banks, they are finding themselves in a regulatory tsunami right now”*. – Partner, Consulting firm. Becoming PSD2 compliant is a challenge in itself and may also have limited banks’ focus on the strategic consequences of PSD2. The Partner further explains that in his opinion, banks do not appear to have the capacity to look at the competitive implications of PSD2 until it hurts, meaning that strategic steps do not seem to be taken until the regulation affects the top or bottom line. In addition, he believes that *“most products offered today have been made as a result of regulations and security requirements, and not as a result of real customer needs”*.

The fear of cannibalization may be another reason explaining why we have not seen any clear signs of banks creating aggregation services yet. As mentioned, PSD2 is believed to increase transparency and reduce customer loyalty, both leading to reduced revenues for existing products. As one interviewee expressed: *“no banks are interested in a race to the bottom”* – Strategic Advisor, Consulting firm. This means banks could have been working on developing aggregation services without launching anything, in hope of delaying the cannibalization effect. A fast-follower strategy might be a good option if the imitation is done correctly and fast enough, as supernormal returns often still exist in the new market (Cusumano et al., 2008). In addition, followers may be able to build on the mistakes done by the first-mover and thereby avoid investing in non-profitable projects. However, this wait-and-see strategy might also be risky as a success of platform services highly correlates with the number of users it manages to build (Hagiu, 2014). If an innovating firm manages to build a platform, it may be hard for followers to compete against this first mover advantage unless they manage to offer something extraordinary through their technology or partnerships (Belik et al., 2018; Eisenmann et al., 2011).

Responses after the technological shock

Finance Innovation was established in Bergen in June 2017 and is “*an association and innovation cluster of banks, financing companies, insurance companies, consultancy companies, tech companies and educational and research institutions working on the financial services and solutions for tomorrow*” (Finance Innovation, 2018). According to Atle Sivertsen, the CEO of Finance Innovation, this cluster was first and foremost viewed as a defence strategy towards a new and more open competitive landscape: “*Companies not previously existing in the SWOT-analysis are suddenly ready to enter a disruptive industry*”. In his view, banks have now turned this defensive strategy into a more aggressive one, collaborating in a way he did not expect to see so quickly. Through a cluster, banks and other parties are able to share knowledge and create value that was previously not possible (Bettis & Hitt, 1995). In general, banks have for a long time focused on operations, compliance, and security instead of innovation. Fintech companies’ ability to be agile and continuously innovate increases the banks’ motivation in collaborating with these companies. By collaborating and discussing with technology companies, banks have taken one step further towards building the resources necessary to compete in new markets.

Banks have also partnered with start-ups themselves through alliances or acquisitions, two well-known strategies for obtaining resources (Barney, 1991; Dyer & Singh, 1998). Taking into consideration the capital strength of banks today, they are positioned to acquire promising fintech actors to quickly gain resources needed. As one of the interviewees stated, “*with their financial strength, banks can buy companies like Payr easily*”- Partner, Consulting firm. Two months after this statement from the Partner, DNB admittedly invested NOK 6 million in the start-up through its venture fund “DNB Venture” (Nikolaisen, 2018b). In addition, Nordea Liv partnered with the savings app Spiff in February 2017 to gain insight on how current and future pension customers are motivated to save more (Nikolaisen, 2018a). A couple of months later, Storebrand executed the same strategic step by partnering up with the Swedish savings app Dreams (Nikolaisen, 2017). To strengthen its position within the digital savings market, Sbanken invested in the fintech company Quantifolio which use AI technology to provide their customers with user-friendly and automated advice when investing (Weldeghebiel, 2017). Just recently, Danske Bank became the Co-owner of the aggregation platform Spiir, thus becoming the co-owner of a fintech for the first time (Kjær, 2018).

It is important that the understanding of the importance of technology and innovation runs through the entire organisation. As mentioned, if leaders on the top do not have a good understanding of the consequences of PSD2 and open banking, this might limit banks' ability to adapt. We can again look towards the statement from one of the interviewees; *"It would be very interesting to see how the average age of the board of a bank correlates with the banks' strategy towards open banking"* – Entrepreneur/investor. The interviewee further expresses his view on the importance of hiring young talents with a business background that also understand how technology affects the banking industry in the years to come. As mentioned in Chapter 2, managers' mindset depends on his/her experience and background. Managers with a technology background emphasize fewer opportunity dimensions than those generalist experience (Folta, 2007). However, a combination of management skills and technological knowledge is valuable for today's banks when deciding upon new strategies towards PSD2. Perhaps that is why Christoffer Hernæs, a previous management consultant and technology enthusiast, received the position as Chief Digital Officer in Sbanken in October 2016. Through his efforts in pushing Sbanken to become more digital and experimenting in unknown waters, he helped the bank in becoming more aggressive when it comes to preparing for the years to come.

One way to internally accumulate right resources is to experiment and learn by doing. A number of banks recently performed so-called "open banking initiatives" and gave developers the possibility of creating demo solutions through open APIs in "sandboxes", often through "hackathons" where programmers and business developers gather to create solutions of the future. Some banks also tested basic aggregation services by providing customers with account and transaction overview across a couple of banks (partnership banks such as the Sparebank 1 alliance)(Weldeghebriel, 2018). In addition, Sbanken experimented with different ways of communicating with their customers to show how they use data to provide better services, such as giving customers notifications when they have spent more than usual on certain product types. Sbanken also integrated their account overview with the API of Coinbase (a cryptocurrency trading platform) so that their "crypto-customers" could view their crypto accounts through Sbanken instead of logging into Coinbase (Wig, 2017). These are examples of how banks can accumulate resources by getting to know their customers and their preferences.

Sub-conclusion

As discussed above, banks are now responding to the shock, both in terms of alliances, acquisitions, and internal accumulation. Additionally, banks are challenging their own business models, and are offensive in terms of open banking initiatives and collaborations with partners and competitors. However, despite PSD2 being announced already in 2015, most measures were not taken until 2017 and 2018. As seen from the text analysis, the technological shock did not occur before the summer of 2017, indicating that many banks chose the “wait and see”-strategy for a long time before acting.

5 Conclusion

In this final chapter, I aim to answer the research question outlined in Chapter 1. Thereafter, I discuss implications of the study with some suggestions for future research on this topic. I also propose a few managerial implications before I finally present the limitations of the study.

The purpose of the thesis was to study how the Norwegian banking industry is affected by PSD2, and how existing banks respond to the regulation. I first presented a short analysis of the current Total Bank market pre PSD2. Additionally, I shortly presented the directive before I thereafter analysed the industry's ability to create and capture value in the PSD2 aftermath, and how banks possess or lack resources in the new market for payment and aggregation services. Finally, I presented my findings on the timing of the technological shock and how existing banks responded based on their expectations of the implications of the shock.

In the first sub-question, I aimed to explain how the technological shock affects the banking industry and the players within it by considering value creation and value capturing. In my analysis, I first find that innovative services in the market for Payment Providers and Aggregation Banks become substitutes for banks' existing product portfolio. Value creation in the industry will consequently increase, while the value created by existing players may be reduced. Simultaneously, PSD2 is believed to increase competition in the market for Total Banks as different parts of banks' current business models are challenged by these substitutes. Aggregator Banks are believed to increase the transparency in the industry and thereby lower customer loyalty. Additionally, supplier power is believed to increase. In total, this leads to a decrease in value captured in the industry.

In the second sub-question, I asked how the competitive landscape is formed by PSD2, and which resources banks must possess to compete in this market. My findings show that things are believed to be different in the new positions that arise in the aftermath of PSD2. Altered market boundaries open for international competition, creating a new competitive landscape in Norway. As new entrants are able to provide customers with valuable and innovative solutions, the value creation in the industry is believed to increase drastically. The value capturing in the industry is first expected to be low, as a number of competitors try to attract new customers towards their solutions. In the long-term, however, value capturing is believed to increase as "the winner takes it all"-effect occurs with only a few players dominating the market with data-driven platform services. These players are expected to gain significant

market power, resulting in a decreased rivalry, increased negotiation power towards suppliers and increased value capturing and creation in the industry. The competitive landscape changes as these new substitutes challenge the traditional way of banking services, and new, technical resources are necessary to compete in this new landscape. Considering Payment Providers, the success of Vipps suggests that traditional total banks have the resources necessary to compete in the future landscape of digital payments. However, to compete in the market for Aggregator Banks, banks have to combine platform services with data usage. Currently, Norwegian banks have not taken a clear stance in this market and appear to lack the resources necessary to combine platform services with data usage to create a competitive Aggregator Bank.

In the third sub-question, my goal was to investigate when the technological shock occurred in Norway, and how banks are responding to it. I find that, despite the fact that the official statement of PSD2 was announced already in 2015, the shock did not take place until mid-2017. My findings show that the majority of banks did not respond with strategic measures until 1.5 years after the announcement. Reasons for this may have been uncertainty, the paradox of success, organisational structure, regulatory focus or fear of cannibalisation. From mid-2017, however, banks have taken measures to gain the resources necessary to compete in the coming market for banking services. The level of collaboration between banks have increased in terms of innovation, strategy, and regulations. Additionally, strategic acquisitions and investments have been performed. Some banks have also started experimenting through open banking sandboxes to gain experience and create ideas on how to create value through data and account aggregation.

In sum, theory covering technological shocks accurately explains the current situation in the Norwegian banking industry. The competitive landscape is about to change as new, profitable banking services will appear as a result of PSD2. The industry of banking services is facing great changes as existing business models are challenged. Although the shock leads to a high degree of uncertainty in the market, existing players need to make decisions before it hurts. If not, they risk being left behind and lose the competition in the market for future banking services. Still, we see that the incumbents are, of various reasons, hesitating in their response to the implications of PSD2. Although measures now are being taken, my findings show that most banks went for the “wait and see”-approach when first hearing about the regulation and its implications. According to theory of technological shocks, this is an often used approach as a technological shock often leads to high level of uncertainty in the market. Neither companies nor customers know which products will end up dominating the market, resulting

in a number of companies sitting on the fence without knowing how to tackle this uncertainty. Also, the possible downside of investing in new business models may be significant when the market is highly uncertain. Predicting a technological shock is very challenging as it requires players to understand the new technology, complementary technologies and customers' expectations and preferences towards these new technologies. As my findings show, banks are yet to show comprehension of the technology or customers' expectations towards it. PSD2 further creates a discontinuity in the market as the regulation leads to a change in expectancies towards Payment Providers and Aggregator Banks. Although current banks may be able to win the market for Payment Providers, they appear to lack the resources necessary to create the best Aggregator Bank. In other words, this technological shock seems to be competence-destroying for total banks in terms of Aggregator Banks.

5.1.1 Research implications

One goal for this study was to broadly consider PSD2 and pursue findings which could act as a ground rule for further studies. In the following sub-chapter, I suggest four instances for further research on the topic.

As mentioned in Chapter 3, a survey could have been conducted to gain more specific and quantitative knowledge about the timing of the technological shock and measures taken as a response to it. Additionally, more data could have been collected for the textual analysis. For instance, data from news articles, Google or LinkedIn could have been used as data sources in this process as it would have increased the findings generalisability on the timing of the technological shock. For future research, this can be an interesting approach.

During the analysis in Chapter 4, it was mentioned how suppliers of IT systems face challenges when providing technical solutions for banking customers that are continuously increasing their expectations towards solutions provided by suppliers. It would therefore have been interesting to study a similar case, only from the suppliers' perspective, as they also need to adapt to regulations such as PSD2 to ensure they provide solutions that create value for their customers and their customers' customers.

Research on multisided platform strategies usually focus on platform owners and their challenges related to growth and profitability. However, it would be valuable to study how the platform supply side can use platform data to create better services for their customers. For instance, the supply side of the Amazon platform can use data to investigate which products

are most and least attractive based on clicks, sales, reviews etc. This data can further be used to create niches in different supplier markets and improve existing products based on customer preferences. An Aggregator Banking platform creates similar opportunities for banks, as they can use existing platform data to create better products. For instance, banks could subsidize lowered interest rates from increased competition with data they can use to create other more profitable business models.

A fourth suggestion for further study is to analyse how technological shocks, such as PSD2, affects organizational structure and culture among existing banks. For banks to compete against technology-driven and fast-moving companies they must be organized in a way that stimulates innovation and enables quick decision making. However, implementing a flat and flexible organisation structure is challenging, especially for large companies that have followed a predominant vertical structure for a prolonged time.

5.1.2 Managerial implications

My conclusion above has some implications for the banking industry players in Norway. In this chapter, I provide suggestions on how decision makers in Norwegian banks can improve their organisation and prepare for a changing competitive environment in the years to come. Finally, I propose a few suggestions on how new entrants can exploit current weaknesses among Norwegian banks to gain market share in the PSD2 aftermath.

For banks to thrive in the future competition for banking services, leaders should; 1) be willing to experiment and fail, 2) increase data knowledge and capabilities through internal and external accumulation of resources, 3) look towards a more agile way of managing projects, 4) create a flexible organisation structure, 5) take measures to become attractive for young talent while also focusing on continuous learning among its senior employees, and 6) focus on competing in a market where a competitive advantage is within reach.

When technological shocks occur, decisions often need to be made before it hurts. Therefore, banks must take strategic measures before changes in the competitive landscape affect their top or bottom line. To understand technical and regulatory implications early in the process, leaders should explore new ideas, test different concepts in the market, and be willing to fail at certain points. This new type of leadership requires flexibility in decision making, as market changes may require project pivoting. Traditional manager mindset often leads to formal strategic planning not sustainable in unpredictable environments. Instead, leaders must have a

mindset building on curiosity and innovation. Failing should not only be allowed, but be considered a necessity for banks to create new services for their customers.

Through acquisitions and alliances, banks can position themselves towards a more data-driven banking market. However, in times when an industry faces disruption, internal accumulation might be more important than acquisitions and alliances for creating an organisation for the future. In the PSD2 case, where a high degree of uncertainty exists in the market, banks must look internally and explore how this uncertainty can be handled in the best possible manner. Although innovation and technology investments might seem expensive at first, especially when business models are uncertain, the alternative of doing nothing is often more expensive. With this in mind, the fear of the unknown should be replaced by the fear of doing nothing, as a “wait and see” approach might hurt more in the long term.

Considering project management and organisational structure, leaders should in many cases look towards management approaches different from what has been the standard for a long time. In the case of traditional project management, information usually flows in one direction through phases of conception, initiation, analysis, design, testing, deployment etc. Traditional project management works well in stable competitive environments with low uncertainty in the market. In times where uncertainty reigns, however, this approach is often expensive and inflexible. There is only a certain number of times a company can afford to scrap and rebuild products and services, and the traditional approach may put the company in a disadvantage against competitors. Additionally, a traditional project management strategy is often a result of a traditional organisational structure where strategic decisions are made at the top of the organisation. This requires a lot from managers at the top as they are believed to best know how to innovate and make correct decisions. The traditional project management approach also slows the project process as big decisions can only be taken after going through several levels in the organisation. An agile approach, on the other hand, is a faster, less risky and cost-effective approach opening for flexibility and creativity throughout the project period. Agile recognizes that problem solving is a discovery process, encouraging hypothesis building and experimentation as an overall organisational exercise. This means decisions are made throughout the project period, including more members of the organisation in the project process and thereby increasing the chance of success.

An Agile approach strongly links with the organisational structure as it requires flexibility and decentralized decision making. In periods with an uncertain competitive environment, banks

should aim for horizontal structures with decision making decentralized to cross-functional teams to remain innovative and flexible. Additionally, horizontal organisational structures result in younger employees being included in strategic decision making, as decisions are now made in teams and not at the top of organisations. This is highly important as banks today depend on input from younger employees to stimulate future banking customers and discover new technologies. Moreover, flat organisational structures are a signal to young applicants that the organisation value skills over seniority. This attracts talent, which in turn leads to increased innovation and so on.

Despite young workers being essential for banks to be more innovative and competitive, experienced workers are still very important. Experienced workers possess deeper banking knowledge and an understanding of how complex projects and departments should be managed. In the years to come, banks will highly depend on senior level workers and their knowledge of new technologies. To prevent managers from becoming “outdated”, banks should focus on continuous learning and keep leaders and experienced workers updated, through internal and external measures of education.

The size of banks also affects their ability to respond to changes in competitive environments. For banks, it is important to focus on competing in a market where a competitive advantage is within reach. While big banks such as DNB and Nordea have an enormous customer and capital base, local banks such as Tysnes Sparebank highly depends on its localization and physical customer relationship. DNB has the capital to acquire new resources through heavy investments and partnerships, whereas Tysnes Sparebank must adapt in its own way, perhaps by creating its own niche in the market. For instance, instead of aiming to become an Aggregator Bank, Tysnes Sparebank should perhaps focus on becoming an advisor for local businesses. If not able to create value from its local appearance in the PSD2 aftermath, small banks such as Tysnes Sparebank may suffer. DNB, on the other hand, should use the vast amount of customer data, capital, and market power to create the best third-party solutions in the market. As the majority owner of Vipps, DNB can use data from this Payment Provider to build aggregation services that create value for both customers and businesses.

Although this thesis mainly focuses on traditional banks and how they are affected by and reacting to PSD2, one can also look at the situation from the perspective of a fintech company when focusing on manager implications. Since traditional banks in Norway most likely will meet several challenges in their attempts of becoming more technology-oriented, fintechs may

use this as an advantage to attract both customers and talented workforce. First, fintechs have the ability to build their services from scratch and can create data-driven and regulatory-fitting services from the bottom of their technical infrastructure. Banks, however, have an enormous technical depth and are continuously struggling just to keep up with regulatory requirements. While traditional banks need to continue focusing on their regulatory requirements and technical investments, fintech companies can explore the market and fill new customer needs that traditional banks are not yet aware of. Secondly, fintechs have the ability to attract very talented banking workers who are tired of being limited when working for larger banks that suffer from hierarchical structures and slow decision making. By attracting the best banking talents in Norway, fintechs will continue to increase their technical banking knowledge, while incumbents, on the other hand, may lose their best employees and perhaps struggle even more to keep up with the competition. Thirdly, many fintechs already have the necessary resources to actually get to know their customers and their behaviour through data-driven payment and aggregation services. More data leads to increased knowledge, and fintechs may use this knowledge to continue creating products they know are demanded in the market because of the information they have on their customers. This way, they may get a head start in the competition of providing the best Aggregator Bank towards Norwegian customers.

5.1.3 Limitations

The research study has its challenges and limitations. The biggest challenge with this study is the postponed implementation plans of the regulation. Since the security measures outlined in the Regulatory Technical Standards (RTS) will not become applicable until the third quarter of 2019, most effects of PSD2 are yet to be seen. This increased the difficulty of investigating implications the regulation has on the banking industry and its players, both when gathering primary and secondary data. Interview respondents may not have been able to talk freely about future plans for banks due to non-disclosure agreements, and secondary documents used in this research only describe actual happenings in the present and the past. However, the aim of this research study was to investigate how players' *expectations* changed their perception of the industry and led to strategic changes within organizations. I therefore believe this study has contributed with valuable insights into the banking industry in Norway, from both a theoretical and practical perspective.

Another possible limitation of this study is the fact that the majority of the respondents, 6 out of 10, worked in different Norwegian banks, either as employees or external consultants. This

may have biased their answers, favouring the bank and its ability to innovate and adapt to new regulations. To increase the level of impartiality among respondents, further interviews with both Norwegian and foreign entrepreneurs could have been conducted.

Since the qualitative data gathering was performed in a time where the competition was changing, and measures were continuously taken by existing banks, there is a risk of important aspects or information being kept a secret as it may have been deemed competition sensitive. This may have limited findings and consequently the quality of the study. In addition, some banks may have developed different solutions yet to see the light of day. For instance, an Aggregator Bank may have been developed and tested, but still not launched in the market, in fear of cannibalization of other products. As mentioned in the analysis, aggregator solutions may decrease value capturing as a result of increased transparency and reduced customer loyalty. Therefore, existing banks may have followed a Kodak-strategy¹ in fear of reducing existing revenue streams.

Keeping in mind that this study considered implications on an industry level, my findings may not be relevant for readers specialising in certain banking services. My findings are fairly general, which again can reduce the practical value it serves readers working at the company level.

Regardless of the limitations presented above, my findings are valuable as they present a thorough overview of the banking sector in Norway and how it is changing as a result of PSD2. My findings explain, through highly relevant theory in technological shocks, why incumbents in the industry have been hesitant in their response to the shock. By combining qualitative and quantitative research methods, I have also managed to present the timing of the technological shock and incumbents' response to it.

¹The "Kodak strategy" is used as an analogy of how Kodak invented the digital camera in 1975, but still chose not to launch it in the market.

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7 Appendix

A1 – Concepts and abbreviations:

AISP	Account Information Service Provider
API	Application Programming Interface
EBA	European Banking Authority
GAFA	Google, Apple, Facebook, Amazon
MSP	Multi-sided platforms
PSD1	Payment Service Directive
PSD2	revised Payment Service Directive
RTS	Regulatory Technical Standards
SCA	Strong Customer Authentication
TPP	Third-party Provider
PISP	Payment Initiation Service Provider
XS2A	Access to account

A2 – Interview guide:

The interview guide presented underneath is the guide used towards interviewees working in a bank. For consultants not working in a bank or for entrepreneurs/investors, the interview guide was adapted to fit their background and knowledge. For simplicities sake, only one guide is presented in this Appendix.

Interview guide

The purpose of this guide is to prepare the interviewed party for the questions asked during the session. If the interviewed party wishes to change or remove any of the questions asked below, he/she has the right to do so without providing a specific reason. If this turns out to be the case, a notice before the interview takes place is highly appreciated. The interview is planned to last for approximately 1 hour, and will be held in Norwegian.

Background & introduction

I will start the session with a short introduction about me and the background for the choice of topic. The agenda for the interview will be presented to you.

- A recorder is preferred order for me to be able to gather all relevant data while also being a part of the conversation
- If the interviewed part wishes to remain anonymous, that will of course be respected
- A quote check/transcription will be sent to the interviewed party when ready, this to make sure we both agree on the content of the interview

Background information about the interview party

- Please tell us about your background and your current/previous position in the relevant company

Part 1 – how the regulation has affected your bank since its annunciation in 2015

- How and when did you first hear about PSD2?
- What was your first impression when you heard about the regulation?
- When did the top leaders of your bank start to discuss this regulation?

- When did the top leaders of your bank start to make concrete measures in your organization?
 - What kind of concrete strategic measures have you performed already?
 - Organizational change
 - Investments
 - Partnerships
 - Collaboration

Part 2 – Industry Characteristics

- How do you think the industry have been and will be affected by international players?
 - tech companies
 - international banks
 - fintechs
- How do you look at the change in entry barriers in the banking industry?
- Could you describe the change in negotiation power between the different parties involved in the value chain?
- What kind of your existing banking services do you think will meet most competition from new players in the coming years?

Part 3 – Players' response to the regulation


- Do you believe different parts of the organization have different incentives regarding the adaption to this regulation/change in competitive landscape?
 - IT department VS Finance department VS management
 - Long-term vs short-term goals
- Which type of players do you think will thrive in this new environment, and which ones will suffer?
 - How do you think niches will do it compared to full-service banks?
- How do you think your closest competitors will manage compared to you?
 - What kind of competitive advantage do you see yourself having?
- What are you most worried about on behalf of your bank?
- Looking at the market as of now, how do you think it will look 1 year from now?
- What about 3 years?
- Could you have done something different if you could go back two years in time?
- If you had 100k to invest in a Norwegian bank, which one would you go for, and why?

Finishing up

- Is there anything you would like to add that might provide relevant content for this thesis?
- I will send you the transcription of the interview as soon as its ready, so that you can have a look at it and confirm the content


A3 – Master thesis presentation:

The master thesis presentation was sent out to interviewees by email the day before the interviews were held.



CARL CHRISTIAN ELLINGSEN
 Master Student - NHH & CEMS
 +47 415 78 394 / carl.ellingsen@student.nhh.no

I am currently diving into the intersection between banking and technology, working on my master thesis concerning the newly implemented payment service directive (PSD2). During the spring semester of 2018, I will perform dept interviews with key persons in the business of open banking in Norway, aiming to gain deep insight into this fast-changing competitive landscape of banking.



Exploring the business implications of PSD2
A case study of the Nordic banks' adaptation of the newly implemented Payment Service Directive II

The implementation of The Payment Service Directive is a regulatory shock on the industry of payment service, opening doors for companies that never before has been allowed to compete in this area before. The regulation can also be looked upon as a technological shock, taking into matter its impact on the industry by allowing fintech/larger tech companies to compete against traditional banks.

In this study, I aim to further collaborate on this technological shock and how it affects the Norwegian industry for banking services. Looking upon relevant and up to date literature on the topic, there seems to exist substantial information regarding Payment Initiation Service Providers (PISP). However, the focus on aggregators (AISP) has not been as overwhelming as for PISPs. Therefore, my motivation is to further investigate the implication PSD2 has on existing banks in Norway, focusing on the aggregation services and the value they bring into the business of banking.

With counselling from my supervisor, Eirik Sjøholm Knudsen (NHH), a case study will be added to the master thesis. The case study aims to focus on the strategic choices banks are faced upon as a result of PSD2, and will have the purpose of being used as educational material at the new Fintech MBA starting this autumn at NHH.

A4 – Information letter:

The information letter was sent out to interview participants the day before the interviews were held.

Forespørsel om deltakelse i forskningsprosjekt angående PSD2 og implikasjoner direktivet har for norske banker

Bakgrunn og formål:

Jeg er en masterstudent ved Norges Handshøyskole (NHH) som nå er iferd med å avslutte med 2 årige mastergrad i Økonomisk Styring, samt 1årige CEMS internasjonale mastergrad. Denne utredningen skrives i samarbeid med forskningssenteret STOP (Centre of Strategy, Organisation and Performance) ved NHH.

Masteroppgaven har som hensikt å undersøke hvordan eksisterende banker i Norge har blitt påvirket av – og velger å tilpasse seg det nye betalingsdirektivet (PSD2). I besvarelsen vil jeg anvende grunnleggende teori i strategifaget (ressurs – og aktivitetsbasert teori) samt teori rundt teknologiske sjokk og innovasjon. Formålet er dermed å se hvordan en stor teknologisk endring i bransjen, forårsaket av en regulering av EU direktivet, endrer grunnleggende forretningsmodeller som bankene har benyttet seg av i lang tid.

Problemstillingen er som følgende:

How has the new payment service directive, PSD2, affected the Norwegian banking industry, and how are banks responding to this regulation?

Ved å intervju nøkkelpersoner som besitter relevant og dyp kunnskap om PSD2 og Open Banking, ønsker jeg å produsere en masteroppgave som er up to date, gir et oversiktlig bilde på situasjonen og inneholder gode drøftelser. I den sammenheng ønsker jeg å intervju deg til mitt forskningsprosjekt.

Hva innebærer deltakelse i studien?

Deltakelse i studien innebærer at du vil bli intervjuet én gang, og intervjuet vil ha en varighet på omtrent en time. Jeg vil sende deg spørsmålene i forkant slik at du har tid til forberedelse. Med ditt samtykke ønsker jeg gjerne også å bruke lydopptak, da det gjør det lettere for meg å både kunne delta i samtalen men samtidig være sikker på at jeg ikke går glipp av informasjon. Lydopptaket vil senere transskriberes, før materialet blir sendt til deg for endelig godkjenning, slik at du kan sjekke at jeg har tolket svarene dine korrekt.

Hva skjer med informasjonen om deg?

Alle personopplysninger behandles konfidensielt. I transkriberingen vil både navn og stilling oppføres ved en koblingsnøkkel og holdes adskilt fra navnelisten. Kun jeg vil ha informasjon om deg og informasjonen du gir meg i løpet av intervjuet. Både opptak og transskribert materiell vil lagres lokalt på en privat maskin med passordbeskyttelse på maskin og mappe. Alle respondenter har muligheten til å være anonyme i utredningen om det er ønskelig. Prosjektet avsluttes 20.6.2018, og alle opptak og personopplysninger er slettet innen den datoen.

Frivillig deltakelse

Det er selvfølgelig frivillig å delta i studien, og du har rett til å trekke deg fra intervjuet uten samtykke, og det uten å oppgi noen grunn. Om du trekker deg, vil alle opplysninger om deg bli anonymisert. Om du har spørsmål eller ting du gjerne vil snakke om når det gjelder studien, ta gjerne kontakt med meg på mail eller telefon. Veilederen min, Eirik Sjøholm Knudsen (55959414) kan du også kontakte om ønskelig.

Studien er meldt til Personvernombudet for forskning for NSD – Norsk senter for forskningsdata AS.

Samtykke til deltakelse i studien

Jeg har mottatt informasjonen om studien, og er villig til å delta

(Signert av prosjektleder, dato)

Vennlig hilsen

Carl Christian Ellingsen

MSc-student ved Norges Handelshøyskole

carlcellingsen@gmail.com

+4741578394

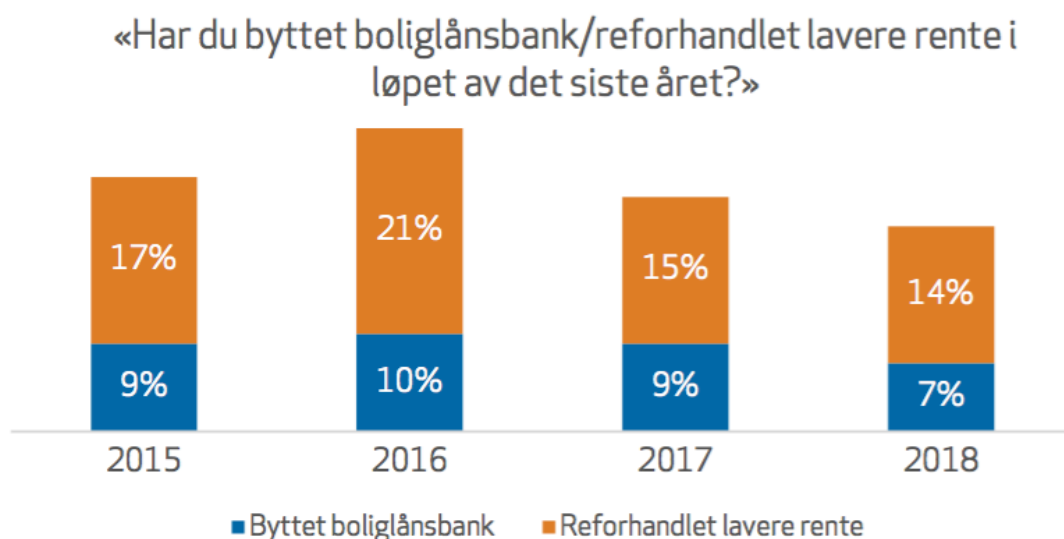
A5 – Example data of collocation:

Example data: Personf- 10000-txt. Looking towards the bigram “open banking”, we see that the word “open” has occurred 15 times, the word “banking” has occurred 26 times, and the bigram “open banking” has occurred 12 times, indicating a high degree of collocation. Numbers to the left are values indicating the strength of the collocation.

8453249,96594	199	sparebanken Møre	1054	251
7145552,89058	43	kunstig intelligens	48	48
6181613,28205	12	Etisk bankguide	13	15
5648070,21535	148	sparebanken Hedmark	1054	244
5470739,19419	27	tidspunkt analysene	39	30
5145879,91713	50	sosiale medier	62	70
5145770,68339	56	LO favør	88	62
4754247,09257	20	motsyklisk kapitalbuffer	27	27
4441776,30120	16	finansminister Siv	17	29
4394571,26786	5	EFTAs overvåkingsorgan	6	7
4376486,01587	6	mangelfullt utredet	7	9
4376074,44034	7	motsykliske kapitalbufferen	11	8
4332305,62778	20	visuell identitet	25	32
3938836,74643	6	EBAs stresstest	10	7
3658521,90416	9	Verdipapirfondenes forening	12	15
3560416,87500	3	godtar Telenors	4	4
3560416,87500	3	Tomt rede	4	4
3282362,84226	6	alternative resultatmål	12	7
3186347,28774	39	høyest markedsføringsforbruk	106	40
3101517,41667	4	betjente kasser	6	6
3090799,54935	12	open banking	15	26
3076198,20000	5	nedre aldersgrense	10	6
3047971,16363	27	indirekte tap	28	75
3009453,12442	22	Banks utlånsundersøkelse	56	25
2871112,96499	11	uvektet kapitalandel	25	14
2848332,81250	3	opptjene EuroBonus-poeng	5	4
2848332,81250	3	delte meninger	4	5
2846355,45155	10	individuell prising	17	17
2791365,28125	4	lagmannsrettens avgjørelse	5	8
2572592,90659	36	Ingen renteendringer	47	95
2563497,56250	5	manuelt betjente	12	6
2563497,28125	5	Statistisk sentralbyrå	9	8
2552946,99305	6	misligholdte engasjementer	9	12
2441423,30357	8	investeringstjenesten June	10	21
2413053,81969	84	tallene inkluderer	229	115
2377123,00463	7	publikums innenlandske	9	18

A6 – Survey:

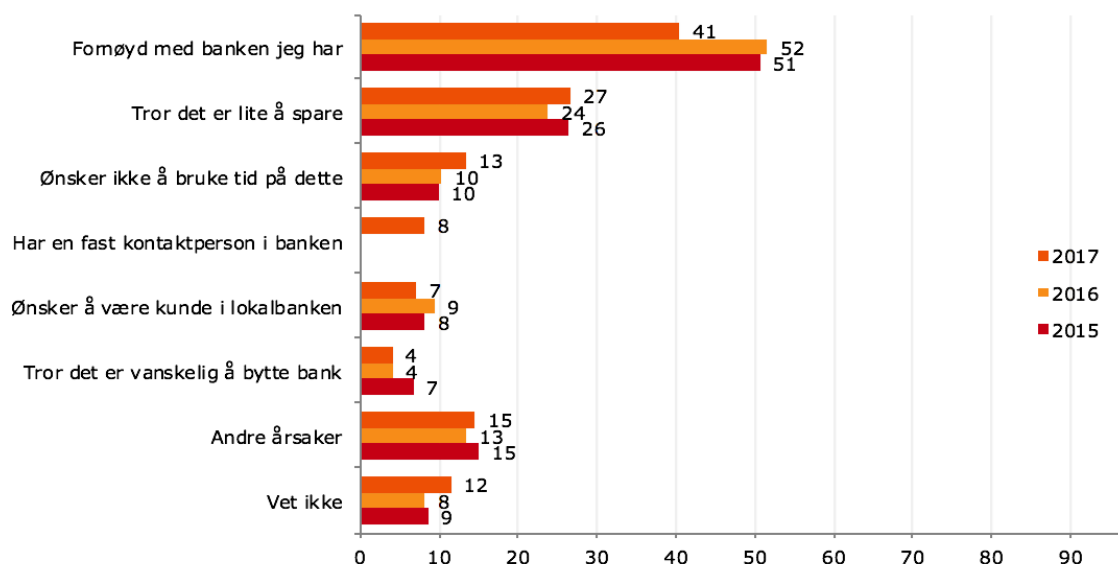
Results from survey asking how often consumers switch or renegotiated their mortgage. Source: Cicero (2018)



A7 – Survey:

Results from survey asking consumers why they did not switch or renegotiated their mortgage. Source: Kantar TNS / Finans Norge (2018)

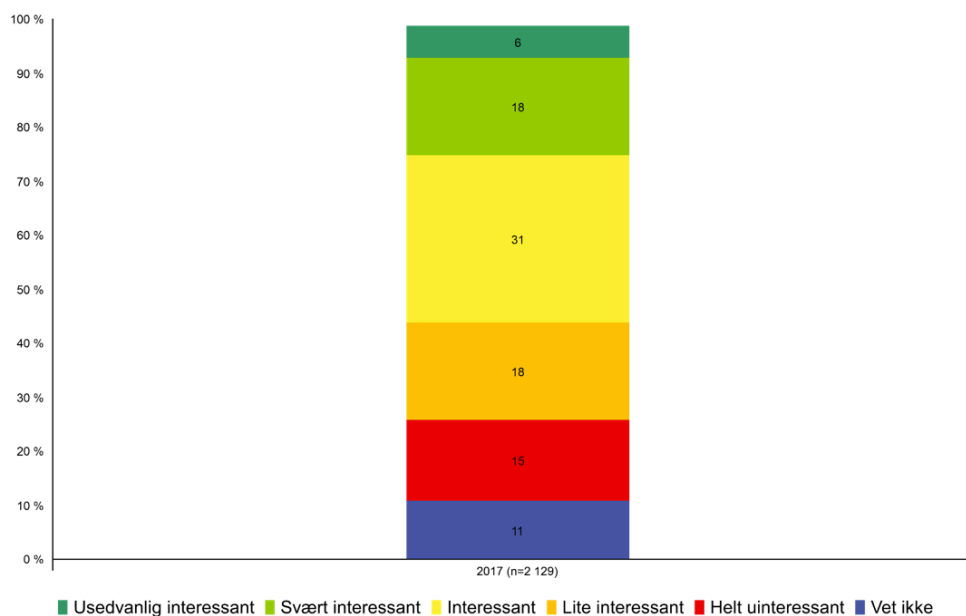
Hva er årsaken til at du ikke byttet boliglånsbank eller reforhandlet boliglånet ditt i løpet av det siste året?



A8 – Survey:

Survey showing how interested consumers would be towards bank aggregation services. Source: Kantar TNS / Finans Norge (2018)

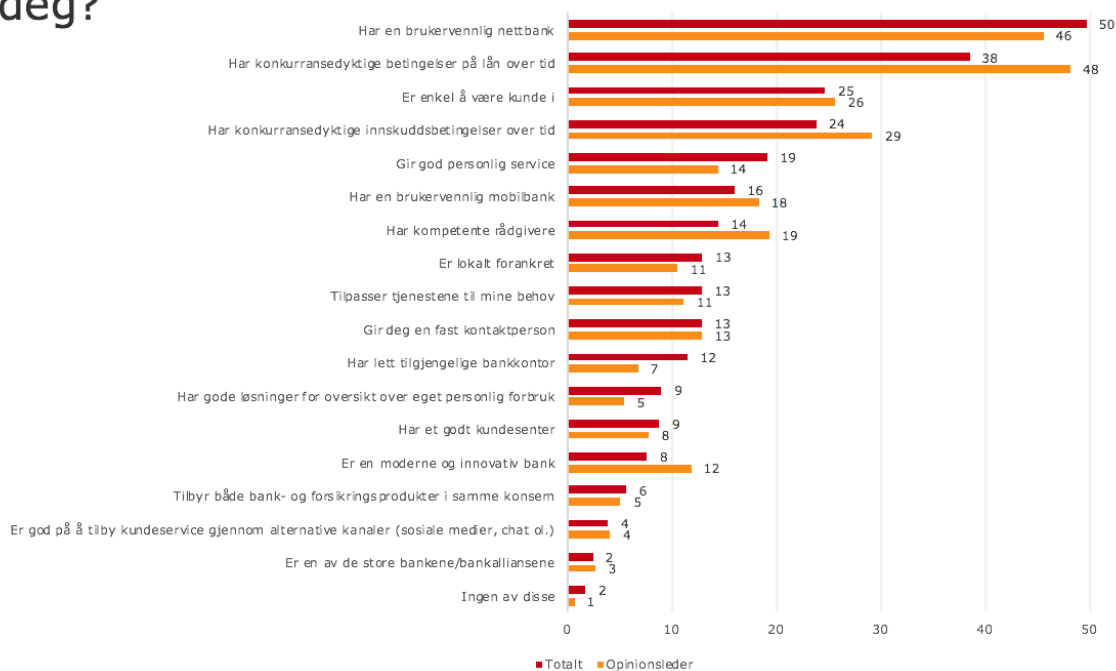
I noen land finnes det aktører som tilbyr én innloggingsportal som gir deg oversikt over alle dine kontoer og hele ditt engasjement på tvers av alle banker du er kunde hos. Tenk deg at en slik aktør tilbyr det samme i Norge. Hvor interessant er en slik løsning?



A9 – Survey

Survey showing which factors are most important for consumers when choosing bank. Source: Kantar TNS / Finans Norge (2018)

Tenk deg at du skal velge en ny bankforbindelse. Hvilke av disse forhold er av størst betydning for deg?



A10 – Statistical summary

Statistical summary of the text analysis of the words “fintech”, “API” and “PSD2” presented in figure 12.

Summary(linearMod) - "fintech"	Summary(linearMod) - "API"	Summary(linearMod) - "PSD2"
Residuals:	Residuals:	Residuals:
Min 1Q Median 3Q Max	Min 1Q Median 3Q Max	Min 1Q Median 3Q Max
-9.5690 -5.0486 -0.5893 3.9920 -12.4717	-12.478 -4.217 -0.717 -4.783 -15.283	-10.563 -4.867 -0.437 -4.599 -12.576
Coefficients: Estimate Std. Error t value Pr(> t)	Coefficients: Estimate Std. Error t value Pr(> t)	Coefficients: Estimate Std. Error t value Pr(> t)
(Intercept) 9.6096 1.6924 5.678 6.52e-06 ***	(Intercept) 11.7170 1.5518 7.750 4.17e-08 ***	(Intercept) 11.5630 1.5513 7.454 8.22e-08 ***
freq 0.9797 0.2572 3.809 0.000808 ***	freq 1.7612 0.5655 3.115 0.00458 **	freq 0.9536 0.3126 3.051 0.00534 **
Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1	Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1	Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Residual std.error: 6.439 on 25 degrees of freedom	Residual std.error: 6.871 on 25 degrees of freedom	Residual std.error: 6.91 on 25 degrees of freedom
Multiple R-squared: 0.3672	Multiple R-squared: 0.2795	Multiple R-squared: 0.2713
Adjusted R-squared: 0.3419	Adjusted R-squared: 0.2507	Adjusted R-squared: 0.2421
F-statistic: 14.51 on 1 and 25 DF	F-statistic: 9.701 on 1 and 25 DF	F-statistic: 9.308 on 1 and 25 DF
p-value: 0.0008078	p-value: 0.004578	p-value: 0.005342