



DEPARTMENT OF  
APPLIED IT

# FROM PIPELINE TO PLATFORM

A study of eHealth platformization

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Thesis:	30 hp
Program:	Digital Leadership (M. Sc.)
Level:	Second Cycle
Year:	2020
Supervisor:	Fredrik Svahn
Examiner:	Professor Jan Canbäck Ljungberg
Report nr:	2020:048

# Abstract

Digital platforms dominate the global, contemporary economy. Therefore, incumbent firms must transform their existing business, often structured as a pipeline, into a platform business. This study investigates the process of platformization and how established firms can leverage their core assets in order to launch a digital platform and grow their installed base. The coring and tipping theory by Gawer and Cusumano (2008) is used as a conceptual framework and is carefully applied during the analysis of results. I conducted a case study at a start-up which operates in the eHealth sector. I analyzed empirical data in form of transaction data, documents, presentations, and interviews in order to make observations on the platformization process. My study resulted in five guidelines on the platformization process: *Guarantee a smooth transition for existing customers*, *Develop a hybrid business model*, *Reuse the technology*, *Capture spillover of trust*, and *Shift to resource orchestration*. The finding can guide other firms which find themselves in the platformization process. I further contribute to the theory by expanding the theory of coring and tipping.

# Keywords

Digital Platforms, Platformization, Coring and Tipping, Core and Complementarities, eHealth, Platform Strategy

# Foreword

*I would like to thank Theodor, Peder, and Anton from Boneprox for the amazing opportunity to conduct the case study at their company. Not only were the insights I gained fundamentally important for my learnings, but the great atmosphere at the company made it a joyful experience.*

*Further, I would like to thank my supervisor Fredrik Svahn, who always contributed constructive feedback and guided me through this journey. His expertise as a digital platform expert really helped a lot.*

# Table of contents

1	Introduction .....	1
2	Previous Research .....	3
2.1	Digital Platforms .....	3
2.2	Pipelines vs. Platforms .....	4
2.3	Platformization .....	6
2.3.1	Shifts in Strategy .....	6
2.3.2	Platformization Strategies .....	7
2.3.3	Products to Platforms .....	7
2.3.4	Core and Complementarities .....	8
3	Conceptual Framework .....	9
4	Method .....	11
4.1	Research Setting .....	11
4.2	Data collection .....	12
4.2.1	Referral data .....	12
4.2.2	Documents .....	13
4.2.3	Interviews .....	13
4.3	Data analysis .....	14
5	Platformization at Boneprox .....	15
6	Discussion .....	24
7	Conclusion .....	28
8	References .....	29
9	Appendices .....	31

# 1 Introduction

Digital Platforms are the rising businesses of the last two decades and, with all we know, this trend will not end soon (Eisenmann, Parker & Van Alstyne, 2006; Parker, Van Alstyne & Choudary, 2016; Van Alstyne, Parker & Choudary, 2016). Airbnb tackling the hotel industry, Amazon revolutionizing retail, and Uber disrupting the taxi industry are only three out of many examples. They are examples of how digital platforms dominate the global, contemporary economy. They do this without generating value units themselves, but they match the needs of different user groups. In other words, the value unit creation is not the core activity of a platform owner, but it facilitates the connection of users that generate the value themselves. To be competitive in this emerging, digital economy, incumbent firms must transform their existing business, often structured as value chains, into a platform business.

The process of transforming an existing business into a platform is often referred to as “platformization” (Isind et al., 2016). Platformization comes with many challenges and firms must make difficult decisions along the process. Analyzing platformization is challenging because it is context-dependent (Zhu & Furr, 2016). Previous research analyses the environment and settings in different markets and points out different approaches and strategies to fulfil a successful platformization (Parker et al., 2016; Van Alstyne et al., 2016; Zhu & Furr, 2016). Many papers show how successful platforms made their way, but only little is known about the process to shift from a traditional business to a digital platform. Overall, research is missing an in-depth analysis of the platformization process and investigation of the strategy decisions that firms makes. In particular, we know little about how incumbent firms convert an existing customer into platform users.

Researchers sometimes approach the challenge of platformization by analyzing the relation between “core” and “complementarities” (Teece, 2018). The core is the center of the firm and can be a technology, product, or service. The users of the core are usually the customer base. Complementarities surround the core and offer additional services to users of the core. In order to fulfill a successful platformization, the core and complementarities must be managed together very carefully to reduce tensions. On the one hand, introducing new complementarities may jeopardize existing revenue streams that are needed to keep the business running. On the other hand, the complementarities can be used to attract new users to the platform. In the process of platformization, a firm needs to fulfil a shift of focus from the core to complementarities (Van Alstyne et al., 2016; Zhu & Furr, 2016). While existing

research elaborates on the relation between core and complementarities, it is still unclear how firms strategically implement such shifts in practice.

Addressing this gap, the objective of this thesis is to bring more light into the practical platformization by providing an in-depth analysis of an eHealth start-up. I do so by adapting the “coring” and “tipping” theory by Gawer and Cusumano (2008) and the underlying approaches and assumptions because it provides a framework to analyze how the firm can leverage their different assets. Coring, which does not originate from the term core used by Teece (2018), addresses the challenges of creating a new platform where none exists yet. Tipping tackles the problem of how to win platform wars against other firms by building the largest installed base. This theoretical model guided the data collection process, but in particular it was carefully applied when analyzing data. By doing so, I answer the following research question:

*How do established firms leverage core assets to launch a platform and grow the installed base?*

In order to answer the research question, I turn to a company in the eHealth industry that operates in the dental sector. I analyzed the transaction data from mid-2018 to beginning of 2020, conducted several qualitative interviews with the three co-founders of the company, analyzed documents, and examined presentations. By doing so, I provide an in-depth analysis of the platformization process of a single firm. I use these insights to contribute to practice five guidelines for a successful platformization. I further contribute to theory that coring and tipping strategies can be used in combination to leverage core assets and grow the installed base.

## 2 Previous Research

The existing literature on platforms and platformization is varied and extensive. To understand this subject, it is important to explore the environment in which it exists.

### 2.1 Digital Platforms

Platforms have been looked at from different perspectives over time in previous research, and many of the characteristics overlap. Three distinct definitions emerged over time (Baldwin & Woodard, 2009). First, product development researchers use the term to describe a product or family of products that is generated for a particular firm. Platform products aim to meet the needs of a core user group but are designed for easy modification (Wheelwright & Clark, 1992 as cited in Baldwin & Woodard, 2009). Second, platforms are referred to as technological ecosystems. The platform is the valuable point of control and only few dominant platforms exist (Bresnahan & Greenstein, 1999 as cited in Baldwin & Woodard, 2009). Rochet and Tirole (2003) then use the term platform to characterize products, services, firms, or institutions that facilitate transactions between two or more user groups (as cited in Baldwin & Woodard 2009). Fellow researchers then adopt this definition (Eisenmann, 2008; Hagiu, 2008; Parker & Van Alstyne, 2005). The notion of two-sided (or multi-sided) markets concentrates on the macro-economic aspect and sees platforms as one part of an ecosystem with different forces (Rysman, 2009). Conclusively, platforms mostly operate in two-sided markets (Rochet & Tirole 2003). In this paper, I will use the term platform initially provided by Rochet and Tirole (2003), which is then further developed by other researchers. Parker, Eisenmann, van Alstyne, and few of their co-authors provide the core literature in the field of digital platforms.

There are many prominent examples of successful platforms in the digital world, like Spotify, Airbnb, and eBay. In each of these examples, the platform itself does not create value units or items: Spotify does not produce music, Airbnb does not own any apartments, and eBay does not own any items. They all create value by matching user groups with each other: Spotify connects artists with listeners, Airbnb connects hosts with tourists, and eBay connects seller and buyer. While all of these examples emerged in the previous years and rely heavily on digital infrastructures, there are other examples from former times, for example the credit card, travel agencies, and newspapers. Credit Card companies like Visa or MasterCard simply connect merchants with consumers, travel agencies connect tourists and trips, and newspapers connect subscribers and advertisers (Eisenmann et al., 2006; Van Alstyne & Parker, 2017).

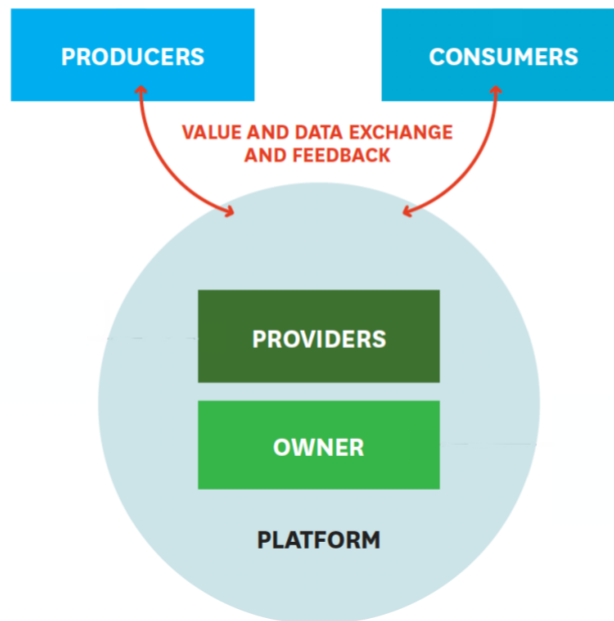


Figure 1: The players in a platform ecosystem (Adapted from van Alstyne et al., 2016)

What all platforms have in common is the underlying architecture of the ecosystem (Figure 1). The platform itself consists of two players: The platform owner and platform provider. The platform owner is responsible for the rules and management of the platform, while the platform provider controls the interfaces to access the platform. Together they provide the infrastructure for producers and consumers to exchange value, data and feedback with each other (van Alstyne et al., 2016). This approach to look at a digital platform provides a comprehensive understanding how the different players of a platform ecosystem fit together.

## 2.2 Pipelines vs. Platforms

Contrasting to platforms, value-chain-oriented businesses are referred to in the literature as “pipelines” (van Alstyne et al., 2016). It is called a pipeline because the value stream is linear and flows from left to right. On the left side of the business are the costs to run a business and on the right side is the revenue. Very simplified, the firm buys certain goods that are then processed and later sold for a margin (Porter, 1985). In other words, the pipeline business generates value by controlling a linear series of steps (van Alstyne et al., 2016). Existing literature on strategies to optimize a pipeline business concentrates on how to make the value chain more efficient. This includes the internal value chain itself, as well as buying-strategies and strategies to sell the product with the most revenue (Porter, 1985). Platforms on the other hand do not have a value chain, since the value creation lies in connecting two sides of a



market with each other and not shipping a product to a consumer. This calls for a fundamentally different approach to manage a platform business.

With the changing business models, also the challenges that businesses are facing change rapidly. Since pipeline businesses follow a linear supply chain, the strategies often included to make each step in the value chain more efficient in order to generate a more efficient overall process (Porter, 1985). Platforms do not follow the linear process of pipeline businesses, instead their whole purpose is to make an interaction possible and as valuable as possible to all participants (Parker et al., 2016). Parker et al. (2016) describe that platforms must perform three key functions to ensure that valuable interactions take place: (1) pull, (2) facilitate and (3) match. (1) The platform must pull producers and consumers towards the platform. While pipeline businesses focus on pushing their product to the market using a wide variety of marketing and pricing strategies, platform businesses face different challenges. One of the driving factors for platforms are “network effects”. Network effects describe the phenomenon that the value of the platform increases with an increasing number of users (Halaburda & Oberholzer-Gee, 2014; Hanseth & Aanestad, 2003; Katz & Shapiro, 1994). Logically, the value for the first users is comparatively small. A second pull challenge is to keep users interested and motivate them to come back after their first visit on the platform. (2) The platform must facilitate the interaction between producers and consumers by providing them with a tool to connect easily with each other. Furthermore, the rules and tools should encourage the value exchange between the different players. Compared to pipeline businesses, platforms are not directly involved in the value creation process. Instead, they create a set of rules defining in which ways value can be generated and exchanged and define principles that govern these processes. (3) The platform must match the producers and consumers efficiently. The platform does so by analyzing all existing data to find the optimal match between the consumer and producer needs. It’s the biggest challenge of a platform to balance these three key functions.

Even though pipeline businesses have dominated the industry for the most part of the 20<sup>th</sup> century, more and more platforms are evolving in all different kinds of industries. They do that with a lot of success. As Van Alstyne et al. (2016) claim:

*When a platform enters the market of a pure pipeline business, the platform virtually always wins.*

The success of platforms leads to new phenomenon, the platformization of pipeline industries and firms in order to compete with emerging platforms.

## 2.3 Platformization

Platform businesses are disrupting nearly every industry, but that does not mean incumbent pipeline companies will capitulate and leave the market to the platforms. When the first instinct to fight the new platforms vanishes, many companies try to become a platform themselves to still be competitive in the market (Parker et al., 2016). This process is called platformization. As well as the term of a platform itself, also the term platformization can be viewed from a more technological or economical point. Viewed from a technological perspective, it is referred to as the process where software product solutions are transformed into a platform-oriented digital infrastructure (Bygstad & Hanseth, 2018). It is further defined by the characteristic of making a product accessible from external resources, for example through an API (Helmond, 2015). In this paper, I will follow the definition of Isind et al. (2016) that refers to the term platformization as the process of establishing a platform because it also includes the economical perspective. In this thesis, I consider platformization as the process of establishing and growing a platform from an existing product or pipeline business.

### 2.3.1 Shifts in Strategy

Van Alstyne et al. (2016) observe three key shifts when moving from pipeline to platform. (1) From resource control to resource orchestration. When running a pipeline business, it is essential to control the own resources in order to make the value chain as efficient as possible. This includes controlling as much of the value chain as possible. For platforms on the other hand, the true value lies in the efficient orchestration of external resources, meaning that managing the relations between producers and consumers is the most important asset for a platform business. The producers and consumers themselves are assets, which generate value for the platform owner. (2) From internal optimization to external interaction. Since the value chain is closed in itself and has strict borders, management often concentrates on optimizing the value creating process. Platforms concentrate on managing their relationships to producers and consumers to make the interaction as efficient as possible so that value can be generated. (3) From a focus on customer value to a focus on ecosystem value. Pipeline businesses intend to maximize the value for the customer who sits at the end of every value chain in order to generate more revenue. Platforms seek to maximize the value of their whole ecosystem, since a higher ecosystem value usually also means a higher value for every player in the ecosystem. Overall, the competition and markets of a platform are more complicated and dynamic (Van Alstyne et al., 2016).

### **2.3.2 Platformization Strategies**

Parker et al. (2016) introduce two platformization strategies, the “follow-the-rabbit strategy” and the “single-side-strategy”, which both use the already existing installed base. The installed base describes the users, which use a specific product or service (Star & Bowker 2006). An example for the follow-the-rabbit strategy is the online retailer Amazon. Amazon operated as a profitable pipeline business, which used online product listings to attract consumers. With the installed base from that pipeline business, Amazon transformed itself to a platform by opening up the other side to external producers. The result is Amazon Marketplace, which connects millions of consumers and retailers every day (Parker et al., 2016; Zhu & Furr, 2016). An example of the single-side strategy is the restaurant reservation management app OpenTable. It first started as a booking management software that restaurants could use to manage their restaurant internally. Once they had reached a critical mass of restaurants, they opened up the other side of the platform to allow consumers to make online reservations themselves (Parker et al., 2016). The two strategies provided by Parker et al. (2016) are rather broad and give little insight on which steps a pipeline business must do in order to become a successful platform.

### **2.3.3 Products to Platforms**

Zhu and Furr (2016) analyze more than 20 firms which wanted to become platform providers and identified four steps that can make the difference. (1) Start with a defensible product and a critical mass of users. Incumbent firms have a great advantage over platform start-ups: They do not have to solve the “chicken-or-egg-problem”, which is a metaphor describing situations where it is not clear, which of two events should be considered the cause and which should be considered the effect; or to express the difficulty of sequencing actions where each seems to depend on others being done first (Plutarch, 1909). While start-ups often fail to generate a critical mass of users after the launch of their platform, incumbent firms already have an installed base of users. Zhu and Furr (2016) mention not to use platformization to revive an already struggling product with a small installed base. (2) Apply a hybrid business model focused on creating and sharing value. Previous research assumes that platform owners must commit to either a platform-based or a product-based business model. This may be true for start-ups and other companies which start from scratch, but for companies that transform from pipeline to platform it may be valuable to use a hybrid business model during the transition. While consumers start to derive benefits from use of complementary services, the firm’s own product often remains the primary attraction. That should be reflected in the business model. (3) Drive Rapid Conversion to the new platform. It is important to convert users of the product or service to users of the platform. The platform leaders can do so by providing adequate value, stay consistent with the brand and involve users in

improvements. (4) Identify and act on opportunities to deter competitive imitation. To be able to do that, platform owners should consider which of the services they want to offer themselves and which should be offered by third parties. Another way to gain a competitive advantage is to get exclusive contracts with partners which slow down the growth of possible competitors. Zhu & Furr (2016) give very interesting insights to the development of the business model and which ideas should be considered but little still little is known about the actual process of platformization.

### **2.3.4 Core and Complementarities**

Long before digital platforms, Teece (1986) introduced his theory about “core” and “complementarities” to capture value from an innovation. In the framework, Teece (1986) refers to the core as an innovation that consists of technological knowledge about how to do things better than the competition. He claims that in order to profit from this innovation, a firm almost always needs other capabilities or assets: Complementarities. Complementarities can be supporting activities such as marketing or after-sales support but can also be sold together with the core as a complementary services or product, such as an operating system with a computer (Teece, 2018). In the case of digital platforms, complementarities are often used as main source of profits while the core is free or subsidized. For example, in the video game industry, consoles are often sold under production cost and the profit is generated by selling video games (Eisenmann et al, 2006). In the platformization-process, the organization often sees itself with a service or product, which is responsible for generating the revenue. Furthermore, an organization may or not have complementarities offered to their consumers. When transforming the business model from a linear pipeline strategy to a platform business model, organizations should aim to shift the revenue generation from the core product or service towards the complementarities in order to maximize exponential effects. The core and complementarities theory by Teece (1986, 2018) provides a good understanding of how value can be captured from innovation, but little is written about how to transform a business from core-oriented to platform-oriented.

The previous sections described many, but not all dimensions and decisions an organization has to make, when they want to enter a new market or build a new platform. Naturally, it is not possible for researchers to give organizations a recipe or detailed plan on how to be successful. They instead aim to give organizations the right tools and thinking approaches to make the best possible decisions themselves. Most decisions are strongly dependent from the industry, existing markets and organizations, as well as regulations. One of these theoretical dimensions is decisions between a coring strategy or a tipping strategy (Gawer & Cusumano 2008).

### 3 Conceptual Framework

In this thesis I set out to study the process of platformization. In particular, I seek a deeper understanding of how core assets can be leveraged in order to launch a platform and grow the installed base. As I have demonstrated, that involves different dimensions and an intricate balancing of many factors. To do such an analysis, I will use a theoretical framework on coring and tipping, originally developed by Gawer and Cusumano (2008). Gawer and Cusumano (2008) point out that strategies for products and platforms must be different in its nature. They show that the reason for that is mainly the fact that digital platforms require complementary innovations to be useful. In their work, they develop two basic approaches: Coring and tipping. I will use this theory by Gawer and Cusumano (2008) as a conceptual framework to have a lens of analysis for the results.

Coring addresses the challenges of creating a new platform where one has not existed before. In this case, the word coring does not come from the word core as used by Teece (2018), but from trying to establish the own product or service as core of a market or ecosystem, therefore the term is used independently. Coring describes a set of activities which aim to make the own platform, service, or product essential for a market or technological system. The goal is to position the own organization as the core of an ecosystem. This can be achieved by resolving a problem affecting a large proportion of other parts in the system. While that approach is rather technological, the business side is as important. On the business side, not only needs a platform to be accepted by the other players in the system, they also have to allow and incentivize the development of complementarities for the core in order to be successful. Complementarities can be developed by the organization itself or by third parties. This thesis focuses on the development of complementarities by the organization itself. By being the core of a system, the organization builds an installed base and therefore makes it difficult for other companies to imitate their product, service, or platform. This installed base can later be used to make profit from complementarities. One example for the coring strategy is Google. The company started as a simple search engine and established itself as the core of the internet itself. They later built many different complementarities around the search engine; some developed by Google itself, some by others.

Tipping focuses on systems, where different solutions to a problem already exist. The strategy aims to “tip” the market towards the own product. While traditional pipeline industries often allow many different organizations to share the market, this is not true for platforms. Most of the time, one strong platform emerges from the platform war (Eisenmann et al., 2006). In order to be the winning platform, it has to control the largest installed base. While it is always an advantage to be early in the

market, there are other elements which can help to grow the own installed base and lead the market. The installed base can also be won by offering the best complementarities.

Table 1: Coring vs. Tipping strategies (Adapted from Gawer & Cusumano, 2008)

Strategy	Technology Actions	Business Actions
Coring	<ul style="list-style-type: none"> <li>• (C1) Solve an essential “system” problem</li> <li>• (C2) Keep intellectual property closed</li> <li>• (C3) Maintain strong interdependencies between core and complements</li> </ul>	<ul style="list-style-type: none"> <li>• (C4) Solve an essential business problem for many industry players</li> <li>• (C5) Protect your main source of revenue and profit</li> </ul>
Tipping	<ul style="list-style-type: none"> <li>• (T1) Develop unique, compelling features that are hard to imitate and that attract users</li> <li>• (T2) Tip across markets: Offer features from an adjacent market</li> </ul>	<ul style="list-style-type: none"> <li>• (T3) Provide more incentives for consumers and producers than your competitors do</li> </ul>

Gawer and Cusumano (2008) have identified different action points that firms could use for either coring or tipping (Table 1). In their work, Gawer and Cusumano (2008) limit the creation of incentives to third parties which create complementarities. I will add to that by also looking at complementarities developed by the firm itself and which effects that has on using the strategies.

## 4 Method

With the goal to explore how established firms can leverage their core assets to launch a digital platform and grow the installed base, I carried out this study using a qualitative case study approach in order to explore the causes and underlying principles of the platformization process. I conducted the case study at a start-up called Boneprox that currently operates in the eHealth sector in Norway and Sweden. A qualitative case study was reasonable for the research question because of its empirical nature and the allowance for in-depth explanations of a specific phenomenon in its natural context (Zainal, 2007). It further fits the rationale of investigating a real-world phenomenon in order to achieve more than a superficial understanding (Yin, 2009). The case study was confined to investigate the platformization through coring and tipping in the eHealth industry.

### 4.1 Research Setting

Boneprox was founded in 2013 as a software company within the dental industry. Their offline product (Jaw-X) allowed dentists to get an automated analysis of an x-ray scan of the lower jawbone to get an immediate response on the chances of the patient getting osteoporosis at a later age. Osteoporosis is a bone-illness, which results in increased bone fragility. 25% - 50% of all people are diagnosed with osteoporosis as they grow older, therefore this innovation provides the opportunity for treatment since the disease is not curable but preventable through changes in nutrition, exercise, or drugs.

In 2013, the co-founders decided to offer their patented solution online on their own portal. Dental clinics could now easily upload x-ray scans and get an immediate result online from an Artificial Intelligence (AI). With the product having great success and winning many awards and public procurements, they took the next step in 2018 and started to offer additional services to their customers and transform their product into a platform. While the Osteoporosis-AI is called Boneprox-AI (BPX-AI), the new specialist consultation platform is called ReferralExpress. With ReferralExpress, dentists could now upload different types of images (e.g. Cone beam computed tomography (CBCT) scans and other medical images) together with information about the patient and the referral in order to receive consultation from a specialist (e.g. radiologist). The specialist could then access the referrals on the platform and write the diagnosis directly online. That allowed dentist and specialists equally to digitalize their workflows since until then this process was done via standard mail and took days or even weeks instead of only few hours now. The dental clinics could access both services, BPX-AI and ReferralExpress, through the same

platform. Boneprox further offers other services like courses and technical service, which are not looked at in this paper.

Two things are exceptional in the dental sector and the dentist-specialist relationship, which are relevant for this case study. Firstly, Swedish law requires every x-ray image to be send to a radiologist. Secondly, clinics and specialists usually have contracts with each other, which means that one dental clinic usually consults the same radiologist. This information is relevant for the results.

## 4.2 Data collection

To conduct the case study, the transaction data was analyzed, interviews were conducted, documents were reviewed, and secondary data was examined.

*Table 2: Data collection*

<b>Data type</b>	<b>Description</b>	<b>Amount</b>	<b>Time</b>
Referral data	Extracted transactions from billing reports	2.197 referrals	July 2018 – February 2020
Documents	Internal documents from Boneprox	20	March 2019 – March 2020
Interviews	Semi-structured and unstructured interviews	9 (+5 secondary)	February 2020 – March 2020

### 4.2.1 Referral data

To understand the underlying structure of the platformization, every transaction was gathered from semi-structured data and billing reports with every referral being equal to one transaction. A referral describes the act of referring someone for consultation. Each dataset consisted of information about the dentist, the specialist, the dental clinic, the patient, and the referral itself in form of image type, status, and date (see Appendix I). The data for the BPX-AI starts in July 2018, when the online portal was launched. Data on ReferralExpress start in November 2018, when the platform was released. Data was collected until the end of February 2020.



The data was extracted from billing reports to the dental clinics, separated between the BPX-AI and ReferralExpress. Overall, 2.197 transactions were analyzed, divided in 944 BPX-AI referrals and 1253 ReferralExpress referrals. The data was merged into one data model using the graph database neo4j (see Appendix I). The data model was built to make information on the relationships between the different user groups as easily accessible as possible. That allowed the generation of reports using the neo4j browser and the APOC-library (Awesome Procedures On Cypher), which could be extracted later and will be described in Section 4.3.

## **4.2.2 Documents**

In order to get a better context on the referral data, several types of documents were analyzed. This includes protocols and presentations from board meetings, pitches to possible investors, and other documents. Furthermore, the documents were used to gather additional data about the financials and business decisions made by the start-up from 2018 to 2020. Some of this newly generated data was later merged with the referrals data in the results, which will be further described in Section 4.3.

## **4.2.3 Interviews**

To get a better understanding of the industry, the history of Boneprox, their processes, the decisions made, and the platform, there were several contact points with the three co-founders. The three co-founders do now have the positions of Chief Execution Officer (CEO), Chief Technology Officer (CTO), and Chief Sales Officer (CSO). There was continuous contact through semi-structured interviews, mail and messenger exchange as well as unstructured conversations. Overall, 8 unstructured meetings were held at the Boneprox Office in Gothenburg with the CEO, CTO, and CSO. The goal of these deep-dive sessions was to gain in-depth knowledge about the IT-architecture, to better understand the existing data, and to discuss business decisions. Whiteboard drawings, notes, and sketches from these meetings were later used to iteratively develop reports. Furthermore, I conducted a two-hour semi-structured interview with the CEO and CSO, which was transcribed. Additionally, five interviews with dentists and specialists, conducted by another thesis group, were analyzed in order to gain a better understanding of how each user group interacts with the platform and what their needs are. These interviews were conducted in Swedish and were then transcribed. Occurring language barriers were resolved by Google Translate and native speakers. The different contacts generated in-depth knowledge about the activities and strategies followed by the start-up and helped very much to make sense of the provided data and documents.

## 4.3 Data analysis

The analysis was guided by Gawer and Cusumano's (2008) theory on coring and tipping strategies for digital platforms (see Section 3).

The first step was to design a data model that puts the relationships between dentists, the platform, and specialists in focus (see Appendix I). After that, I wrote two different import scripts in order to load the referral data into the model. One script loaded the BPX-AI data, the other one the ReferralExpress data. I automated this process in order to efficiently load the newest data at all times. In the next step, I coded 14 data views, each projecting a different dimension (e.g. monthly referrals of a specific specialist).

The data gained from the transaction data (see Section 4.2.1) was exported from the neo4j browser and visualized into different tables and diagrams. Since the transformation and strategy decisions all include a crucial time aspect, the data was cumulated by weeks and/or month to see the process over time. This data was extended by the unstructured data received from documents (see Section 4.2.2). Here the financial data (e.g. revenue) were of largest interest and were used to expand the previously created tables and diagrams (see Section 5). Furthermore, some irregularities in the data could be explained through the nature of the business and industry (e.g. seasonal breaks, fairs, investor decisions, etc.).

Overall, I developed six reports that I present in Section 5, each showing a different perspective on the development of Boneprox. These reports were developed iteratively and built the foundation for the interviews and guided the deeper analysis of strategic decisions made by the co-founders of Boneprox. It was important to have the raw data as a foundation for the qualitative analysis because it allowed a detailed and unbiased discussion about the firm's development. The information gathered from the interviews was used to iteratively develop the reports and guidelines. The notes and sketches from the unstructured interviews were used as feedback and were continuously integrated in the existing report sheet.

When developing the guidelines for a successful platformization, the transaction data could also be used to confirm the impact of the decisions made by the co-founders. Overall, I always looked at the referral data, unstructured data and interviews together as one view on the firm. This allowed me to develop guidelines, which provide an all-around perspective of platformization.

## 5 Platformization at Boneprox

The story of Boneprox started in 2013, when two of the co-founders went to Jönköping International Business School together. As part of a school project, a co-founder's grandfather offered them to collaborate with him on the marketing of his patented software "Jaw-X". The software was able to calculate the risk of a patient getting osteoporosis at a later age and was distributed to dental clinics via usb-stick from which the software could be installed. The two students were that amazed by the product, that they decided to get a license for the software in exchange for a royalty payment and started a business. Together with the third co-founder, they decided to implement the solution as a cloud-based service: The Boneprox-AI (BPX-AI) was born.

*"They [the clinics] all saw the added value for the patients, so they started using it and then it started escalating from there."*

(CEO)

As they developed the portal, they constantly gathered feedback from the clinics which already used the Jaw-X software. The feedback was extraordinarily positive and so they continued to work on the algorithm and the online platform. Boneprox managed to gain momentum and acquired more dental clinics over the following few years to use their software. During these years, Boneprox followed the *Coring* strategy (Gawer & Cusumano, 2008). With an algorithm and technology which was completely new to the market, they managed to *solve the essential system problem (C1, see table 1)* of transferring and saving highly sensitive patient data in a secure and safe way. Before, clinics had to print out the scans and send them to a specialist via mail, who then also answered via mail. At the same time, they *solved an essential business problem (C4)* for the clinics in form of the osteoporosis analysis that the clinics could use to create a better customer experience and protect the health of their patients. Together with the patented algorithm, Boneprox *kept its intellectual property close (C2)* and therefore *protected their main source of revenue and profit (C5)*.

In 2016, the Swedish government issued a public procurement to find a solution for age assessment based on x-ray scans of jawbones. With already having a portal in place which can handle these types of images in a very secure and fast way, Boneprox applied for the procurement and won.

*"In the beginning they told us 'you're testing 500 people', at the end we were testing 14.000 in a year. There was a lot of work put into this."*

(CSO)

*“That was kind of a quality stamp on what we are doing. We were not only these three young entrepreneurs with this cool technology, instead we had services that somehow showed the market that we are credible. That’s probably the ultimate stamp when the government is hiring your services.”*

(CEO)

With the momentum gained from the winning of the public procurement, Boneprox managed to attract more clinics. At this point, Boneprox was still following the *Coring* strategy to become the leading platform in the risk calculation of osteoporosis. The public procurement not only gave them a great selling point when talking to new potential customers, Boneprox now also a was more interesting to investors. As a reward for their hard work during that time, Boneprox won the DNB (Den norske Bank) Healthcare Price 2017 and received the Seal of Excellence by the European Commission.

Around the same time, Boneprox often got the same feedback from dentist when they were asked about the portal: Clinics wanted to upload other types of images and referrals and get the results as fast and accurate as they were used to from the BPX-AI. Having that knowledge, together with the momentum they got from the public procurement, they started a collaboration with a radiologist to investigate possible solutions.

*“With that radiologist, we got the information that you have to, by law, send certain types of 3D images, scans of the head, to a radiologist. So, we saw if we get into that market, there is a recurrent revenue, automatic, because of the law.”*

(CSO)

Using their core technology to transfer and store medical images efficiently, they started to build a new platform in 2018 by adding complementary services to their portal. With the General Data Protection Regulation (GDPR) and other local regulations being implemented during that time, Boneprox was able to *solve an essential problem to many players in the industry (C4)*. It was required by law to send certain x-ray images to a radiologist, which was usually done via post mail. This results in a demand for radiologists in the dental sector. Eventually the new platform launched in July 2018, at which point it was still only offering the osteoporosis analysis. Then in November 2018, they launched their new product ReferralExpress. The dentist could now upload multiple categories of referrals:

Radiology, Cone beam computed tomography (CBCT), which is a 3D scan of the whole head, and Muscular Change (MC), which are usually photos of the mouth. The dentist added descriptions and rudimental patient data to generate a referral. This referral was then analyzed by a specialist and the feedback was received within 24 hours, conveniently in the same platform as all other referrals and osteoporosis analyses. The revenue for every referral was split between the specialist and Boneprox. The main driver for the revenue is the analysis of CBCT scans. Dental clinics later said that the new functionality did not feel like another product as more as an additional functionality. By integrating the new ReferralExpress into the existing platform, Boneprox *maintained strong interdependencies between core and complementarities (C3)*.

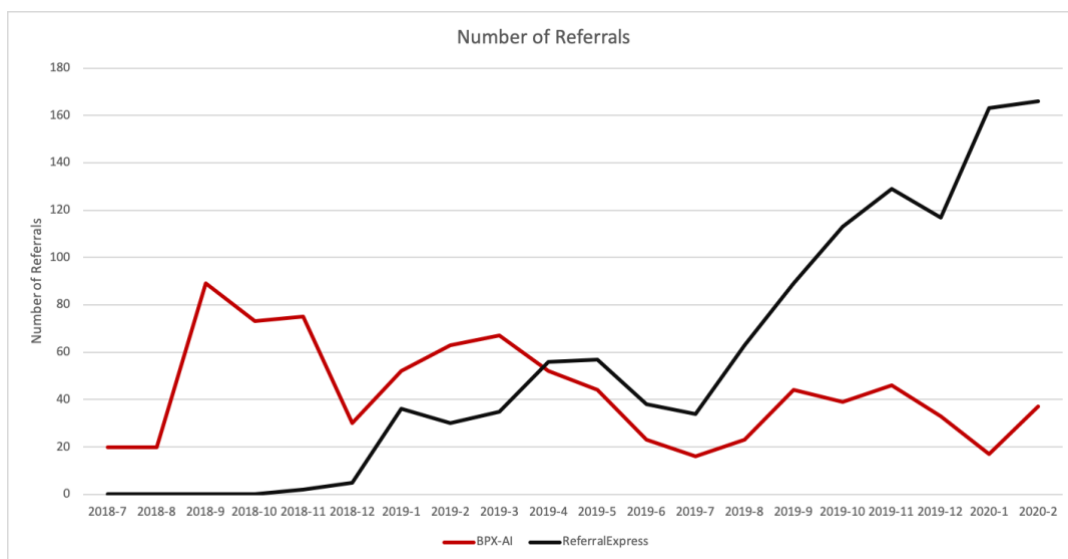


Figure 2: Number of Referrals: BPX-AI vs. ReferralExpress

With the launch of the new platform at the end of 2018, the focus rapidly started to shift from BPX-AI towards the new ReferralExpress (see Figure 3). ReferralExpress can be seen as a complementary service to the core product BPX-AI. While the number of referrals uploaded to BPX-AI slowly decreased, the number of referrals uploaded to ReferralExpress significantly increased. One of the major decisions made was the change of the pricing model. While clinics previously used a pay-as-use license, the start-up now offered a subscription-based model. With paying a monthly fee, the clinics now got unlimited access to the BPX-AI and additionally paid the specialist consultations (see Appendix II). The shift shown in Figure 3 and 4 shows a successful transition of the business model, since the core product still created the essential revenue stream “to keep the lights on” and the complementarities increase and created the winnings for the company.

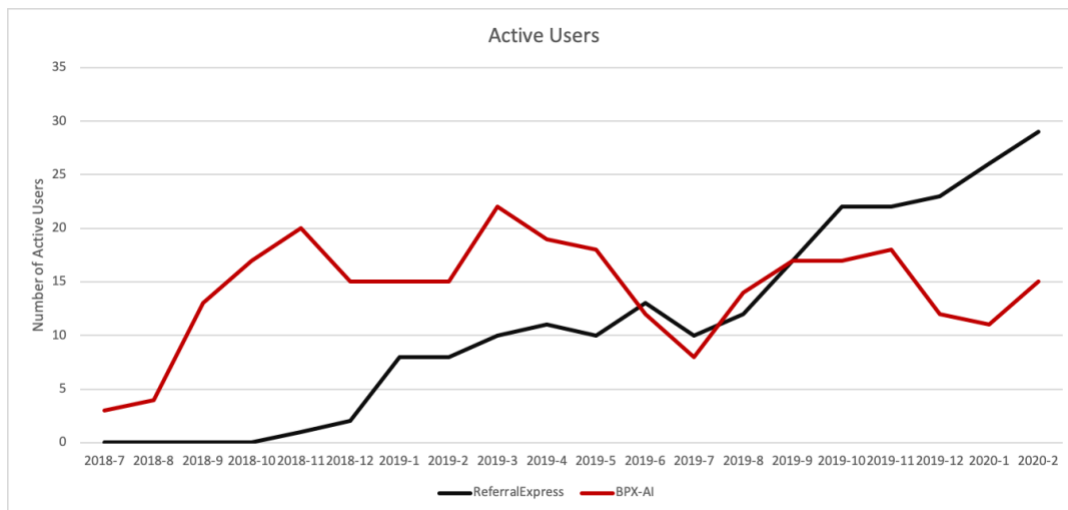


Figure 3: Active Users: BPX-AI vs. ReferralExpress

The same development was observed when looking at the active users each month that used each of the services (see Figure 4). Here, the number of active users of BPX-AI was stagnating but not decreasing, causing an even more solid essential revenue stream in the new pricing model. This further means there were users coming to the platform that only used the complementary services.

After the platform was launched successfully, the founders concentrated on the acquisition of new investors in the first half of 2019 to be able to scale the platform up and develop more functionalities. Additionally to the DNB Healthcare price money (1 MSEK), Boneprox was able to get more funding from Innovation Norway (1,2 MSEK) and further closed several cooperation and partnerships with hospitals and dental chains.

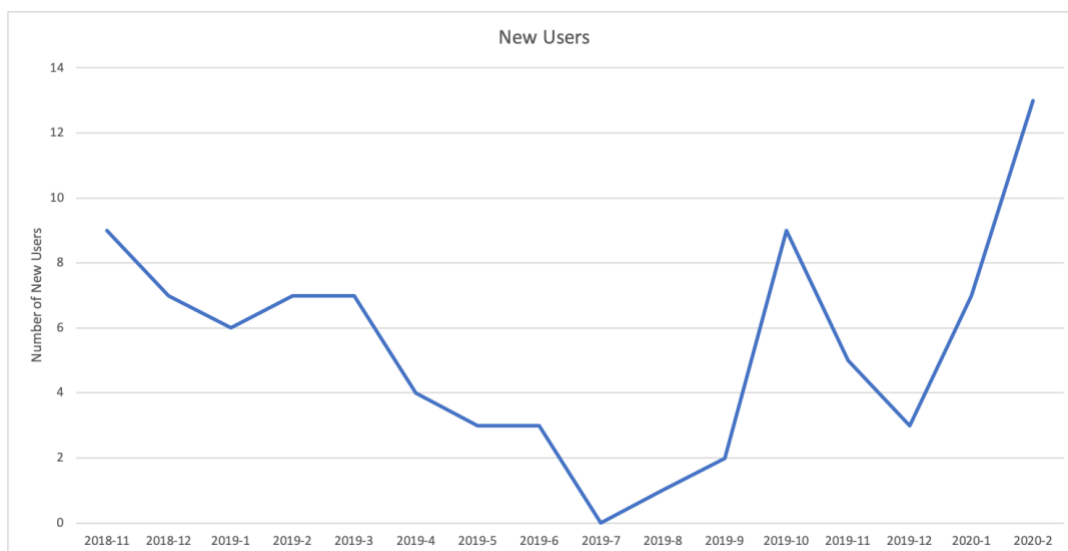


Figure 4: New Users

As it is shown in Figure 5, also the number of new users each month decreased in the first half of 2019. This demonstrates that the amount of workforce which is invested into the acquisition of new customers was correlated to the number of new users. In reverse conclusion, the number of new users increased after more focus was put on the acquisition of new customers again after the summer of 2019.

With entering the market of specialist consultations, Boneprox also made a shift in strategy from *Coring* to *Tipping* strategies (Gawer & Cusumano, 2008). While they still used *Coring* strategies and the BPX-AI to attract more customers towards the platform with traditional tools like marketing, exhibitions, mailing, and personal contact, they increasingly had to work on tipping the market towards their direction by *developing unique, compelling features that are hard to imitate and attract users (TI)*. Boneprox achieved that with offering a fast and secure way to process referrals.

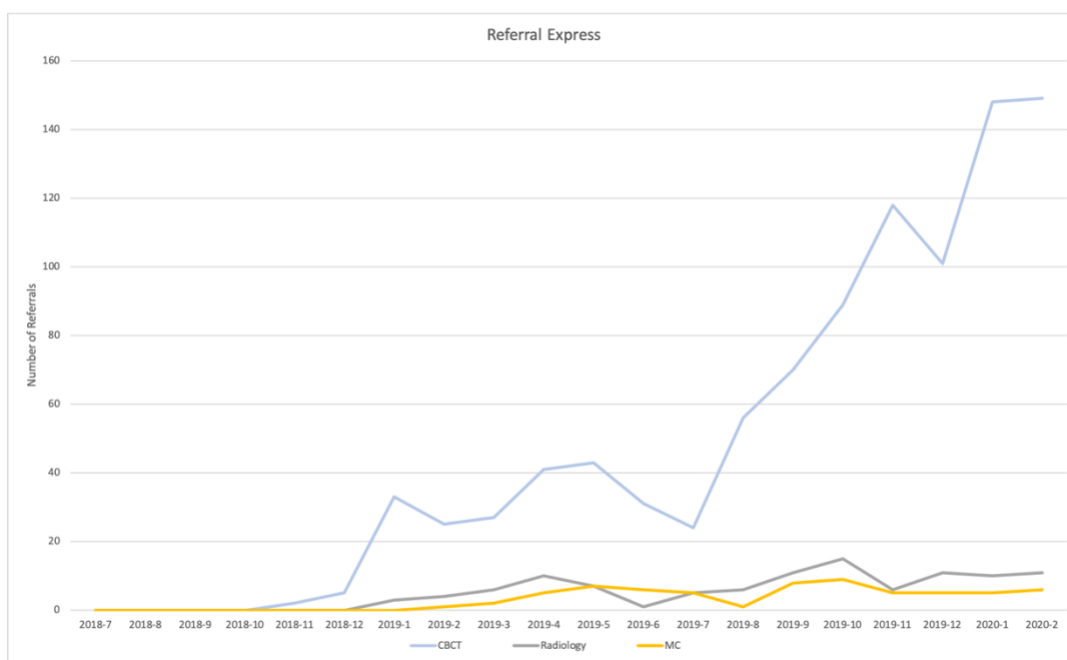


Figure 5: Referral Express

Figure 6 shows that the analysis of CBCT scans was clearly the most used service on ReferralExpress. Due to the fact that every x-ray image has to be send to a radiologist, on the one hand there was a natural high demand for these analyses but on the other hand every clinic already had a contracted radiologist. Boneprox cancelled the partnership with the initial radiologist and started a new partnership with another radiologist specialized in dental scans. The explosion of referrals starting in mid-2019 is also caused by the new radiologist who increased the quality of CBCT consultations. Other specialist consultations on the other hand were only increasing slowly. This was mainly for the reason that there is no law to make

referrals in this case, which is the case for CBCT scans. Clinics did not make many referrals in MC or common Radiology before there was a digital solution available because it was often too expensive and complicated. The slow increase shows, that there was a basic interest in this services and interviews with clinics showed, that they were just not used to having the opportunity to get an analysis this efficiently. However, there are no observable cross-selling effects, which means that clinics which used one service, did not tend to use another service offered by Boneprox.

*“We have taken 15% when it comes to CBCT in Norway and 10% in Sweden, people are losing business to us. [...] Until we have reached a certain market share, I don’t think that people [specialists] will join us. Once we have reached a certain market share, then people have to lay down their axe and will join us. If they can’t beat us, they join us.”*

(CSO)

Once the platform volume is exaggerating the one specialist’s capacity, Boneprox will face the challenge that they need more than one specialist for CBCT scans analyzing the referrals. The Boneprox founders are sure that this will happen round about the time other radiologists will have to join their platform in order to remain in the business because Boneprox is taking to many market shares. Once new radiologists will join the platform, they will have to bring their already contracted clinics to the platform and therefore will cause exponential growth effects and the market will eventually *tip* in their favor. Boneprox used tipping strategies by *providing more incentives than competitors do and develop unique, compelling features that will attract more users (T1)*.

*I was very happy when they called me, and it was no hard decision to join the team. It’s been a pleasant journey from day one.*

(Radiologist)

*“We are becoming the friend of the dentist”*

(CSO)

The most common feedback was the ease of use and the extraordinary response time, as well as the quality of the analysis delivered by the specialist. With already having one other specialists for other referrals than CBCT, Boneprox currently works to add more types of images and types of analysis to the platform. While CBCT scan consultation remains the main driver for revenue because of the law to send images to a radiologist, the addition of more complementary services is a good selling point. All in all, the selling strategy shifted towards the advertisement of complementary



services after the number of active users pass the number of active users of Boneprox AI in autumn 2019 (see Figure 4).

*“We are seeing that clinics start by using one service and then they change to use other services”*

(CEO)

The idea is to offer more services to the clinics and try to profit from spillover effects. Once a clinic has experienced the platform, they are more likely to use other functionalities of the platform as well. As shown in Figure 6, the spillover effects did not happen in a significant way yet and the analysis of CBCT scan was the main driver for the revenue.

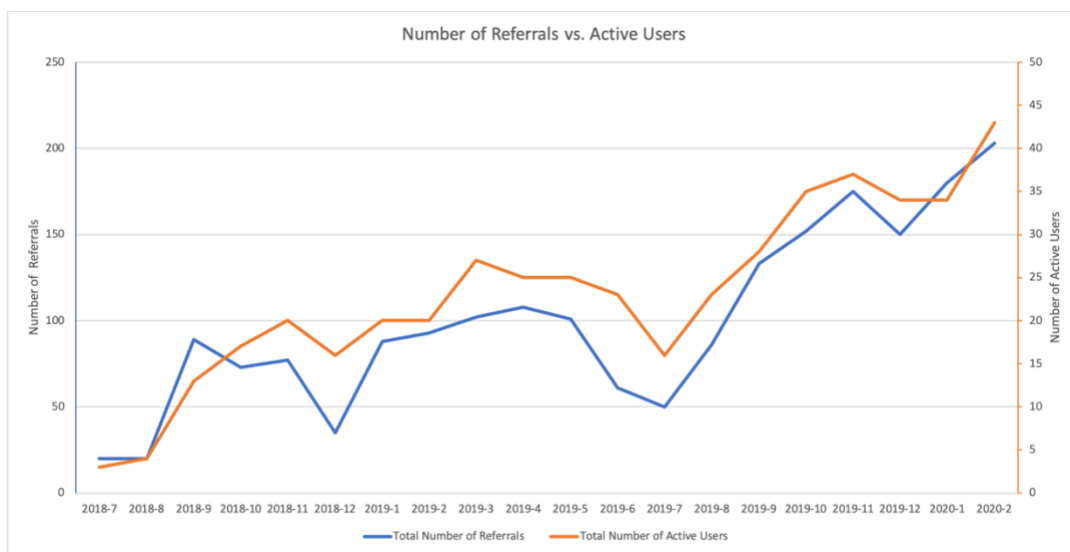


Figure 6: Number of Referrals vs. Active Users

Adding to this, it can be observed that the average usage per clinic was not increasing in a significant way (see Figure 7). The number of total referrals uploaded (BPX-AI and ReferralExpress combined) were strongly correlated to the number of active users on the platform. That means the usage of the same service per clinic did not increase. According to the tipping strategy, this behavior of customers can be changed by *creating new incentives (T3)* for customers. Boneprox plans to create these incentives by adding more functionalities in form of different types of analysis offered.

But not only did Boneprox continuously offer more functionalities on the platform as complementarities and worked on make their core asset of secure data transfer even better, they further worked on different integrations into other software's and machines, for example the operation system of a x-ray scanner which can upload the

image directly to the platform. Seeking collaborations with possible competitors in order to gain a larger installed base is also a known *tipping* strategy. With getting a more and more diverse installed base, Boneprox also planned to expand their subscription-based pricing model and wanted to start offering different packages with different pricing structures to fit every dental clinic needs on a fair price (see Appendix II).

*“We want clinics to use Boneprox every single day.”*  
(CSO)

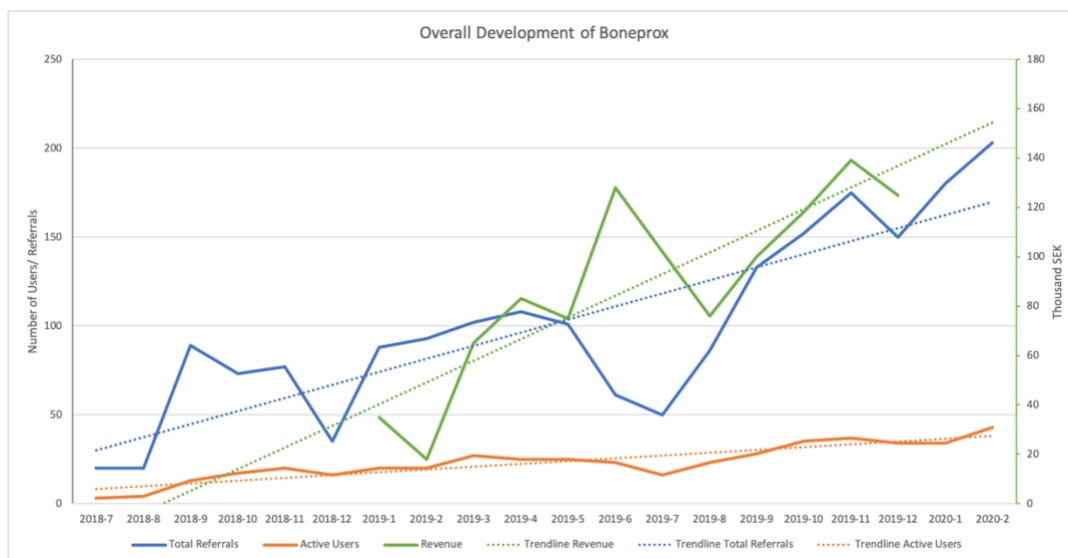


Figure 7: Overall Development of Boneprox

As shown in Figure 8, the total number of referrals (BPX-AI + ReferralExpress) developed steadily and had more than doubled within the first year after the launch of ReferralExpress. The start-up was able to attract new customers without losing many of the previous customers (also see Figures 5 and 6). Dips in the graph in the middle and end of years are caused by the holiday seasons, which naturally means little activity in the dental clinics and therefore a lower market volume. Following that trend, also the monthly revenue of the company has nearly tripled in 2019 alone. With the main reasons for that being the increasing number of active users and referrals each month, also the change in the pricing model made the company more efficient. The revenue peak in mid-2019 also came from payments for the public procurement.

The data in Figure 8 shows that Boneprox was successfully combining *coring* and *tipping* strategies at the same time. On the one hand, they *solved essential system and business problems (C1, C4)* by offering a digital solution to the dental

consultation sector. They were able to *keep the intellectual property closed and protect the main source of revenue (C2, C5) while maintaining strong interdependencies between core and complementarities (C3)* in order to preserving high switching costs. That guaranteed an essential revenue stream which allows innovation. On the other hand, Boneprox was able to *tip* the specialist-consultancy market in their favor by *offering unique, compelling features (T1)*. At the same time, they *provided high incentives to join the platform (T3)* by continuously adding new complementary services to the platform. Furthermore, they attracted possible emerging competitors into coalitions to deliver an integrated solution to their users. By reaching out to hardware companies to integrate their solution, they also tried to *tip across markets (T2)*.

## 6 Discussion

This paper contributes to the digital platform and platformization research by conducting a case study of a start-up in the eHealth industry. The research question guiding this investigation is:

*How do established firms leverage core assets to launch a platform and grow the installed base?*

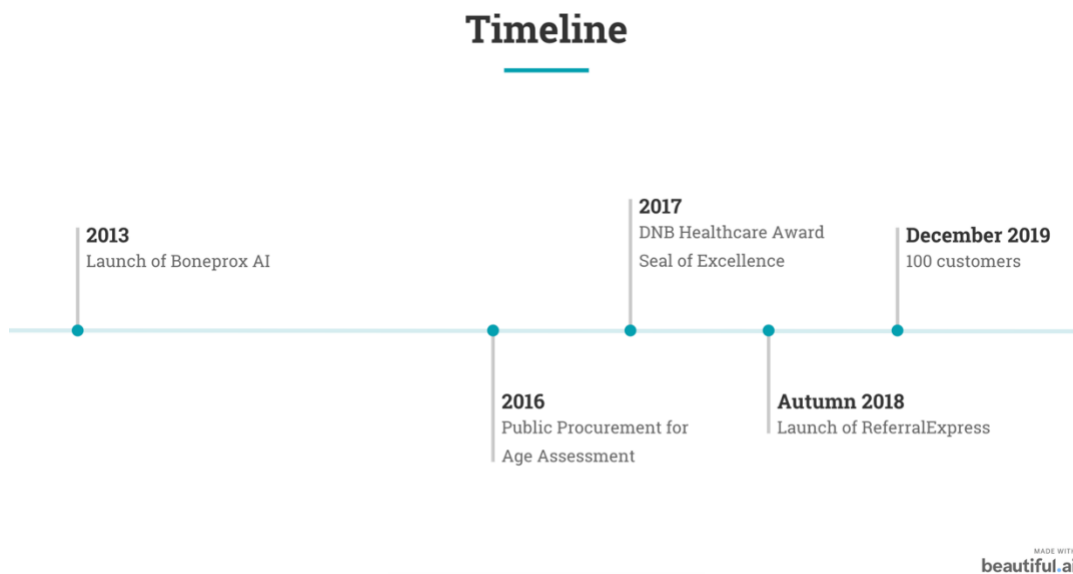


Figure 8: Timeline

The case study start-up actively designed the process of shifting from a pipeline business towards a digital platform (see Figure 9). I could observe that the start-up leveraged their already existing core assets at all times in order to gain momentum and further grow the installed base. I contribute five guidelines on how to grow an installed base by leveraging the core asset.

I could observe that the main reason for a successful platformization was the combination of coring and tipping strategies. When marketing the core asset, the case study company was established by *solving an essential technological problem* (Gawer and Cusumano, 2008). By solving this problem, they created a new product that has not existed before and therefore did not have any competitors. That allowed the firm to acquire many customers without being identified as a threat to existing players in the specialist consultation market. Customers stayed on the platform because of the *high interdependencies of core and complementarities*, since they were offered on the same platform. Only after they reached a critical mass and had a mature technology, they started to use tipping strategies *by offering unique,*

*compelling features* (Gawer and Cusumano, 2008). Companies could later shift back to coring strategies if they decide to launch complementarities that have not existed before in the market or when they want to offer the services in an adjacent market. In this case, the company would use coring and tipping strategies at the same time, for the same product, in different markets. I show that it is not a transition or shift from coring to tipping strategies, but that they are used in combination throughout the whole process. I provide five guidelines designed from my observations (Table 3).

Table 3: Guidelines

<b>Guidelines</b>	<b>Underlying Theory</b>	<b>Observations in Case Study</b>
Guarantee a smooth transition for existing customers	Platform Envelopment (Eisenmann et al., 2007)	High user overlap from existing and new market  Same online portal
Develop a hybrid business model	Hybrid Business Model (Zhu & Furr, 2016)	Integrate prices for complementarities into subscription-based model for core asset
Reuse the technology	Economies of Scope (Panzar & Willig, 1981)	Reuse technology for secure transfer and storage of highly sensitive medical images
Capture spillover of trust	Start with a defensible product (Zhu & Furr, 2016)	Generate trust by winning public awards and certification by the government
Shift to resource orchestration	From resource control to resource orchestration (Van Alstyne et al., 2016)	Use different specialist for different fields; Create incentives for them instead of controlling them

The first guideline I suggest to successfully launch a platform is to guarantee a smooth transition from the perspective of existing customers. The case study company firstly made their core asset available on a new online portal without changing the functionalities, so it felt just like a re-design for the customer. Only after giving the users a few months to get used to the new portal, the new complementary services were added. While internally the complementarities were handled as a second revenue stream and were managed differently from the core asset, it did not feel to the customer as a shift or change but as an additional service. By doing that the customer was left with the choice to use the new services or not, but none of the existing customers was scared of. Eisenmann et al. (2007) previously observed this strategy as *platform envelopment*, where platform owners use the existing installed base to lower the entry barriers into a new market. The case study actively looked for the highest possible *user overlap* to establish the existing installed base in a new market. At the same time the transition was designed very smooth so that there were no losses of the installed base in the existing market. Zhu and Furr (2016) also refer to this observation as the rapid conversion to the platform to make users of the initial product to users of the new platform. As previously observed by Eisenmann et al. (2007), this guideline can be transferred to other markets and platforms, although different conditions may apply.

The second guideline is to develop a hybrid business model. I could observe that changes in strategy and sales decisions were hidden from the users, which relates strongly to the previous guideline. It adds to it in a way that it was also suggested by the pricing model. The price did not change for the core asset and the complementarities were integrated into a *hybrid business model* (Zhu & Furr, 2016). By doing so, the company is able to secure an existing revenue stream and will not lose existing customers. These customers can also be transformed into the installed base of the digital platform by cross selling the core asset and complementarities (Teece, 2018). This observation can easily be transferred into other markets and industries, since it is in the full control of the company to design its own platformization process.

The third guideline I contribute is the reuse of the core technology and applying the *Economics of Scope* (Panzar & Willig, 1981). For the case study company, it was possible to use the existing technology to build complementarities (Teece, 2018). By doing so, they were able to generate a competitive advantage by having much lower R&D costs than any other existing player in the market. Furthermore, the operational and fix costs were comparatively low because they could be spread between the different products. The economies of scope are a widely applicable concept which can be projected to many industries (Panzar & Willig, 1981).

The fourth guideline I suggest is to capture the spillover of trust from the initial product to the platform. Not only is it more efficient than for other industry players that do not have that technology (see guideline 3), but it also uses the image and trust laid into the company by existing customers. This guideline goes hand in hand with the first guideline but focusses on capturing the good relationship with partners and customers and therefore stands on its own. The case study company did so by winning a public procurement and winning several awards and certifications. By using the same technology for the complementarities, also the trust into the firm could be transferred towards the newly launched digital platform. This factor can also be seen in Zhu & Furr's (2016) first step and is projectable to other markets as well. While trust is one of the most important factors in the eHealth industry, it can also be valuable in other industries to have a good image before introducing new services to the market. The trust does not mandatorily have to come from the government but can be gained through many ways.

My fifth guideline is the shift from *resource control to resource orchestration* (Van Alstyne et al., 2016). While the shift should be invisible for the customer (see guidelines 1 and 2), it is even more important to make this shift in the business processes. The case study company started to make this shift by not making any specialist consultations themselves but contracting specialists for different fields. Later in the process, they planned to attract more than one specialist for each field to the platform, which is the next step in the process of shifting to resource orchestration. They tried to achieve resource orchestration because control over resources do not guarantee for a competitive advantage, but they must be used and managed efficiently (Sirmon et al., 2011). By not contracting specialist, they gained this efficiency. Not only did the shift allow them to focus on sales and the development of new functionalities, it also made them very flexible and lowered the fix costs since they did not have to pay salaries for the external resources but only as they were needed and used. One example was the change of radiologist in summer 2019 that made the CBCT consultation more valuable and therefore attracted more customers and grew the installed base. In order not to be dependent, the company created incentives for external resources instead of controlling them. The company leveraged their core asset to introduce more services and functionalities to the market by only controlling the core asset and orchestrating other resources to establish new complementarities. The situation in the eHealth industry is very special due to a lot of laws and regulations, nevertheless it is possible for others to project this strategy.

## 7 Conclusion

This study answers the question how established companies can leverage their core assets in order to launch a digital platform and grow their installed base. I conducted a case study at a successful start-up in the eHealth sector. Gawer and Cusumano's (2008) theory of coring and tipping strategies was used as a conceptual framework and theoretical lens on the results.

I contribute five guidelines that I think are essential for a successful platformization: *Guarantee a smooth transition for existing customers*, *Develop a hybrid business model*, *Reuse the technology*, *Capture spillover of trust*, and *Shift to resource orchestration*. While many of these observations may be transferred to other companies in the platformization process, these observations are highly sensitive to the industry, market and other circumstances. The framework provided a useful foundation for the conducted case study and laid the foundation for a focused analysis of the results.

This paper contributes to theory that coring and tipping strategies can be used combined to leverage core assets to grow an installed base. The gained trust by solving a small but relevant system problem in an efficient and secure way, can later be used to enter an existing market and tip the market by offering unique and compelling features. Furthermore, I expand the framework by applying it to proprietary services instead of only focusing on complementarities provided by third parties. I further contribute to practice the five guidelines I formulated during the case study of a start-up in the eHealth industry. While not all success factors will be applicable in every market for every company, I offer some guidance to established firms that go through the process of platformization.

The scope of this study presents some limitations. Firstly, the case study company was founded in 2013 and is therefore relatively new. It is unclear, in what degree the results are applicable for firms with older structures. In addition to that, the case study company was founded as a technology company, so that the gap between the old and new business model was comparatively narrow. It is not sure if there will be other obstacles for firms that are not native digital. Therefore, to complete the findings of this study, future research should focus on the generalizability of the guidelines to other firms and industries.

I have identified that the studied company was able to leverage their core assets in order to launch a new digital platform and grow their installed base successfully. The platformization is an ongoing process for the company and they continuously make improvements to their strategy.



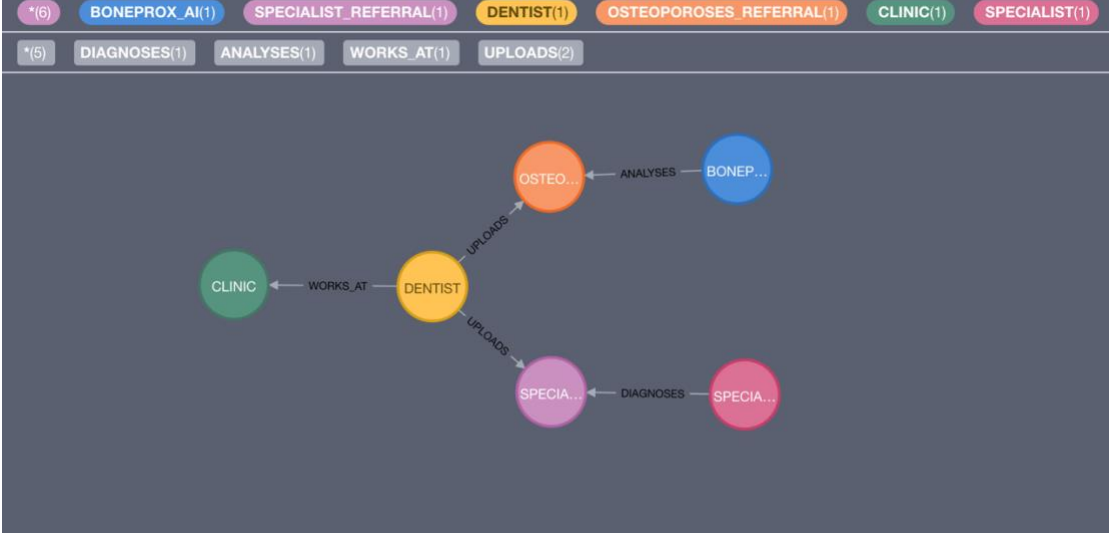
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# 9 Appendices

## Appendix I – Data Model



## Type of nodes (anonymized)

### Clinic:

```
{
  "name": "█",
  "organizationNr": "█",
  "costCenter": "█"
}
```

### Specialist:

```
{
  "name": "█",
  "fields": [
    "Radiology",
    "CBCT"
  ]
}
```

(BPX-AI is declared as a specialist with the field "Osteoporosis")

### Dentist:

```
{
  "name": "█"
}
```

### Referral:

```
{
  "date": "2019-11-11",
  "analysisID": "10313",
  "type": "OP_ROI",
  "patientRef": "█",
  "status": "DONE"
}
```

(Type of referral (ReferralExpress/BPX-AI) are distinguished in the attribute "type")

# Appendix II – Pricing Model

## 2013 – Summer 2018

Price per Analysis: 150 SEK

## Summer 2018 – March 2020

**Subscription Fee:** 450 SEK

**Price per Analysis**

Boneprox AI: free

CBCT: 790 – 1000 SEK (Individual prices)

MC: 350 SEK

Radiology: 400 SEK

## From March 2020

Milk Tooth	Standard	Wisdom Tooth	Enterprise/CBCT
<b>249 SEK</b> / Month	<b>450 SEK</b> / Month	<b>995 SEK</b> / Month	<b>Price Upon Request</b>
First month + first analysis free of charge!	First month + first analysis free of charge!	First month + first analysis free of charge!	
Number of users: 1	Number of users: 2-5	Number of users: Unlimited	Number of users: Unlimited
Consultation (oral medicine): 549 kr	Consultation (oral medicine): 350 kr	Consultation (oral medicine): 275 kr	Consultation (oral medicine): Price upon request
Consultation (radiology): 549 kr	Consultation (radiology): 399 kr	Consultation (radiology): 299 kr	Consultation (radiology): Price upon request
Consultation (periodontology): 549 kr	Consultation (periodontology): 399 kr	Consultation (periodontology): 299 kr	Consultation (periodontology): Price upon request
Consultation (cariology): 549 kr	Consultation (cariology): 399 kr	Consultation (cariology): 299 kr	Consultation (cariology): Price upon request
Consultation (osteoporosis): 150 kr	Consultation (osteoporosis): 0 kr	Consultation (osteoporosis): 0 kr	Consultation (osteoporosis): Price upon request
No commitment	No commitment	No commitment	Marketing pack: Enterprise*
Support	Support	Support	Support
50% discount on Boneprox courses	50% discount on Boneprox courses	50% discount on Boneprox courses	50% discount on Boneprox courses
<b>GET STARTED</b>	<b>GET STARTED</b>	<b>GET STARTED</b>	<b>GET STARTED</b>

Note: Already includes new functionalities, CBCT prices are negotiated individually and are dependent on the size of the dental clinic