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Facilitation of Network Effects in Early-Stage Multi-Sided Platforms

A Multi-Case Study

Master's thesis

Master's thesis in Industrial Economics and Technology Management
Supervisor: Jørgen Veisdal
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Kunnskap for en bedre verden

Preface

This master's thesis is written by three M.Sc. students as part of their specialization in Strategy and International Business Development through the Department of Industrial Economics and Technology Management at the Norwegian University of Science and Technology (NTNU).

The authors would like to express their sincere gratitude to their supervisor Jørgen Veisdal for his valuable feedback, encouragement, and insightful discussions during the writing of the thesis. Additionally, the authors thank the managers of the case companies for taking their time to be part of this study and sharing their insights and experiences. Their answers and reflections have been invaluable for the research.

Trondheim, June 11, 2019

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Abstract

An increasing number of industries are being disrupted and dominated by products built around platforms like Uber, Airbnb, and Facebook. These platforms are experiencing self-reinforcing user growth due to network effects – a phenomenon that occurs when the value of the product is mainly derived from the platform-mediated network, more so than the product itself. The point where self-reinforcing growth occurs is called the critical mass, and platform managers seek to reach and grow beyond this critical mass of users.

While network effects have historically been regarded as uncontrollable external factors, the literature has started to explore how platform managers can strategically control network effects. By understanding the drivers of such network effects, managers can treat them as strategic resources and leverage them to their platform's benefit.

This thesis contributes to the field of strategic management by presenting several network effect-related aspects managers of multi-sided platforms consider when forming strategies before reaching critical mass. Through interviews with managers from nine different Norwegian platform companies, the study provides qualitative empirical data that challenge previous claims in the literature that platform managers still develop and rely on strategies that ignore network effects.

The findings suggest that platform managers do consider drivers of network effects when strategizing for growth towards critical mass. Additionally, four observed strategies applied by the managers to achieve growth through network effect facilitation are discussed: 1) Building expectations of future dominance through social media, influencers, and media coverage, 2) Reaching critical mass by targeting niches, 3) Mitigating multi-homing with lock-in functionality and niche focus, and 4) Balancing curation and governance with platform growth.

Suggested areas for further research include how the strategic use of influencers can entail long-term effect on growth, the impact of niche-focused strategies on network effects, and how the interplay of network effect drivers affect the formation of growth strategies.

Sammendrag

Et økende antall bransjer blir radikalt forandret av produkter og tjenester bygget rundt plattformer, med eksempler som Uber, Airbnb og Facebook. Disse plattformene opplever selvforsterkende brukervekst på grunn av nettverkseffekter – et fenomen som oppstår når verdien av produktet primært kommer fra plattformens nettverk, fremfor selve produktet. Punktet der selvforsterkende vekst begynner, kalles kritisk masse, og ledere i plattformselskaper jobber med å nå og vokse forbi denne kritiske massen av brukere.

Selv om nettverkseffekter historisk sett er blitt ansett for å være ukontrollerbare eksterne faktorer, har litteraturen begynt å undersøke hvordan plattformselskaper strategisk kan kontrollere nettverkseffekter. Ved å forstå driverne av slike nettverkseffekter, kan ledere behandle dem som strategiske ressurser og utnytte dem til plattformens fordel.

Denne oppgaven bidrar til feltet strategisk ledelse ved å presentere flere nettverkseffekt-relaterte aspekter som ledere av flersidige plattformer tar høyde for i utformingen av strategier før de når kritisk masse. Gjennom intervjuer med ledere i ni ulike norske plattformselskaper, bidrar oppgaven med kvalitativ empirisk data som utfordrer tidligere litteraturs påstand om at plattformselskaper fortsatt benytter strategier som ignorerer nettverkseffekter.

Funnene antyder at ledere av plattformer faktisk tar høyde for drivere av nettverkseffekter når de utformer strategier for å oppnå kritisk masse. I tillegg drøftes fire observerte vekststrategier som omhandler fasilitering av nettverkseffekter: 1) Skape forventninger om fremtidig dominans gjennom sosiale medier, influensere og mediedekning, 2) Oppnå kritisk masse ved å rette seg mot nisjer, 3) Redusere brukerhopping mellom plattformer med lock-in-funksjonalitet og nisje-fokus, og 4) Balansere plattformvekst med filtrering og tilgangsstyring.

Foreslåtte områder for videre forskning inkluderer hvordan strategisk bruk av influensere kan påvirke vekst på lang sikt, nisjefokuserte strategiers innvirkning på nettverkseffekter, og hvordan samspillet mellom drivere av nettverkseffekter påvirker utformingen av vekststrategier.

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Chapter 1

Introduction

This chapter presents the background and context for the thesis, relevant definitions and concepts, as well as observed research gaps in the literature. It also presents the motivation behind the study, together with the purpose and proposed research question. Lastly, the outline of the thesis is laid out.

1.1 Background and context

In today's economy, industries experience increasing competition from companies that facilitate interactions between distinct user groups – referred to as *multi-sided platforms* (Eisenmann et al., 2006; Evans and Schmalensee, 2007; Rochet and Tirole, 2006; Gawer and Cusumano, 2008; Hagiu, 2006). Ten years ago, only 1 of the 10 most valuable publicly traded companies in the world was a platform. Today, platforms constitute 7 of the 10 most valuable companies[1]. Social media platforms like Facebook, Twitter, and Instagram connect people, organizations, developers, and advertisers, and are significantly altering the business dynamics of their industries (Hamari et al., 2016; Kumar et al., 2018). Uber does not hold ownership over cars, but matches drivers with passengers, challenging the taxi industry worldwide. Airbnb couples homeowners with travelers without owning any property, in a domain previously dominated by the hotel and travel agency industries (Resnick and Zeckhauser, 2002; Zervas et al., 2015). In parallel with the rapid growth in the number of businesses operating as platforms, the concept has been devoted increased attention from researchers (McIntyre and Srinivasan, 2017).

[1] `https://ycharts.com`: Top 10 public corporations by market capitalization in 2009 and 2019

1.2 Definition of a platform

Platforms can be defined as an intermediary for one or more user groups that receive value from interacting with each other, and without the platform would not easily be able to interact (Evans, 2003b; Ondrus et al., 2015). By managing connections between users and resources, a platform enables participating parties to interact, trade, and realize gains (Evans and Schmalensee, 2007; Iansiti and Levien, 2004). From an architectural point of view, a platform can be seen as a stable core of components that facilitates interactions through providing infrastructure and maintaining linkages between individual users, user groups or resources (Baldwin and Woodard, 2009; Hagiu, 2014; Ondrus et al., 2015).

Although attention devoted to platforms has increased in recent years, the concept is not new (Hagiu, 2014). Platforms have, for a long time, served one or more user groups, referred to as *sides*. It is common to distinguish between one-sided, two-sided, and multi-sided platforms. Traditional one-sided platforms include telephones, where users can call other users through a mediating network. Traditional multi-sided platforms, i.e., with two or more sides, include shopping malls (connecting retailers and customers), newspapers (connecting writers, readers, and advertisers), taxi companies (connecting drivers and passengers) and operating systems (connecting users and developers) (Evans, 2003b). Evans (2003b) further argues that there are three prerequisites for a multi-sided platform to increase value: First, there must exist two or more distinct types of user groups with complementary interests. Second, a member of one group gets a benefit when their demand is presented to one or more users of another group. Third, an intermediary part can coordinate relationships between users more efficiently than the users can between themselves.

1.3 The concept of network effects

A growing number of products and services rely on *network effects* (Afuah, 2013). Network effects occur as the total value of a product depends on the user's access to a network of people and resources connected to that product, more so than the features and benefits from the product itself (Katz and Shapiro, 1985; Farrell and Saloner, 1986; Sheremata, 2004). The presence of such network effects differentiates platform businesses from others. Traditional businesses often face the problem of diminishing returns from a growing customer base (Eisenmann et al., 2006). That is, as they sell more products, it can get increasingly harder and more costly to attract

and convert new customers. Successful platforms, however, can experience the contrary effect through self-reinforcing user growth. Acquiring the first users is often challenging, but as users start to connect, interact and transact, with a more extensive network of other users, further growth can become self-sustaining (Eisenmann et al., 2006).

Borrowing from Afuah (2013), this study makes use of three reigning definitions of network effects:

1. "The benefit that a consumer derives from the use of a good often depends on the number of other consumers purchasing compatible items" (Katz and Shapiro, 1986, p. 822)

2. "A good is often more valuable to any user, the more others use compatible goods" (Farrell and Saloner, 1986, p. 940)

3. "A network externality exists when the value of consuming a particular product or service increases in the number of consumers that use compatible products or services" (Gandal, 1994, p. 160)

To be able to describe observations related to network effects in further detail, it is common to distinguish between direct and indirect network effects (Tellis et al., 2003). *Direct* or *same-side network effects* occur when a user benefits from an increased number of the same user group with whom he or she can interact (Eisenmann et al., 2008; Farrell and Saloner, 1985; Katz and Shapiro, 1986; Rochet and Tirole, 2006). *Indirect*, or *cross-side network effects*, on the other hand, arise when the users on different sides have a reciprocal gain from an increased number of users in other groups with whom they can interact or transact (Boudreau and Jeppesen, 2015; Evans, 2003b; Hagiu, 2014; Rochet and Tirole, 2003). The presence of such indirect network effects is a critical trait of most multi-sided platforms (Ondrus et al., 2015).

Network effects are not necessarily positive. When one side of a platform grows disproportionately to the others, the platform might experience negative network effects (Van Alstyne et al., 2016). For example, consider a general marketplace. If there is an overweight of sellers compared to buyers, prices may go down, causing sellers to leave the platform. As the supply-side decreases, buyers might not find the product they are looking for at the right price and leave the platform. This again causes more sellers to leave due to insufficient demand. Such negative network effects can thus become self-reinforcing, causing platforms to collapse.

1.4 The importance of critical mass

Consumers in platform markets get value from both the product itself and the size of the network (Sheremata, 2004). At the launch of a new platform with a small network, customers will use the product mostly based on the value of its features, so-called *standalone benefits* (Afuah, 2013; Bhargava, 2014). When there is a certain amount of users on each side of a platform, the value from other users dominates the value of the product itself. This threshold is referred to as the critical mass, and from this point on, the network growth is said to become self-reinforcing (Ondrus et al., 2015; Afuah, 2013; Stremersch et al., 2007; Rogers, 2010; Evans, 2003b). Therefore, critical mass is considered to be a necessary condition for a platform's success (Ondrus et al., 2015; Evans and Schmalensee, 2010).

1.5 Chicken-and-egg-problem

In multi-sided platforms with indirect network effects, the user base on one side attracts participation on the other sides (Katz and Shapiro, 1994; Rochet and Tirole, 2006). Therefore, the reliance on such indirect network effects are in the literature thought to give rise to the so-called *chicken-and-egg problem* – one user group waits until the other user group uses the platform, and vice versa (Caillaud and Jullien, 2003; Stremersch et al., 2007; Gupta et al., 1999). In a two-sided network, a developer will not create applications or games for a specific platform unless there is, or is expected to be, a critical number of users on the platform. Opposite – a user is unlikely to join a platform unless there is a critical number of quality applications or games available (Eisenmann et al., 2006). Thus, the chicken-and-egg problem may result in the case that no one joins until everyone joins.

1.6 Research gaps

The network associated with a platform can be an important strategic asset (Shankar and Bayus, 2003), and previous research has acknowledged that critical mass is an important factor for a platform's success Evans and Schmalensee (2010). Platform providers must proactively obtain strategic control and drive, leverage and intensify network effects in order to reach critical mass (McIntyre and Subramaniam, 2009; Fuentelsaz et al., 2015). However, in the current state of

the literature, few studies have looked into how drivers of network effects contribute to platform growth *before* critical mass is reached (Ondrus et al., 2015; Tiwana et al., 2010). A considerable amount of the literature base its findings on the criteria that critical mass has already been reached (McIntyre and Srinivasan, 2017). Hence, critical mass is often considered *a priori*, and few scholars make a clear distinction between before and after a platform reaches critical mass for optimal strategies. This is problematic because the research can easily be affected by survivorship bias, thus largely ignoring early-stage platform providers' ability to manipulate network effects to their advantage. Therefore, recent papers have called out for an increase in the attention towards multi-sided platforms during their pre-critical mass phase (De Reuver et al., 2018; Ondrus et al., 2015).

Furthermore, several calls for more qualitative data in the body of multi-sided platform literature has been made (De Reuver et al., 2018; McIntyre and Srinivasan, 2017). De Reuver et al. (2018) discuss the challenge of obtaining qualitative empirical data from within platform companies, and states that a vast amount of data in previous studies stem from either interviews with third-parties (e.g. Selander et al., 2013) or through data collection from an outside perspective (e.g. Eaton et al., 2016). This remark is further exemplified in the frequently cited literature review of McIntyre and Srinivasan (2017), where the majority of mentioned studies are either of a theoretical or quantitative nature.

Additionally, a large portion of previous studies pursue single, well-established industries, such as the video game console market and the credit card industry (e.g. Caillaud and Jullien, 2003; Suarez, 2005; Clements and Hiroshi, 2005; Cennamo and Santalo, 2013; Boudreau and Jeppesen, 2015). This limits the research's potential implications due to a lack of cross-industry generalizability. According to McIntyre and Subramaniam (2009), there are several variations across industries when comparing drivers of network effects across industries, as some products offer stand-alone value before the emergence of a connected network (Afuah, 2013; Bhargava, 2014).

1.7 Purpose and research question

As a response to the proposed research gaps, the purpose of this study is to identify network effect-related strategies applied by managers in multi-sided platforms before they reach critical mass. By doing so, the study also seeks to challenge previous claims in the literature that managers of platforms still develop and rely on strategies that ignore network effects (Eisenmann et al., 2006) by regarding such effects as uncontrollable, external forces (McIntyre and Sub-

ramaniam, 2009). To achieve the proposed purpose, the following research question has been formulated:

> **RQ:** *How do managers in early-stage multi-sided platforms facilitate for network effects?*

By addressing this question, the study seeks to contribute to the field of strategic management literature with a better understanding of how platform providers manage network effects in the platform's early stage. Additionally, the study aims to provide the field with valuable qualitative empirical data on companies from a wide range of industries.

1.8 Outline

This study proceeds with a theoretical foundation on the individual drivers of network effects, followed by the applied research methodology, including information on how the data collection and analyses were carried out. Thereafter, the case companies are introduced and the most prominent findings and analyses related to the facilitation of network effects are presented. The study concludes with a discussion of the findings, along with observed research gaps, and implications for further research.

Chapter 2

Theoretical foundation

This chapter provides an overview of the relevant literature on drivers of network effects and proposed strategies on leveraging network effects. Where appropriate, a distinction between strategies applicable to before and after reaching critical mass is made. Furthermore, for simplicity, a consistent use of terms related to platforms and network effects are applied, even though the literature's usage varies. The definitions used are *platform provider* as a firm or organization owning and developing a specific platform, *user* as a participant, member, or actor in a platform, and *product* as a general term for products, technologies or services in platform markets.

2.1 Size

Before critical mass

Owners of platforms must consider how to obtain the network size necessary to reach critical mass. Network size is mentioned as an inherent driver of network effects in the literature, and is part of the early definitions of network effects itself – an increase in network size increases the value for all users in the network (Katz and Shapiro, 1986; Farrell and Saloner, 1986; Gandal, 1994). Historically, the literature has focused on the size of the installed base as the most strategic asset in network industries (see Shankar and Bayus, 2003; Shy, 2011; Evans and Schmalensee, 2007). Cennamo and Santalo (2013) state that the most important proposition of platforms is that users value platforms with a larger user base more than those with fewer users.

A traditional mobile phone itself had no value if there were no one the user could call. But due to direct network effects, when a sufficient number of the user's friends an family have one, the user is more likely to get one too, and the phone network grows and expands like a mosaic. Facebook and other social media platforms have grown in a similar manner (Boudreau and Hagiu, 2009). As more users join, the social media platform becomes more valuable to the new user's friends.

The importance of size as a driver of network effects becomes especially clear in two- or multi-sided networks, as they need to reach critical mass (Sheremata, 2004; Eisenmann et al., 2006). A high number of users on the demand-side creates a larger market for users on the supply-side, which in turn increases demand, creating a cascade of reinforcing indirect network effects (Hill, 1997). There are numerous examples of such indirect network effects in the literature. At stock exchanges, an increasing amount of investors will attract liquidity providers, which then attracts more investors (Evans and Schmalensee, 2007). A large installed base is an especially important driver of indirect network effects in the video game industry (Shankar and Bayus, 2003). A large number of console owners leads to more games being developed for the console, increasing the utility and value for console owners and then increasing demand for that console. Direct network effects might also be present, if, in this case, the platform allows console owners to play with each other through online services.

Indirect network effects are known to promote larger and fewer competing platforms (Evans and Schmalensee, 2007). This may eventually lead to a "winner-takes-all" situation where the platform with the most users ends up as a monopolist. However, the possibility of such winner-takes-all outcomes is according to Lee et al. (2006) dependant on the structural properties of the network of potential users, as further described in Section 2.4: Network structure. Eisenmann et al. (2006) identified three criteria for winner-takes-all outcomes to be feasible. 1) The cost related to using multiple platforms is high for at least one of the user groups, 2) Network effects between the user groups are strong and positive, and 3) The user groups do not have strong preferences for niche features.

Cennamo and Santalo (2013) later reinforced the criteria of Eisenmann et al. (2006). They also showed that getting a large user base quickly, as a sole focus, might be too nearsighted and have a long-term negative impact on the platform performance. The findings are in line with those of Evans (2003b) and Liebowitz (2002). Cennamo and Santalo (2013) also dispute the focus previous literature has had on size as a key driver for monopolists to develop.

After critical mass

There is a growing body of work proposing that growth in network size does not always lead to positive network effects or bring more value to the platform users. Letting a network grow unmoderated might come with disadvantages through negative network effects (Cennamo and Santalo, 2013; Afuah, 2013; Evans and Schmalensee, 2007). Asvanund et al. (2004) found that the growth of a network could be negatively correlated with the resource-contribution of the users, i.e., decreased participation or value creation. Scholars have found that indirect network effects might actually start to decline with the growing size of the platform (Evans and Schmalensee, 2007; Afuah, 2013). Network congestion can occur when network architecture and resources are not able to properly scale. This can make the network congested, and be a source of negative network effects (Evans and Schmalensee, 2007; Van Alstyne et al., 2016). An example is congested telephone networks that result in dropped calls (Afuah, 2013). Similar to how a physical space, for example a dance floor or car lane, becomes congested with the presence of too many people or cars, a high number of users on a platform can increase search and transaction costs as a result of congestion (Evans and Schmalensee, 2007). This can discourage participation (Van Alstyne et al., 2016). Two-sided platforms might have to limit the size of the platform, for instance by reducing the number of users with a screening process (Evans and Schmalensee, 2007), which is further elaborated in Section 2.2: Curation and governance. Afuah (2013) generalized his findings, arguing that if platform resources are not scalable, the plot of value against size has an inverted U-shape, as illustrated in Figure 2.1.

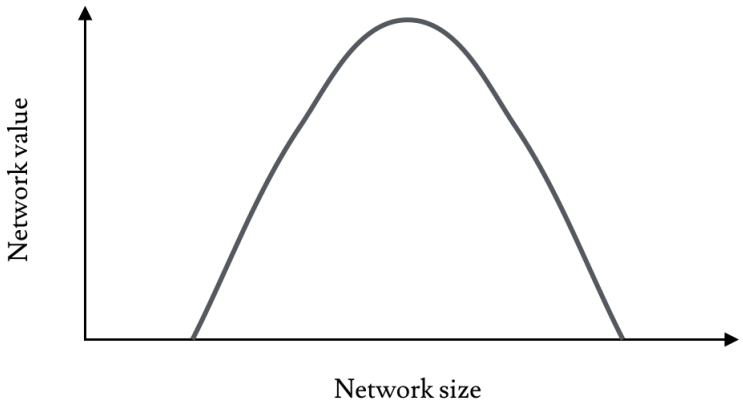


Figure 2.1: Network value versus network size

Negative network effects may also occur when one side of a multi-sided platform grows more than the other(s) (Van Alstyne et al., 2016). If Lyft or Uber has too many riders compared

to drivers, riders might stop using the platform if they get the 'No cars available' message on several occasions. This can, in turn, cause riders to quit the platform as they get fewer rides, leading to a vicious circle of negative indirect network effects (Van Alstyne et al., 2016).

An increase in network size does not bring value unless the user benefits from the growing number of users they can interact and transact with. With the findings of (Asvanund et al., 2004), network participants' contribution tends to decrease with an increase in network size, which might lead to a flooded network with users that provide limited value to the other users. Unrestricted access can lead to the platform being filled with noise, leading to excess or low-quality content that prohibit interactions and weaken the network value as the network grows (Van Alstyne et al., 2016). Consider a dating platform. Intuitively, the users will want a large number of potential partners. However, as the network continues to grow, the user might have an increasingly difficult time finding a partner that suits them. Thus, an increase in network size can decrease the value of the network, weakening the indirect network effects (Van Alstyne et al., 2016). Another example is Chatroulette, which in the beginning had exponential growth due to strong network effects with its randomly paired video chat service. Due to a lack of user restrictions, the platform was filled with noise, referred to as the 'naked hairy men problem' (Van Alstyne et al., 2016). This caused users to leave, and Chatroulette abruptly collapsed because of negative network effects due to the unregulated growth.

2.2 Curation and governance

To avoid negative network effects due to congestion and noise, platforms must eventually utilize curation and governance to make sure the network is both useful and valuable to the users (Boudreau and Hagiu, 2009; Van Alstyne et al., 2016). This is especially true for cooperative two-sided platforms, where the behavior of individual users can critically impact the value of the platform as a whole (Evans and Schmalensee, 2007).

A higher level of trustworthiness, honesty, and dependability of users in large networks is essential for network value (see Afuah, 2013), and these factors cause the need for curation and governance in a network. When network users act in pure self-interest, it is likely to decrease the value for other users of the network. Williamson (1985) describes this as opportunistic behavior, which can materialize through concealing information or intentionally misleading and confusing other network users. This can lead to information asymmetry (Afuah, 2013).

Thus, platforms have an incentive to limit these types of negative network effects through rules and regulations. This is typically achieved by regulating access to the platform, or interactions between users (Boudreau and Hagiu, 2009). Platform providers can regulate access by legal, technological or informational means, as well as price, to keep certain users from joining the platform (Van Alstyne et al., 2016; Boudreau and Hagiu, 2009; Rochet and Tirole, 2004). Most platforms today require their users to agree to terms of access, which often include rules and regulations regarding interactions and behavior towards other users in the network (Boudreau and Hagiu, 2009). Though Chatroulette eliminated the 'naked hairy men problem' by requiring user registrations and terms of use (Van Alstyne et al., 2016), it also strongly dampened network growth.

Once users are allowed into the network, the platform can use other tools to further ensure trustworthiness, quality, and safety for its network users. Facebook seeks to minimize negative interactions, of an irrelevant or inappropriate kind, by implementing privacy control and news feed curation (Boudreau and Hagiu, 2009). Airbnb and Uber offer insurance for drivers and homeowners, as well as riders and renters, making users feel safer. They also give the supply and demand sides of the platforms the opportunity to rate each other, as a mean to filter out network users that are untrustworthy or otherwise reduce the quality of the platform. Both insurance and rating systems are governance initiatives likely to strengthen positive indirect network effects (Van Alstyne et al., 2016).

Governance is not only applicable to avoiding illegal or explicit behavior but also to ensure and sustain the quality of a platform. A typical example is Apple, which is well-known for its strict App Store approval process. Applications they deem to have non-satisfactory quality or unwanted content are not allowed on the platform (Van Alstyne et al., 2016). This type of effective governance has been shown to inspire outsiders to bring valuable property to a platform (Van Alstyne et al., 2016), increasing the quality for users, and in turn strengthening positive indirect network effects. (Boudreau, 2018), however, found that lower barriers for amateurs to develop apps for a platform actually increased the number of high-quality games available. Potential explanations for this are 'more shots on the goal', knowledge spillovers between developers and lower experimentation costs (Boudreau, 2018).

Curation and governance are thus not only important for prohibiting negative network effects but can also strengthen positive network effects. Platforms with a high number of available third-party applications and extensions, such as iOS, Android and Facebook, use both top lists and human curation to help its users find relevant and high-quality applications (Boudreau and

Hagiu, 2009). After Facebook started ranking applications, developers reportedly shifted their focus towards higher quality applications that promoted interactivity, rather than solely focusing on the number of downloads (Naone, 2007), increasing the indirect network effects. Echoing the importance of such curation, Boudreau (2018) found that while lowering the barriers for developing apps for a platform also increased the number of low-quality apps, users would still benefit from an increased availability of high-quality apps due to the use of ratings and top lists. A good example of curation is how Netflix uses algorithms to present suggestions and recommendations for the users, so they will not have to scroll through an endless list of available movies and TV shows.

Hagiu (2014) illustrates the problem of noise in a network by comparing two internet dating platforms. Match.com has no limitations or screening of participants, and all user profiles are available to everyone using the service. This way, with an increasing number of users, each user will have a more difficult time finding the right partner, increasing the search and transaction costs (Hagiu, 2014). With users giving up their search for a partner, they might start leaving the platform. In this case, size becomes a driver of negative indirect network effects. eHarmony takes a different approach. All users are screened by completing a 250-question survey, after which some are not even granted access to the platform. After being granted admission, they cannot communicate freely with all users. eHarmony uses an algorithm to suggest and match potential partners based on their preferences and the answers to the survey. In this way, as network size increases, the users will have a higher chance of being matched with the right partner, and the network size thus increases the value, driving positive network effects. Evans and Schmalensee (2007) support this by pointing out that users will benefit from pre-screening, as it will increase both the likelihood and quality of matches.

2.3 Pricing

Before critical mass

Pricing is an essential aspect of every firm's strategy to ensure a sustainable business. In traditional cases this involves a demand and cost analysis, leading to a simple pricing model (Olajide et al., 2016; Rysman, 2009). However, for multi-sided markets, price and cost are not necessarily tightly connected, and the models used for single-sided markets do not apply (Evans and Schmalensee, 2007). On the contrary, in platforms, prices tend to reflect the need to reach and

maintain critical mass (Rochet and Tirole, 2003). It is, therefore, an important driver of network effects. As one or more sides can be harder to get on board the platform, in a majority of observed multi-sided markets, one side is often significantly subsidized, compared to the other sides of the platform (Evans, 2003b; Parker and Van Alstyne, 2005). Platforms are therefore known for having price *structures*, rather than traditional price *levels* (Rochet and Tirole, 2004).

In many cases, to ensure that strong network effects do develop, the price for a user group is set lower than it would have been if it made up an independent, single-sided market (Eisenmann et al., 2006). By reducing the price, more users are captivated, which makes the platform more attractive to similar and distinct user groups, driving direct and indirect network effects, respectively. Not only can a side be offered a reduced price, but prices below the related marginal cost, free or even paying certain users or user groups, can turn out to be profit-maximizing (Eisenmann et al., 2006; Parker and Van Alstyne, 2005). Being paid to use a platform can, for instance, be done through frequent flyer credits, in the case of credit cards (Rysman, 2009). When deciding which users to subsidize, companies typically choose the most quality- and price-sensitive users (Eisenmann et al., 2006).

The literature generally refers to two types of pricing: An access fee to join the platform or a transactional fee based on the usage (Evans and Schmalensee, 2007). These can be used differently to improve the chances of a platform getting "both sides onboard" and thus reach critical mass. An overarching, fundamental strategy is to make the transition to a new platform as seamless as possible – e.g., the cost of getting used to, setting up, and maintaining a new platform, often referred to as the switching cost in the literature (West, 2003; Economides and Katsamakas, 2006). To minimize the switching cost when participants are moving to a platform while maximizing it when they want to leave it, two central pricing levers are access (or membership) fees, and transaction (or usage) fees (Rochet and Tirole, 2006; Evans, 2013; Takakuwa, 2013), as illustrated in Figure 2.2. An important remark is that the price structure is only pertinent if the participants do not remove the usage and membership externalities through negotiation (Rochet and Tirole, 2004).

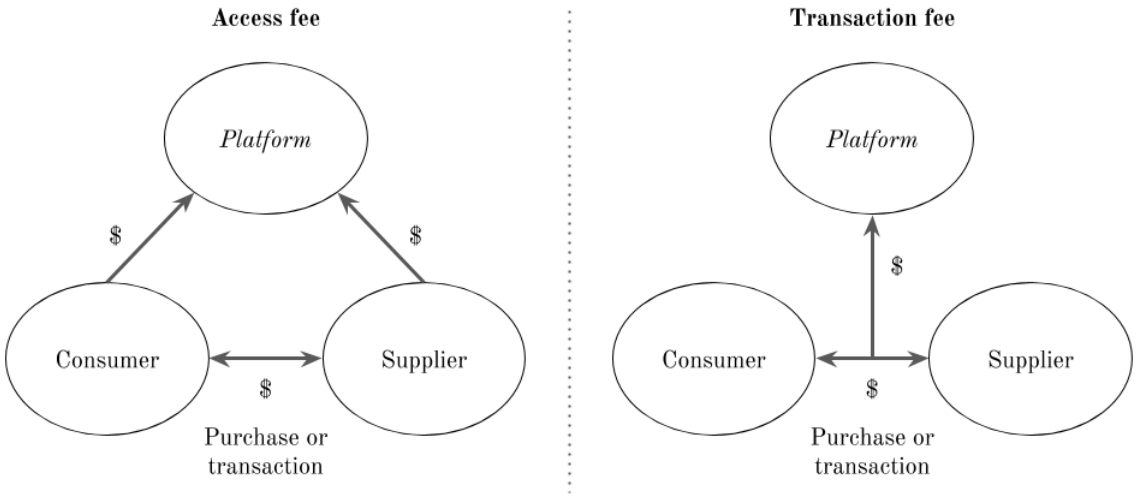


Figure 2.2: Platform pricing types: Visualization of access and transaction fees

Access fee

Access fees are paid up-front by the user, granting access to the platform. An example is game developers purchasing a developer's kit prior to creating games for the platform (Rochet and Tirole, 2004) or consumers buying Apple iPhones to use the apps provided through the App Store. Such up-front fees are useful when it is hard for the platform to charge the transaction, such as conventions where both visitors and those setting up booths are charged an access fee (Bhargava, 2014), and followingly are able to transact freely.

Transaction fee

Without an access fee, but with transaction-based prices, a user can enter the platform free of charge. An example is Airbnb, where the house owner does not pay to be part of the platform, but Airbnb takes a cut of the rental fees paid by tenants. It can be beneficial to only charge transaction fees, as the value from trade between platform participants usually emerge from usage (Rochet and Tirole, 2004). Nonetheless, an important finding is that transaction fees can reduce indirect network effects because the attractiveness of transaction is reduced (Armstrong, 2006). Thus, dominant platform providers might gain more from charging transactions instead of membership fee when deterring the entry of competing platforms (Rochet and Tirole, 2003).

The two pricing strategies are not mutually exclusive, and a platform participant can often be

charged both access and transaction fees (Takakuwa, 2013). Takakuwa (2013) highlights Apple as an example, where developers pay a small fee for the developer kit, but are also being charged 30% of App Store sales and in-app purchases.

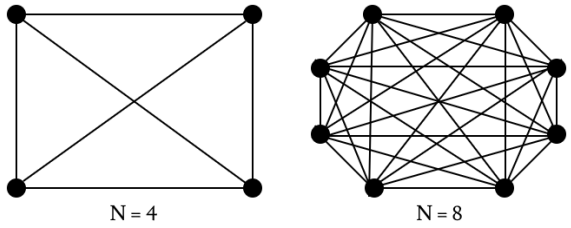
After critical mass

Companies that set out to build a platform must consider an important trade-off with regards to users versus profitability growth (Bhargava, 2014). Further, Bhargava (2014) states, based on theories of (Katz and Shapiro, 1992), that initial users are more likely to value the standalone benefit of the product, i.e., independent of the network. Accordingly, differential pricing can be used to get both sides onboard and to reach critical mass (Evans, 2003b). With the assumption that both sides are already on board, Evans points out that pricing plays a key role in the further evolvement of the platform, after reaching critical mass, to maintain the sides and attract new users. In some cases, substantial fixed costs to set up the platform and low marginal costs associated with running the platform can justify lowering the prices on both sides to maintain user growth (Van Alstyne et al., 2016). In other cases where the user growth stagnates, the platform is inclined to increase its prices to maintain revenue growth, e.g. Netflix' US business where subscription fees were raised in 2017. This can be seen as an example of penetration pricing where the platform first attracts users with a low entry price and then gradually increases the price when network effects become more present (Zingal and Becker, 2013).

2.4 Network structure

Early studies based on industrial organization theory regarded network size, i.e., the total number of users, as a direct measure for the strength of network effects (Brynjolfsson and Kemerer, 1996; Tam and Hui, 2001; Wade, 1995; Schilling, 2002). This assumes that a network consists of indistinguishable users capable of performing transactions with every other user. Further, it is assumed that every user acts rationally and has equal access to information about each other and the potential transactions. Hence, the value provided by any new user entering the network will be equivalent to the utility obtained by the rest of the users in the network (Farrell and Saloner, 1986; Katz and Shapiro, 1985). This is illustrated in Figure 2.3, where the number of possible ties between the users increases exponentially with the total number of users in the network. As every tie presents an opportunity for the users to both capture and create value, it

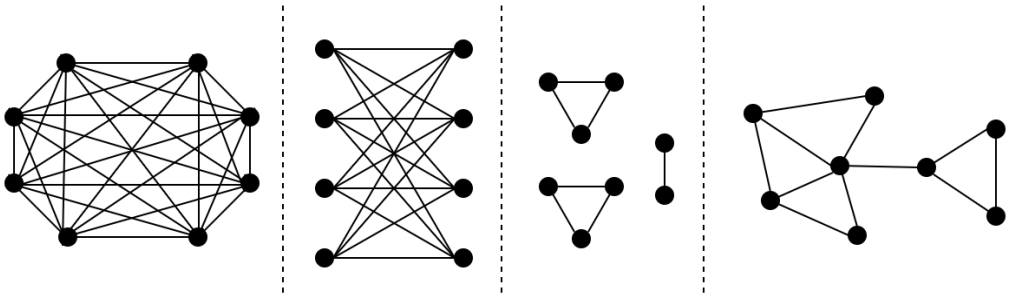
is arguably proportional to the value of the network (Afuah, 2013).



Potential connections increases with number of users

Figure 2.3: Size as a value determinant

While a direct relation between network size and network effects holds true in certain cases, such as phone networks where every user can call every other user, it fails to explain why the strength of network effects can vary between networks of the same size (Afuah, 2013). See Figure 2.4 for examples. In two-sided platforms with two distinct user groups, such as a heterosexual-oriented dating app, transactions only occur between users of opposite user groups. Thus, a new user to the system will only increase the value to the users of the opposite group. A similar effect can be observed on social media sites like Facebook. These platforms often include *subnetworks* – smaller networks within the main network with none or few ties to other subnetworks. Here, a new user will, for the most part, create value for users in the same subnetwork.



The network structure greatly affect the number of potential connections

Figure 2.4: Structure as a value determinant

As an attempt to explain these incongruities, more recent research has considered the *network structure* as a driver for the strength of network effects (Kane et al., 2014; Soh, 2009; Suarez, 2005; Dellarocas, 2003; Swann, 2002). Here, size is only one of several components – the structure of a network is characterized by the number of users, the relationships among the users, and the relative attributes and heterogeneity of the users and their relationships (Besanko and Braeutigam, 2010; Burt, 2001; Tirole, 1988).

Theoretical perspectives from social network theory have also been applied to further describe the role of and the relationships among network users. Social network theory assumes that networks have a varying density and that ties between network users can be broadly classified as either strong or weak and direct or indirect (Ahuja, 2000). Hence, certain parts of a network with particular tie characteristics will for some users be more relevant than other parts (Rindfleisch and Moorman, 2001). This can serve as an explanation of why children tend to prefer video game systems that are popular among their classmates, regardless of the system's total network size, and why Korean villages are prone to adopt a specific family planning method, irrespective of the nationwide adoption rate of the particular method (Suarez, 2005).

Density variation

A varying density in a network can lead to certain users having a higher number of ties than the average user. Such centrally located users can create and capture more value as they have a relatively higher number of direct ties than the other users. Thus, the advent of a centrally located user in a network can increase the strength of network effects to a larger degree than regular users (Soh, 2009; Paruchuri, 2010). An example from recent time is so-called Instagram influencers – users in the photo-sharing social network that have high numbers of followers (de Veirman et al., 2017). The influencers are able to extensively create value due to their large audience size and capture value through paid photo posts and sponsorship agreements with brands, thus increasing the intensity of both direct and indirect network effects.

Density variation can also create *structural holes* in the network in the form of partly or wholly separated subnetworks. Several authors argue that users with the ability to bridge the gaps between these subnetworks are more valuable to the network as a whole than users that do not because they increase the number of both current and future ties for the subnetwork users (Fleming and Waguespack, 2007; Pollock et al., 2004).

Strength of ties

Rindfleisch and Moorman (2001) introduce the strength-of-ties perspective, suggesting that users in a network care most about specific, relevant parts of the network in which they connect with other users with special tie characteristics. The strength of ties is typically measured as the frequency of contact but is also a function of emotional intensity and intimacy (Suarez, 2005). Typically, strong ties are beneficial for frequent and close relations, in which tacit knowledge

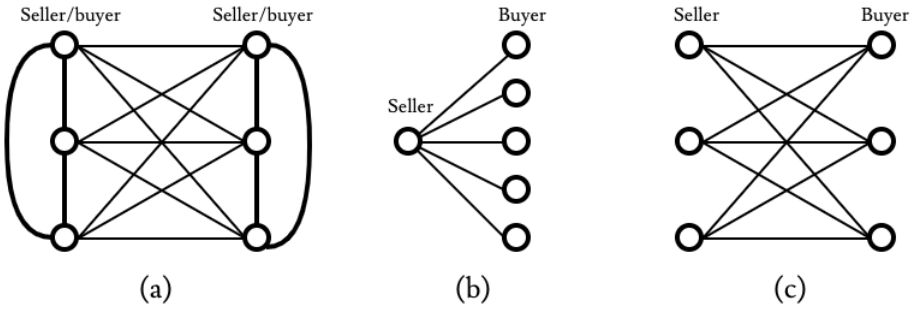
can be transferred, while weak ties are more appropriate for transferring explicit knowledge in infrequent and distant relations (Hansen, 1999). For instance, on the online auction site eBay, strong ties between a buyer and a seller can be beneficial if the buyer seeks more detailed, subjective information about a listed antique item. In this case, the platform includes a private messaging service that can create stronger ties between the buyer and seller. On the other hand, on Amazon, where generally a single, large supplier sells products to many buyers, the platform does not encourage one-to-one interactions between the buyer and seller to the same degree. Here, weak ties are sufficient as they are mainly used to transfer explicit knowledge such as product specifications and price with greater distance between buyer and seller. Based on these differences, Afuah (2013) points out that in order to maximize the intensity of network effects, a platform should seek an equivalent strong-to-weak ties and tacit-to-explicit knowledge ratio.

The concept of *excess inertia* – users' bias towards joining the platform with the greatest size when network effects are present – has been widely accepted in economics and management research (Farrell and Saloner, 1986). This notion explains how two or more competing platforms, such as video game consoles, move towards a "tipping market" where one of the platforms reaches critical mass and ends up dominating the rest in terms of the installed base. More recent research, however, argues that the effect of excess inertia does not propagate uniformly throughout a network (Lee et al., 2006; Suarez, 2005). Due to a difference in the strength of ties between users, different parts of the network may make a non-uniform decision, thus not tipping the market as a whole in favor of a particular alternative. Lee et al. (2006) call this phenomenon *local bias* and explain that a customer's choice of technology can in some instances be more strongly influenced by the choices and opinions of peers than by the total network size. They further argue that local bias is more prominent in customer networks with certain characteristics. In highly clustered networks, one can observe strong ties among neighbors inside a cluster and weak ties between the different clusters. Such local bias may, over time, act as a brake on the WTA (winner-take-all) outcome. A more recent example of this is how Facebook has harvested community effects and social dynamics to create stronger network effects leading to growth in its network (McIntyre and Subramaniam, 2009).

User roles

Afuah (2013) proposes that a user's ability to play several critical roles makes the network more valuable to each user and the platform as a whole. From a structural point of view, networks that allow user switching creates more potential ties between its users, as illustrated in Figure

2.5. By switching roles, a user can, for example, be able to act both as a buyer and a seller in a two-sided marketplace-based platform like eBay (Figure 2.5a). Another example is how YouTube, the American video-sharing website, provides all of its users with tools to both create and consume video content.



The role played by network users decides the number of potential connections

Figure 2.5: User roles as a value determinant

Amazon, the American online retailer, started off with a network structure similar to that of Figure 2.5b, where they were the sole seller in the network. This structure severely limits the number of possible ties due to the unbalanced distribution of seller and buyers. To cope with this, several online retailers, including Amazon and the Chinese equivalent Alibaba, have evolved their network structure to allow third-party sellers into their network, thus increasing the strength of indirect network effects (Figure 2.5c).

In addition, to play one or more roles, certain users can also increase their contribution of value to other users by maintaining specific positions in the network in terms of the network structure and the strength of its ties (McIntyre and Subramaniam, 2009). In the industrial organization economics literature, the term *marquee user* is used to describe a user that is generating a high surplus to the opposite side (Rochet and Tirole, 2003). The term has later been expanded to include users "with whom many other users wish to interact" (Eisenmann et al., 2008).

Marquee users can have a strong attracting effect on potential users for the network and can be highly valuable to users on the opposite side of the network (Rochet and Tirole, 2003; Evans, 2003b). Due to their strong effect on other users, Eisenmann et al. (2006) proposes that platforms should seek to secure exclusive participation from marquee users, effectively creating a monopoly for that provider or its goods or services, by avoiding marquee user switching between competing networks. To achieve this, platforms must often reduce the prices on the marquee users' side, thus increasing the price for the other side of the platform (Evans, 2003b). An example of this

is the satellite TV platforms DirecTV offering exclusive access to every game of NFL its users (Eisenmann et al., 2008). Here the NFL is the marquee user, and the platform typically offers concessions to achieve such exclusivity, increasing the price for the opposite side – the satellite subscribers. A similar case can be observed in the credit card business – American Express has been able to charge substantially higher merchant fees compared to other card issuers due to their attractive customer base consisting of high-spending corporate users (Evans, 2003). These users are considered marquee users by the vendors, and American Express are therefore able to raise its prices on the merchant side.

2.5 Complementors

In multi-side platform literature, *complementors* are regarded as producers of complementary goods – content, features or services of any kind – that provide value beyond the core product to users on other sides of a network (Rochet and Tirole, 2003; Parker and Van Alstyne, 2005; Cennamo and Santalo, 2013). In two-sided networks, complementors are typically on the supply-side, and the availability of complementary products has been shown to be one of the main drivers of the strength of indirect network effects (Armstrong, 2006; Rochet and Tirole, 2006; Hagiu, 2006; Caillaud and Jullien, 2003). Several researchers have empirically tested and confirmed the importance of complementary products when seeking platform success in terms of user growth (Schilling, 2002; Clements and Hiroshi, 2005). McIntyre and Subramaniam (2009) further argues that, in addition to the availability of complements, the necessity of complements should be considered when deciding the importance of complementary products. When the core product provides sufficient value itself, there is little need for complementary products. Other products, such as Blu-Ray players, have no value unless there is a wide range of available complements in the form of third-party content. The necessity for complements can thus be strategically controlled through platform design.

Complementors generally want to build their products on platforms with the largest user bases as platform-specific investments are often required (Boudreau and Jeppesen, 2015). In the video game industry, Venkatraman and Lee (2004) found that third-party video game developers wish to develop their games for the video game console with the largest user base, as it offers a greater market potential. As more complementors on a platform results in user base growth, a mutually reinforcing feedback between complementors and users can be observed. For this reason, the literature has put a strong emphasis on growth strategies with the goal of mass-

attracting complementors and thus maximizing the number of complementary goods available on the platform. In fact, Gawer (2010) and Yoffie and Kwak (2006) found that platform strategies involving complementor management can be more effective for growth than those constructed to attract more users.

Complementor management

There is a strong consensus among scholars in strategic management and economics that complementor management is especially important for platforms (Kapoor and Lee, 2013). In addition to attracting complementors, platform providers must maintain and grow a diverse ecosystem around the platform in which unique skills and insights into user needs can be nurtured (Ceggagnoli et al., 2012; Cusumano, 2010). Benlian et al. (2015) argue that software platforms such as Apple's iOS and Google's Android are dependent on complementors to continuously develop new platform applications to attract users to the platform.

In order to incentivize support from complementors over time, platform providers can provide toolkits that streamline the process of developing complementary goods for the platform. These toolkits can range from basic tutoring of developers to complex software libraries that include commonly used modules in platform application (Yoffie and Kwak, 2006; Evans et al., 2006). Another example of complementor management is Facebook's *widget* ecosystem. Widgets were tiny software applications that could be added to the user' profile pages. In 2009, over 30,000 unique widgets had been added over 900 million times. Boudreau and Hagiu (2009) argue that the widget's popularity both enhanced the network effects among the platform's users, as well as attracting new users and complementors to the platform. The authors further point out how Facebook designed the widget developer ecosystem around free access and low barriers to entry. This included free development tools and testing environments, easy-to-use application programming interfaces (APIs) with the support for several programming languages, and developer conferences to encourage knowledge sharing among the developers.

Competition and exclusivity

To further increase the number and variety of complementary goods, platform providers can encourage competition among its complementors. While competition is not preferred by the complementors (Boudreau and Jeppesen, 2015; Turner et al., 2010) and competing complementors will increase negative direct network effects (Boudreau and Jeppesen, 2015), the advantages

of selling their goods on a dominant platform can exceed the negative sides (Cennamo and Santalo, 2013). Cennamo and Santalo (2013) further argue that high levels of competition among competitors on an application platform can attract more users by lowering the transaction and search costs through greater availability of complementary goods.

Another strategy that platform providers apply to increase the strength of indirect network effects is to form exclusivity deals with certain complementors that deny them access to competing platforms. These complementors can be considered marquee users (see User roles in Section 2.5: Complementors) as they typically provide high-quality complementary goods that users are not able to obtain on the competing platforms (Mantena et al., 2007; Lee and Mendelson, 2007). Armstrong and Wright (2007) further argue that complementor exclusivity can also reduce the platform's competitors ability to participate in the consumer and content markets. For the platform provider, an exclusivity deal can lead to a closer relationship with the given complementor. This may give the provider more extensive control over aspects of the complementary good such as release dates and content type and quality (Stennek, 2006; Yoffie and Kwak, 2006).

Although both competition and exclusivity among complementors can provide greater indirect network effects, Cennamo and Santalo (2013) argue that combining the two strategies is counterproductive. This is due to incompatibility in the configuration of required activities and the incentives they give the complementors. Srinivasan and Venkatraman (2010) present similar finding, concluding that those platforms with a diverse collection of complementors and those with complementor exclusivity are in a better position than platforms with only a large number of complementors.

Unpaid complementors

More recent research has touched upon platforms where complementors are not paid to provide users with complementary goods (e.g. Boudreau and Jeppesen, 2015). Examples include free mobile applications on Apple's iOS platform, free add-ons for a browser like Google Chrome, and free-to-listen music on the audio sharing platform SoundCloud. In these platforms, the complementors are often mentioned as a "crowd" (Bayus, 2012; Afuah and Tucci, 2012). Even though unpaid complementors are motivated by a diverse range of sources excluding monetary incentives, Boudreau and Jeppesen (2015) showed that they respond equally to their paid counterpart to platform growth.

Concerning critical mass, Boudreau and Jeppesen (2015) also point out that platforms tend to

first launch with unpaid complementors, and then introduce systems that give the complementors monetary incentives through advertising or component sales after reaching critical mass. YouTube's content creator ad revenue sharing and SoundCloud's direct monetization program are examples of such strategic transitions.

First-party complementary goods

The provision of a platform provider's own complementary goods, so-called first-party content, has been discussed by strategy literature as a tool to both diversify the platform and to kickstart platform adoption (e.g. Gawer, 2009; Evans et al., 2006). In general, first-party content can be categorized as either substitutes for or complements to the third-party complementors' goods (Hagiu and Spulber, 2013).

Substitute goods typically compete directly with the third-party goods, such as Amazon's private and white label products versus regular branded products, and first-party video games included with game consoles versus games from independent developers. According to Hagiu and Spulber (2013), these type of goods decrease the benefits users derive from complementors, and the platform provider should, therefore, reduce the cost for users and increase the profits acquired from complementors. In order to even out the negative potential negative direct network effects, platform providers should also give indirect benefits to the complementors through user base growth.

For complement first-party goods that generally enhance the value of the third-party goods, Hagiu and Spulber (2013) argue that platform providers should apply an opposite strategy. Here, the first-party content increases the benefits users get from the complementors, and thus, the platform can increase the cost for users and decrease the profits acquired from the complementors. This will increase the attractiveness of the platform for complementors. Examples include Microsoft providing third-party games online capabilities through Xbox Live, thus enhancing the product value for the end user, and Google providing users with ad-driven free services like Gmail and Maps, which again give advertisers a higher number of ad impressions.

2.6 Openness

Products dependent on network effects must carefully decide on the degree of openness (e.g. Ondrus et al., 2015; Eisenmann et al., 2008). Broadly, whether a network product is open or closed is related to how liberal or restrictive it is with regards to users, technology, competitors and other related actors (Boudreau and Hagiu, 2009). It is a trade-off between retaining and relinquishing control over a platform, and will arguably impact the strength of network effects (Benlian et al., 2015). The choice between adapting open or proprietary technology standards will particularly have an impact on the availability of complementary products, and in turn moderate the intensity of network effects (McIntyre and Subramaniam, 2009; Sheremata, 2004). For instance, Boudreau (2010) found a positive relationship between giving complementors easier access to a platform and the rate of growth in complement development for the platform. Eisenmann et al. (2008) and Ondrus et al. (2015) distinguish platform openness at three levels – the provider level, technology level, and user level. As openness at the user level is presented under Curation and governance in Section 2.2, this section focuses on the provider and technology level.

Provider level

Openness at the provider level is related to the involvement and integration with other actors and key stakeholders, in regards to the rights, privileges, and duties on the provisioning side of the platform (Ondrus et al., 2015). Having a closed platform will bring full control over the key architecture and the related network (Eisenmann et al., 2006; Boudreau, 2010). With an open approach, the platform can gain access to resources and capabilities of competitors or similar network products (West, 2003), and thus leverage network effects through platform openness (Eisenmann et al., 2008; Gawer and Cusumano, 2008). Openness can also lead to an increase in the total potential market (Eisenmann et al., 2006), making it easier to reach critical mass and benefit from network effects. Network benefits of incumbent firms are seen as an entry barrier for challengers (Sheremata, 2004), and might pose a challenge for newly established platforms in a competitive environment where network effects are strong. Srinivasan and Venkatraman (2010) explain how platform providers can benefit from close collaboration with game publishers, i.e. bundling new hardware with a popular game to drive sales and related network effects.

Boudreau (2010) and Benlian et al. (2015) discuss two ways to open the platform at the provider level – by granting other companies access (vertical), or giving up some of the control over the platform (horizontal). Operating systems and gaming consoles can be useful to illustrate the difference (Ondrus et al., 2015). Apple and Microsoft allow other companies to create applications and extensions, i.e. complements, for their desktop and mobile platforms, taking the vertical approach. By opening up on the provider level, their platforms can leverage from the network effects that follow from the availability of these complements. Linux, however, has horizontally opened up the code base to the operating system itself. This way, other companies can build their own operating systems based on Linux, and they risk losing network effects to other platforms. Some large mobile carriers in the US and UK have charged higher fees for calls outside their networks, as an attempt to lock users to its service, and strengthen network effects (Fuentelsaz et al., 2015).

Technology level

Openness at the technology level considers the interoperability of the platform with other platforms and the integration of technological components (Ondrus et al., 2015). It is often focused on the degree of compatibility with existing technologies, products and standards (Rysman, 2009; Sheremata, 2004; McIntyre and Subramaniam, 2009).

Compatibility

With a high level of compatibility, users are able to move information and transactions between competing services. For a new product in platform markets, compatibility lowers the barrier for users to try their new product or service, speeding up the process of reaching critical mass (e.g. Fuentelsaz et al., 2015; Sheremata, 2004). Being interoperable with other platforms, the new product can leech off the benefits from its competitors' networks (Eisenmann et al., 2008). On the other hand, it can reduce the number of transactions on the platform as users can perform their actions elsewhere, which can dampen the network effects (Eisenmann et al., 2006, 2008). Technological compatibility among products is a source of benefit, due to the increase in available complements (Sheremata, 2004; McIntyre and Subramaniam, 2009). The extent of compatibility is found to be especially important for challengers in markets with network effects (Sheremata, 2004). As an example, Apple has long strived for its Mac desktop operating system to be compatible with Windows files and applications (Fuentelsaz et al., 2015). Microsoft, on

the other hand, is by far the market leader and has thus not taken measures for Windows to be compatible with Mac files and applications.

Incompatibility

When a newly launched product or service has a high degree of incompatibility, users will regard the value of the product as lower (Katz and Shapiro, 1994; Lee and Mendelson, 2007). This will also limit the potential network value (Fuentelsaz et al., 2015). However, incompatibility, for example through proprietary standards, can create *lock-in effects*, where the switching cost exceeds the added value from the switch (Farrell and Klemperer, 2007). This makes the platform more resistant to competition (Fuentelsaz et al., 2015; Sheremata, 2004).

When product technologies are incompatible, the customer bases will be heterogeneous across competitors, and thus more challenging to imitate (Shankar and Bayus, 2003). Some researchers have found incompatibility elements such as intellectual property protection and switching costs to moderate network effects (Banbury and Mitchell, 2005; Wade, 1995). Switching costs are also found to be especially high when networks are incompatible (Fuentelsaz et al., 2015). However, if the switch provides sufficient value to consumers, they will be willing to move to a challenger's incompatible product (Sheremata, 2004). Thus, the provider of a new, incompatible product in a market ridden by network effects, must be sure to provide sufficient product benefits to compensate (Sheremata, 2004).

Multi-homing

Opening the platform might lead to another phenomenon in platform markets, called multi-homing (Evans and Schmalensee, 2007). For end users, compatibility ultimately means that they can use similar products from different firms together. Defined as the opportunity users have to rely on several competing platforms they find attractive (Evans and Schmalensee, 2007; Evans, 2003b), multi-homing can be both a positive and negative driver of network effects.

Multi-homing is rooted in the preferences of heterogeneous consumers and allows multiple networks to coexist (Rysman, 2009; Sheremata, 2004). A common example is credit card providers and newspapers (Evans and Schmalensee, 2007). People tend to use credit cards from several providers, and alternate between them. Vendors and merchants, therefore, support different card providers – typically when a critical mass of customers uses them. People also tend to read

several different newspapers and magazines, and companies publish their advertisements across different channels, i.e., separate newspapers reaching different audiences, to reach more of the target customer segments. These are examples where multiple sides multi-home.

Multi-homing can also happen on only one side of a platform (Evans, 2003b). Users tend to stick to one platform if it is not efficient or beneficial to use more than one network (Evans, 2003b). Here, the previously mentioned gaming industry example applies. A consumer might only find it beneficial to own a single gaming console because they can access all the games and co-player opportunities they find necessary. Having another gaming console with the same games would not bring any value. Concurrently, game developers commonly create games for several different gaming platforms, because they can reach a much broader network of potential customers (Evans, 2003b).

Rochet and Tirole (2006) argue that multi-homing, the concept of a user being connected to more than one platform, also plays a significant role with regards to pricing. A user group that has many substitutes is more likely to be subsidized than one with few or no alternatives. If one side is subject to multi-homing, the pricing on the other side tends to be very beneficial to ensure the exclusivity of the user group (Rochet and Tirole, 2006). When users enjoy low switching costs and the ability to multi-home, platform owners run the risk of being enveloped. This means that another platform expands its offerings to make one or more related platforms obsolete, swallowing their network (Eisenmann et al., 2006). This often occurs through bundling. A classic example is how smartphones have enveloped portable music players and handheld gaming devices by including music playback functionality and their own gaming platforms. This makes choosing the degree of openness to drive network effects even more complicated, and products in its network must be able to react to the threat of envelopment (Eisenmann et al., 2006).

As described in Section 2.5: Complementors, platforms can seek to establish exclusivity with complementors, to prevent rival platforms from having access to the products (Lee and Mendelson, 2007; Mantena et al., 2007). This holds especially true for smaller, newly established platforms which can use the exclusivity of complement software or features to attract users from larger, incumbent platforms (Mantena et al., 2007). Exclusivity is also shown to reduce multi-homing (Rochet and Tirole, 2006).

Multiple platforms that intersect and compete can still reach critical mass. Rysman (2009) shows that two-sided markets tend to reach a situation where one side multi-homes, while the

other does not. If there are significant multi-homing costs for one user group, such users tend to join only one, more general platform (Eisenmann et al., 2006; Sun and Tse, 2007; Eisenmann et al., 2011). In such cases, niche platforms will forfeit their positions (Cennamo and Santalo, 2013).

Chapter 3

Methodology

In this chapter, the applied research methodology of the study is outlined. This includes a presentation of the research design, the selection process used, primary and secondary sources for the data collection, how the data was analyzed, and finally, a reflection on the chosen method and its potential limitations.

3.1 Research design

This study seeks to investigate how managers of early-stage multi-sided platforms strategize to facilitate network effects by answering the following research question – "How do managers in early-stage multi-sided platforms facilitate for network effects?". Focusing on the qualitative aspect by asking *how* and *why* questions often entail the need for a case study method (Yin, 2011). Yin (2011), Dalland (2012), and Eisenhardt (1989) have indicated how qualitative methods further facilitate the generation of new theories, by allowing in-depth research within the subject at hand. To research industry and preference-independent constructs, a multiple-case study was chosen.

The research design enabled the collection of data from companies in different development stages, giving insight into a wide range of concerns and considerations that management may experience as two-sided platform companies grow. More specifically, a multiple-case study was applied for two reasons:

1. By using a multiple-case study of platform companies in different stages of development

and industries, one can investigate potential ubiquitous aspects of multi-sided platforms independent of their characteristics.

2. By comparing growth-related considerations in multi-sided platform companies using a qualitative case study, the study can expand on the empirical foundation in a nascent field of research.

The research design incorporates multiple data sources through a mixed method, using both qualitative and quantitative approaches, which can help to gain insights beyond a one-sided research methodology (Flick, 2015). Utilizing a research method featuring multiple sources of information, the study seeks to contribute to a broader understanding of the subject.

By comparing qualitative and quantitative data, Kelle and Erzberger (2004) discuss three possible outcomes. Firstly, results may converge. Secondly, results may be complementary, or thirdly, results may diverge or be contradictory. The first case would strengthen the credibility of the findings, as the results from the two methods could fully or partly confirm each other, by supporting the same conclusions. To exemplify, statements gathered through a standardized questionnaire could align with those gathered from semi-structured interviews with a subset of the sample in the survey Kelle and Erzberger (2004). At the same time, they argue that "The right 'mix of methods' [...] is always dependent on the nature of the subject area under investigation and the theoretical concepts employed". Due to the individual peculiarity of platform companies, qualitative data have been chosen as a primary data source (semi-structured interviews), supplementing with both qualitative (news articles) and quantitative (public financial data), further described in the following sections.

3.2 Selection process

As a means of acquiring relevant data and answer the research question, it is of the essence to choose relevant selection criteria for the domain (Bryman, 2008). Table 3.1 shows the five selection criteria chosen for the case companies in this study.

Table 3.1: Selection criteria for case companies

#	**Selection criteria (SC)**	**Reason**
SC1	The platform has two or more user groups	Eliminates companies that are not structured to experience direct and indirect network effects
SC2	The platform enables interaction between two or more user groups that otherwise would not be able to interact without significant friction	Eliminates companies that do not operate as an intermediary between its user groups
SC3	The company was founded during the last 10 years	Events and strategies related to the early phase are not too distant
SC4	Key early-stage personnel is available for one or more interviews	To ensure reflections on early-stage considerations from an inside perspective.
SC5	The company must be based in Norway	To simplify the data acquisition process and allow for in-person data collection

Based on the presented selection criteria, 9 case companies were chosen for the study. They are further introduced in Chapter 4.

3.3 Data collection

3.3.1 Primary data source: Semi-structured interviews

To answer the research question, semi-structured interviews were chosen as a primary data source. This requires the development of an interview guide with predefined questions. As a result, the data collected from the different interviews are ideal for both intra-case and cross-case comparisons. Also, the interviewers have the flexibility to ask follow-up questions and have the interviewees elaborate on statements relevant to answer the proposed research question (Cohen and Crabtree, 2006; Flick, 2015; Tjora, 2012).

The interview guide was formed based on the network effect drivers emphasized by existing research, as presented in Chapter 2. First, the interviewee was given an introduction to the research project and its purpose. Second, the interviewee was asked introductory questions on their background and experience. Third, questions covering topics related to the company, its purpose and business were asked. Fourth, the interviewee was instructed to draw a timeline from inception until the time of the interview, highlighting important events related to strategic choices. Fifth, the interviewee was asked general questions related to growth, user acquisition,

and limiting factors going forward. Sixth, interviewees were asked more network effect driver-specific questions, to have them elaborate on topics they did not touch upon in part five. Seventh and lastly, the interviewers summarized the interview and opened for additional thoughts and questions from the interviewee.

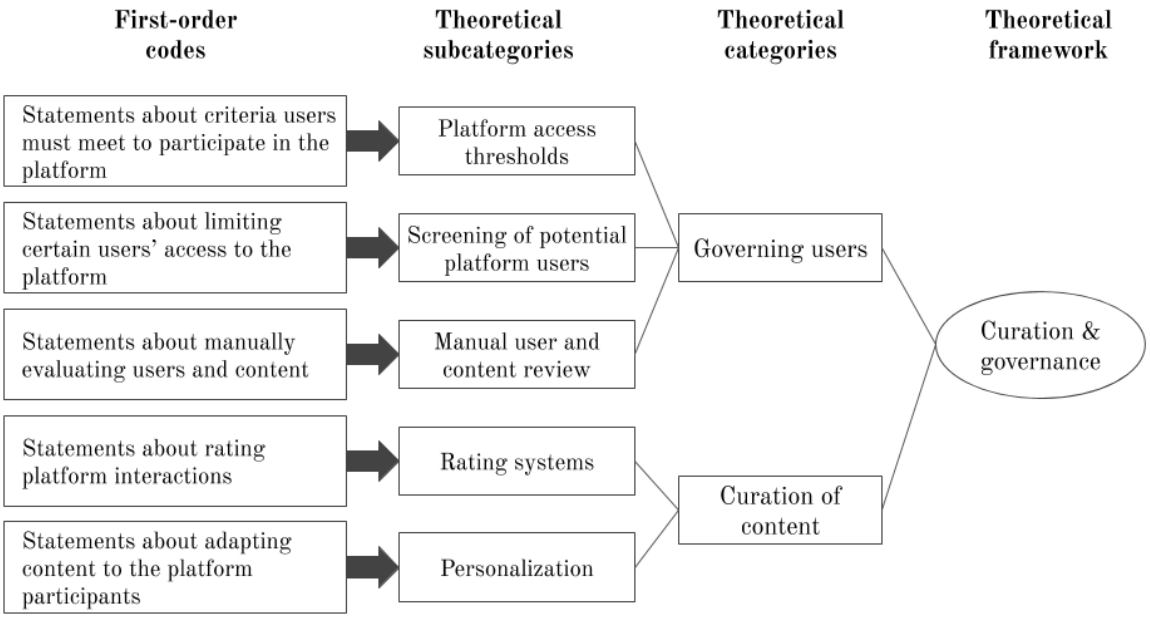
Every interview was conducted by two of the study's authors, with predefined and distinct roles. One was responsible for asking both the prepared and potential follow-up questions. The other interviewer took notes of both verbal and non-verbal communication. In addition, all interviews were recorded using a voice recorder. As interviewees tend to open up in the moments after the formal interview is over (Kvale and Brinkmann, 2009), the interviewers kept recording until the very end and asked explicitly for permission to use any further information that potentially was given. Finally, all recorded interviews were transcribed word by word.

3.3.2 Secondary data sources: News articles and public financial data

As a secondary source of data, news articles, media content and public financial data have been utilized. Such data has been used to deepen the understanding of the historical context of the case companies and their development, giving insights the authors could not obtain directly from the source at the time. The secondary data sources have been used indirectly to give context to the claims made and data collected through the interviews.

3.4 Data analysis

Qualitative data, such as semi-structured interviews, often give vast amounts of data on an unstructured textual format. Some consider existing analysis methodologies to be consistent, allowing repeatability (Eisenhardt, 1989), while others claim that few well-established norms exist (Bryman and Bell, 2014). For this study an inductive approach similar to the one proposed by Gioia et al. (2013), based on Strauss' (1987) method of structural coding was chosen. As illustrated in Figure 3.1, this helps to understand the interviewee's viewpoints on network effect-related aspects, and categorize them into itemized thematic categories, referred to as first-order codes. Next, the first-order codes are grouped in theoretical subcategories, thereafter theoretical categories, lastly connecting them to a theoretical framework. This inductive approach gave an overview of the data in a structured manner, which can be further analyzed. The model in Figure 3.1 includes some examples, but it is not exhaustive of the analysis that was done.



Inspired by Gioia et al. (2013)

Figure 3.1: Structural approach of breaking down the theoretical framework

3.4.1 From first-order codes to theoretical frameworks

After transcribing the interviews, a process of open coding akin to the one proposed by Strauss and Corbin (1998) was applied. Next, utilizing the analysis method of Kvale and Brinkmann (2009), the data was re-categorized using an iterative approach. This was done by re-reading the interview transcripts three times by each of the authors, allowing them to view the data multiple times and potentially reconsider their initial coding. This resulted in more than 50 first-order codes generated. After that, by seeking similarities between the coded data, the number of categories was halved, as proposed by Gioia et al. (2013). While grouping them, the terminology used by the interviewees was maintained. This helped to avoid abstracting away from the interview data at an early analysis stage.

Next, deeper aspects of the first-order codes were attempted to be identified, combining the information given by the informant and domain-specific theoretical concepts, thus attempting to think at multiple levels at the same time (Gioia et al., 2013). This led to theoretical subcategories and categories (Strauss, 1987). For instance, 'Statements about rating platform interactions' was coded as 'Rating systems', generalizing the statements. Based on the similarities between the theoretical sub-categories, the authors were able to group them in broader categories. As an example, 'Rating systems' and 'Personalization' were gathered in the theoretical category

'Curation of content'.

As a final step of the qualitative data analysis, identified theoretical categories were anchored into the theoretical framework. This helps analyze the data both at a more abstracted level, while simultaneously having access to the fine-granular first-order codes that were formed directly from the interview transcripts.

3.5 Reflection on the method

Halldorsson and Aastrup (2003) suggest that the quality of a study can be evaluated by looking into the trustworthiness of the research. Furthermore, trustworthiness is said to be defined by four factors: credibility, transferability, dependability, and confirmability (Lincoln and Guba, 1985).

3.5.1 Credibility

The credibility factor is concerned with establishing whether the results of the research are believable from the participant's perspective. This is because the research intends to describe the point of view of the research participants. Halldorsson and Aastrup (2003) define it as to which extent the participants' perceptions and the researcher's presentation correspond. To control this, all interviews were recorded and transcribed. Further, designing the research as a multiple-case study increases the probability that the outcome is representable. This is because more data give a more comparable data foundation, as well as not being too exposed to outliers which could result in overfitted outcomes.

3.5.2 Transferability

Transferability attempts to identify to which extent findings can be generalized or applied in other contexts or settings than the one studied. The transferability is, by nature, hard to estimate in qualitative research due to the way data is collected in different contexts over time (Erlandson et al., 1993). Nonetheless, the insights extracted from the data in one context can be relevant in other contexts. In such a case it is of essence that the person using the results in another setting understands the original context of findings (Erlandson et al., 1993).

3.5.3 Dependability

The dependability aspect of a research paper is concerned with whether the authors would reach the same conclusions if they could make the same observations twice (Lincoln and Guba, 1985). The data collection has been affected by the time and setting in which it was collected. Connecting the data to the theoretical frameworks has created comparability across the cases. Peer debriefing sessions has further been utilized to discuss the relation between the collected data and findings.

3.5.4 Confirmability

Confirmability is related to the objectiveness of the researchers conducting the study – whether the results of the study could be confirmed or developed by others (Halldorsson and Aastrup, 2003). Therefore it is important that the findings are solely based on the data itself, and not the opinions of the authors. To mitigate this risk peer debriefing has been a useful tool.

3.6 Limitations and assumptions

In this section, limitations and weaknesses of the research method applied are presented. They must all be considered as potential influential factors of this study's outcome.

- The study is based on a multiple-case study. Due to the limited availability of the interviewees, only a single interview lasting 1 hour was conducted per interviewee. This restricted the interviewers' opportunity to ask follow-up questions as they already had a set of predefined questions to go through. Thus, the interviewers might have lost details that were essential to understanding the concepts discussed in the interviews fully.
- In 2 of the 9 cases, due to availability, only one person was interviewed. In both cases, it was the co-founder and CEO. With only one primary source of data from the company, consistency is not controlled across multiple employees.
- The questions asked by the interviewers may have been affected by their subjective, *a priori* knowledge of the case companies, leading to a biased data set.
- CEOs in all case companies were interviewed aside from one, as the CEO here was not available. Talking to the founders and C-level personnel gives proximity to first-hand

insights. However, such personnel is also prone to protect themselves and their reputation, presenting the information in a way favorable to them or biased by their role, consciously or subconsciously.

- All companies interviewed were founded less than 10 years ago, with an average age of 4 years. In early-stage companies there are often unstructured processes and less set routines. Due to this, the data collected is prone to be profoundly affected by the subjective opinion and role of the interviewee.

- Secondary data sources have been applied to enrich the data gathered. Especially news articles are prone to the subjective interpretation of the reporter and authors, limiting the proximity to the original data and beliefs of the companies at the time.

- All of the 23 companies that matched the selection criteria were contacted. 15 of the companies responded to the interview request, while only 9 were available for interviews in the period dedicated to data collection. With more time, a broader data foundation could have been gathered, which might have altered the findings of the study.

- The transcription of the interviews was done using an exact transcription method, including filler words and rephrasing. This ensures including most aspects from the interview to an unstructured textual format.

- The coding can have both a simplifying and a limiting implication on the inductive method. As pointed out by Gioia in the paper of Gehman et al. (2018), using the coding methodology too rigorously might have removed tacit and dynamic elements from the findings.

Chapter 4

Introduction to case companies

This chapter contains an introduction to the interviewed case companies. Public financial data including 2018 revenue and the current number of employees were collected from the Norwegian public register center, Brønnøysund.

Combine

Combine is a gym membership platform that provides its members with access to classes at multiple gyms for a fixed monthly price. Combine shares revenue generated from the monthly membership fees with the gyms based on the total number of booked classes at each gym. After a pilot run in Trondheim, Combine launched in Oslo in 2018. They have about 30 gym partnerships and approximately 300 members.

FundingPartner

FundingPartner is a crowdlending platform for SMEs seeking higher-risk loans. Private investors lend the companies a monetary amount of their choice, and get interests and fixed repayments in return. FundingPartner takes a fixed cut from both sides when a loan is fulfilled. They launched in 2018, and have so far arranged loans for about NOK 50 million.

Learnlink

Learnlink is a private tutoring platform that connects parents seeking tutoring services for their kids, the pupils, primarily in secondary school, with freelance private tutors. The platform takes a cut for each hour of tutoring. Learnlink launched in 2014, and today facilitates approximately

1200 tutoring hours per month.

Let's Deal

Let's Deal is a platform for *deals* – discounts and coupon codes on products or services – submitted by third-party vendors. When a consumer finds and purchases a deal, Let's Deal takes a cut of the transaction. Let's Deal launched in Norway in 2011, as a branch of a Swedish company. In 2018 they provided sales of about NOK 50 million.

Nabobil

Nabobil is a peer-to-peer rental service for privately owned cars. Car owners make their car available for rental on the platform, and consumers browse available cars and can request to rent a car for a limited period of time. Nabobil takes a cut of the rental fee received by the car owner. The platform launched in 2015, and today facilitates about 1 000 car rentals per week.

Teston

Teston is a platform for user testing of digital products or services. Companies submit tests for their product or service online, and freelance user testers give feedback to the company by performing a set of defined tasks. Testons charges companies per completed tests, and testers get paid for each test they complete. The platform launched in 2017, and currently has 4 000 testers.

Tiltspot

Tiltspot is a web-based gaming platform where the player uses his or her smartphone as the controller and a TV as the console. The platform offers games from both first-party and third-party developers, and is currently at a pre-revenue stage. Tiltspot was launched in 2018 and today includes 6 games and has about 200 active players per week.

Tise

Tise is a social marketplace for classified ads, primarily second-hand clothing and furniture. Sellers list their items on the platform, and interact directly with potential buyers. Tise charges a transaction fee for payments done through their in-app payment system. The platform launched in Norway in 2016, and expanded to Sweden in 2017 and Brazil in 2019. Today, they have approximately 500 000 registered users and NOK 2 million in transactions per day.

Unite Living

Unite Living is a platform connecting and providing tools for property owners and tenants. The service started off by providing matchmaking for young adults seeking shared housing, but has later added a marketplace for house listings and a property management tool for property owners. Unite Living launched the first version in 2016, and has about 19 000 registered users.

Table 4.1: Overview of case companies

Company	Acronym	Value proposition	Supply-side participants	Demand-side participants	Founded	Employees (April'19)	Revenue '17 (in NOK)
Combine	**CO**	Gym membership aggregator	Gyms	Members	2018	3	290 000*
FundingPartner	**FP**	Crowdlending service	SMEs	Investors	2016	8	649 000
Learnlink	**LL**	Private tutoring service	Freelance private tutors	Parents (of pupils)	2014	8	501 000
Let's Deal	**LD**	Discount and coupon marketplace	Vendors	Consumers	2011	43	59 571 000
Nabobil	**NB**	Car rental service	Car owners	Consumers	2015	11	6 715 000
Teston	**TO**	User testing service	Freelance user testers	SMEs and large enterprises	2017	11	2 443 000*
Tiltspot	**TS**	Smartphone- and web-based gaming platform	Game developers	Gamers	2017	3	31 000*
Tise	**TI**	Social marketplace for second-hand items	Consumers	Consumers	2014	8	1 313 000
Unite Living	**UL**	Property management and shared housing matching	Property owners	Young adults	2016	5	436 000

*2018 numbers

Chapter 5

Findings and analysis

This chapter presents the most prominent findings from the conducted interviews with the platform managers. The findings are grouped according to the drivers of network effects introduced in Chapter 2, and several aspects managers consider when forming network effect-related strategies are presented. These include building the initial user base, dealing with the challenge of multi-homing and off-platform activity, ensuring platform quality and balancing network growth with curation and governance mechanisms, and managing complementors and complementary goods.

5.1 Building an initial user base

To facilitate future network effects, platforms are dependent on establishing an initial user base. Most of the case companies have done this by first targeting a narrow subset of their potential market, referred to as *niches*. They have then utilized a broad set of channels for attracting the first users from these niches, and after that, added more channels to scale up and strengthen user growth.

Table 5.1: Channels for building and growing the user base

	CO	FP	LL	LD	NB	TO	TS	TI	UL
Niche focus	**X**	**X**	**X**	**X**			**X**	**X**	**X**
Major channels for attracting first users									
Media coverage		**X**			**X**				**X**
Friends and founders	**X**	**X**	**X**		**X**		**X**	**X**	
Direct sales	**X**		**X**	**X**		**X**	**X**		**X**
Marketing			**X**		**X**				**X**
Major channels for strengthening growth									
Influencers	**X**							**X**	
Social, referral	**X**		**X**		**X**			**X**	
Word-of-mouth	**X**	**X**	**X**		**X**				
Partnerships		**X**			**X**				
Marketing	**X**		**X**	**X**	**X**	**X**		**X**	**X**

5.1.1 Network growth within niches

Several of the case companies have targeted particular niches and focused their efforts on these. A niche can be a narrow customer segment with specific limiting characteristics or traits, such as age, discipline, or interests. The niche can also be related to the service offering itself, with the platform provider narrowing focus or scope of the platform offerings. The companies argue that having a niche focus makes it easier to develop and verify the platform's initial market potential, before eventually scaling up and expanding either its offerings or target groups. Companies like Combine and FundingPartner and have focused on niches since their launch. Other platforms, such as Tise and Learnlink, started as entirely open, wide-focused platforms, but later decided to narrow their focus to a more specific niche product or user group. Nabobil has not limited its platform to niches at all, but they did consider it before launching.

Niche from start

Combine wants to give its members access to a wide variety of exercise opportunities for a low monthly price. They have, therefore, decided to focus on partnering with targeting smaller,

more specialized gyms to get them onboard the Combine platform. Large gym chains typically already have an extensive offering of exercise options and are thus considered direct competitors, rather than potential partners. As one of the managers remembers – *"It was first when we met with the smaller gyms and understood their problems that we felt confident that our solution could work"*.

Similarly, while FundingPartner technically could have offered crowdlending to companies from all industries and sizes, they decided to focus on real estate and growth companies initially. Reviewing and evaluating the loan applications require specific domain knowledge, and the type of companies that are granted loans through FundingPartner is thus dependent on the teams' competencies and knowledge of the related industry. For example, FundingPartner has received several applications from companies within the aquaculture industry, but reject them as they do not know the industry well enough to evaluate such applications properly. If applications from a new industry reach a noticeable volume, FundingPartner can then decide to expand its competence and begin accepting applications from such firms, thus expanding into a new niche. This happened recently when FundingPartner started to include movie production companies as a new niche segment. Requests from investors also influence the choice of future niches, and FundingPartner plans on introducing companies from new industries as they get a sufficient amount of requests from both investors and companies in that niche.

At launch, Let's Deal was only open for deals on experiences and services. Due to the temporary nature of deals, Let's Deal was able to test the response of services in various categories continuously. The most popular categories were proven to be restaurants, hairdressers, and other wellness providers, and Let's Deal continue to focus their efforts on landing deals within these categories. Let's Deal also tested selling physical products as deals, such as clothing items to test response. The response was satisfactory, and as a consequence, they have started to build their own inventory of certain popular items.

While Tiltspot could publish games of all genres, they have decided to focus on the social aspect of gaming and only allows repetitive multiplayer games that must be played by two or more players at the same time. *"It became clear early on that we had to focus on a specific niche. We couldn't do both single-player, multiplayer, small, large, narrative and repetitive games,"* says one of the managers. The manager also considers the social aspect of multiplayer games to be an essential factor for creating word-of-mouth effects, as the players will need to have one or more friends to play along with. This aspect is reflected in their slogan *"Gaming made social"*. As for the players, Tiltspot focuses on students and young adults. This focus is consistent with the

games offered on the platform, which are typically games that can be played in school breaks or with friends at parties.

From open to niche

After the platform launched, Learnlink was open for all types of tutoring. Tutors could offer sessions on everything from playing instruments to kiting and driving practice. Learnlink realized it would be challenging to cater to the needs of all these different types of users. Therefore, they decided to focus on a more specific niche by rebranding Learnlink as a platform solely for private tutoring of children. The managers explain that they made this move for several reasons. Firstly, it was apparent that education and homework tutoring was the most prominent type of tutoring on the platform. Secondly, both co-founders had previous experience with homework tutoring on, now, competing platforms. Additionally, the new niche focus made it easier to build a balanced supply and demand of tutors and parents.

Tise made a similar strategic decision as Learnlink. In the beginning, Tise was a second-hand marketplace for all kinds of used goods, including furniture and other interior articles, tools, and even real estate. In the same way as Learnlink, Tise realized they could not simultaneously grow in all of these segments, and needed to focus on a more specific item category. It was not an easy decision, however, and one of the managers remembers being hesitant to decide on a niche category – *"We were for a long time afraid of narrowing the scope, but we were told, and finally understood, that it was important"*. Tise observed that clothes were the far most popular items on the platform, indicating this was the best category to focus on first. This choice has first and foremost affected how they brand their platform, and clothing is the main focus in all of Tise's communication, business development, and marketing. While Learnlink has reduced its platform focus to only offer homework tutoring, Tise is still open for all item categories, but their significant efforts are in the clothing category. By keeping the other categories active on the marketplace, they can continually gather information on which category to start focusing on next eventually.

Additionally, Tise saw that the majority of the items on the marketplace were sold and bought by women aged 18-35, and decided to put their significant efforts into this demographic. Tise now claims to have 60-70% market penetration among women 18-24 in the Norwegian market. These numbers can now be a limitation to future growth, one of the managers explains – *"What do we do when we reach 100% market share in women 18-35? We can't grow beyond 100%"*.

Another observation made by the Tise was that 90% of its users were iPhone users. This share is twice the share compared to the overall Norwegian phone market, where iPhone users make up a 45% share. Furthermore, they noticed that iPhone users tend to sell and buy more items, take better pictures, and generally create higher quality listings. These observations have led Tise to primarily focus on iPhone users, for example, by creating a specific item category for Apple products, where their users can sell used iPhones and Mac computers.

As Unite Living has expanded their service offering over the years, they have also changed which niche to focus on. The first version of the platform focused exclusively on young adults looking for roommates for shared housing. At this time, Unite Living specifically targeted high school students as they were soon to move out from their parents' houses. After they expanded the platform also to include apartment listings, Unite Living included another niche group to the platform – by directly targeted property owners who put up listings on competing platforms.

Before launch, Nabobil was considering whether to launch nationwide or to focus on a geographical niche. They wanted to avoid the so-called 'empty-room' problem – that users would not be able to find a car the first time they visited the platform, be dissatisfied, and thus never return. They, therefore, considered only making the platform available in a smaller, limited area of Oslo. The idea was that if they could focus their efforts on gaining traction in a smaller area, it would be easier to gradually expand as they experienced indirect network effects within that area. However, they decided to go for a full launch by making the service available in all of Norway, and thus decided to not focus on a niche target group. One of the managers explains that by not restricting the service geographically, users themselves would help Nabobil get started in new areas – only by putting their car up on the platform. Nabobil thus decided not to limit their offering geographically, but rather focus on successively catering to 'early adopter' users in new areas. These are user types that are particularly interested in new technology and solutions and contributed to getting Nabobil up and running in new areas.

5.1.2 Attracting the first users

In order to facilitate network effects, the platforms are dependent on establishing an initial user base. The case companies reached their first users through a series of channels. These include friends and family, paid online marketing, media coverage, and direct sales. Most of the case companies have made use of multiple channels to acquire their first users. FundingPartner and Nabobil actively implemented a media strategy to create awareness of their launch. Several of

the companies have used themselves, friends, and other people in their networks as the first users. Reaching out to friends is considered by the managers to be a low-risk effort to get the platform started. Moreover, friends are also more willing and likely to help create awareness of the platform. Other common channels to acquire first users include marketing and advertising, as well as direct sales.

Media coverage

FundingPartner had to be granted a concession from the government before they could launch their platform, and this process took almost two years. After waiting for the concession to be approved, FundingPartner operated in stealth mode because they were afraid others would try to imitate their platform. However, after some time they decide to go out of stealth mode, and instead create hype for the platform and start building a potential user base of both companies and investors. In hindsight, they realized this was a strategically smart move. In the following months after going out of stealth mode, FundingPartner garnered extensive media coverage, with articles in two of the largest Norwegian business newspapers. Together with the media articles, FundingPartner started accepting sign-ups from potential investors through their website. This strategy was positive for increasing brand awareness and helped them build a user base before launch. One of the managers explains that, after the first few articles, *"We went from 1 or 2 sign-ups a week, to 4 or 5 sign-ups per day"*. They still actively use the e-mails gathered in this period to announce newly published loans to investors. FundingPartner also actively managed a Facebook page, where they published updates about the progress. FundingPartner also contacted companies who had previously shown interest as a result of the media coverage. Toward these companies, FundingPartner operated as if they had already launched by simulating the reviewal process of loan applications. This way, FundingPartner gained experience from the process of being operative. When FundingPartner finally received its concession in 2018, it could launch with a group of companies and investors ready to go.

Close to launch in 2015, Nabobil landed an exclusive agreement with one of the largest tabloid newspapers in Norway to cover the platform's launch. The day of launch, a lengthy article was published on the newspaper's front page and contained a direct link to the signup page on Nabobil's website. This coverage drove significant traffic to the platform, and one of the managers explains that this has been the most substantial growth they have ever experienced, both in car owners and car renters joining the platform. After the exclusive coverage in the tabloid newspaper, other news outlets have sporadically written articles about Nabobil, and

each time this happens, Nabobil sees a boost in user growth. With car sharing being a relatively new phenomenon in Norway, a premise for Nabobil's growth is to create consciousness about car sharing itself. Hence, continuing to educate the public with the help of mainstream media is an integral part of Nabobil's marketing strategy.

Friends and founders

Before the official launch in 2016, Tise had a test run of the marketplace, mostly limited to the NTNU university campus in Trondheim. The founders started adding their own clothes, textbooks, and furniture to the app and had their friends and fellow students do the same. The Tise smartphone app also had a Facebook integration, which allowed users also to share their items in relevant buy-and-sell Facebook groups. According to the founders, this helped create a word-of-mouth effect on campus.

Similarly to Tise, the co-founders of Nabobil and their friends and family were the first users to put up cars for rent on the platform. Additionally, the day before launch, the Nabobil team reached out to their LinkedIn network with a short description of the platform concept, urging them to add their cars to the service. By doing so, Nabobil had close to 100 cars available for rental on launch day, just in time for the surge of new users from the previously mentioned newspaper article.

Unlike Tise and Nabobil, Combine did not have an initial plan for acquiring their first members when they first launched in Trondheim. One of the managers remembers that the team was asking themselves, *"How will we even get out first members?"*. However, when the second version of the platform was ready for launch in Oslo in the summer of 2018, they announced it in a Facebook group for entrepreneurs, offering the group members to test the platform for free. To get further volume on the member side of the platform, Combine also contacted a group of potential pilot users. These were typically friends or others within the founders' close network. Through these initiatives, Combine was able to get their first users onboard, which helped them get further feedback on the service as well as spreading the word about the platform. When describing their first users, one of the managers calls them typical *"early adopters"* – *"They didn't care that much about the details and were more tolerant for a less mature service"*. Learnlink also took a similar approach when they launched the first version of the platform. The very first tutors were the founders themselves and a couple of their friends. Learnlink also quickly started to post in relevant Facebook groups, mostly student and university communities across Norway,

where they promoted the opportunity for a well-paid, part-time tutoring job.

At launch, Tiltspot announced its new platform in various Facebook groups and through the founders' network. However, they soon realized that as they had targeted players first, they did not have a sufficient number of third-party games. As a consequence, Tiltspot had to offer games developed in-house, so-called first-party games. After building their technical infrastructure with these few first games, Tiltspot could continue marketing towards players. As more players started testing the platform, they again realized that they lacked content to draw new players to the platform and increase retention. The manager remembers that *"The first summer after launch we barely had any players"*. As developing a game can be very time-consuming, Tiltspot has now understood that they should have targeted game developers first. As the manager says – *"If I could go back, I would have started by reaching out to game developers"*. That way, they could have first gotten a sufficient number of games available on the platform, and in turn, get users to play those games.

Marketing – physical and digital

To acquire their first users, Unite Living spent most of their marketing budget on Facebook ads, targeting their niche of high school students and young adults looking for roommates. Unite Living was using what they refer to as *"viral marketing"*, where the goal is to make the content spread organically through social media. The campaigns included provoking videos that featured nudity and controversial celebrities. While the campaign became popular in social media and had a short-term, viral effect, it did not contribute to sustained platform growth, according to the manager. Unite Living has since moved away from such marketing strategies, as they believe it could harm their brand. In addition to digital marketing, they visited high schools to promote the platform directly to potential users in the niche group. LearnLink also visited numerous secondary and high schools to hand out flyers and create awareness for private tutoring on the platform. Additionally, as a way to reach the parents, LearnLink utilized Google Ads for the most relevant keywords, such as 'homework' and 'private tutoring.' One of the managers explains that advertisement on Google quickly became the most significant source of new users, as they here directly target the parents rather than the children of the parents.

Direct sales

Before launching their platform, Combine tried to land partnerships with gyms in a smaller Norwegian city, Trondheim, but the efforts were not as successful as the founders had hoped. One of the managers reasons that this was due to the city's lack of competition between gyms, as well as a general skepticism to new platform services among the gym owners. Although they landed deals with a few yoga studios, they were not able to obtain the variety in gyms that they deemed necessary for the platform's success. Further, Combine did not get some of the most popular niche gyms in the city onboard, including an indoor swimming pool and a climbing center. These gyms were considered to be essential marquee users, and Combine explains that this is one of the main reasons why they chose to cease operation in Trondheim after their pilot run. After deciding to move their service to Norway's capital, Oslo, Combine conducted a similar approach of on-boarding new gyms by directly reaching out to them. This approach proved to be more successful in Oslo, and one of the managers argues that this was due to more fierce competition among the niche gyms. This lead to the gyms being more open to new services such as Combine.

Similarly, Teston got their first enterprise customers through direct sales when they still had a so-called minimum viable product – a low-fidelity version of what Teston offers today. This version consisted of a landing page where companies could fill out questions in a simple third-party form. Teston then went out to find freelance testers matching the desired criteria by using ads on Facebook. The testers received the questions along with a screen recording tool and instructions for how to perform the test. This way, Teston was able to concurrently validate the product, build an initial user base, and get feedback from both companies and testers used in later revisions of the platform.

When Unite Living transitioned from being a one-sided platform for young adults seeking shared housing to a two-sided platform for both shared housing tenants and property owners, they hypothesized that they could easily attract all the property owners due to indirect network effects. The idea was that if they had many tenants, the property owners would be attracted to the platform. However, this did not go as planned, and they did not see an influx of property owners on the platform. To improve on the situation, Unite Living instead went to a popular platform for listing rental apartments. Here, they found the contact information of property owners and called them to ask if they wanted *"double market exposure"* by also publishing their apartment listings on the Unite Living platform. The strategy proved to be successful, and

Unite Living got the first property owners onto their platform in this. Similarly, the co-founders in Learnlink knew that a large Norwegian classified ads site was a favorite place for parents to look for tutors for their children. Here, Learnlink directly contacted parents who listed tutoring requests for their children and offered them a suitable tutor from the newly launched Learnlink platform. Most of Let's Deals first vendors came through direct sales. Upon launch, Let's Deal already had multiple direct competitors in the market. As they expected to see a consolidation in the market, they sought to position their platform further to attract both vendors and customers from their competitors.

5.1.3 Scaling up and strengthening growth

After acquiring the initial users, the case companies have utilized other strategies to scale up the size of the platform network further. The use of influencers in marketing has been essential to both Tise and Combine. Further, the use of social mechanisms and referral features have been implemented by platforms including Learnlink, Combine, and Tise to build organic growth. Several of the companies have started noticing a word-of-mouth effect, leading to strengthened growth through inbound sales. Other strategies include partnering with incumbent companies, as well as continued efforts on traditional marketing.

Direct sales

With the full-scale launch of the Tise platform in 2016, the company got a new investor and team member onboard who is a well-known influencer within the Norwegian fashion and entertainment scene. This hire created headlines about Tise in many of the major media outlets and significantly boosted user growth. Additionally, the new team member has a broad social media audience, with more than 400 000 followers on Instagram today, many of which are women aged 18 to 35. The collaboration created a new, highly effective way for Tise to reach out to their target segment, according to one of the managers. While Tise can credit a lot of their growth to the reputation the influencer had within their target user group, the managers also point out that it is simply not enough to get any large influencer onboard. *"Others regularly ask us if finding a big influencer will help them succeed, and I don't think so at all,"* says one of the managers. The manager considers their influencer's authority within the field of fashion, and admiration within the target segment as vital factors for Tise's growth. *"The influencer has to truly reflect the brand,"* the manager further explains and says that a competing platform

partnered with one of Norway's best-known influencers, who had a substantially larger follower base than Tise's influencer in 2016. However, the partnership did not have the expected impact on the competing platform's user growth, and it shut down just months later.

A positive side-effect of having a reputable influencer within the target segment on the platform is that similar influencers are drawn to the platform, the other Tise manager explains. These, however, are not compensated and is, therefore, a vital source for further user growth. As an example, he points to a recent event – *"This weekend [the blogger], with almost 300 000 followers, posted on Instagram that she was selling some items on Tise. That generated a lot of traffic"*.

Combine also makes use of influencers to create attention around their platform. In order to attract more members to the platform, an important strategy is the use of so-called ambassadors. Combine ambassadors have a significant audience on social media and are often role models within the field of exercise – similarly to how Tise's influencer is a role model for Tise users. Ambassadors receive free memberships, and in return, promote the Combine platform to their audience, typically by posting on Instagram. Combine has decided to limit the number of ambassadors to 10, in order to keep the management costs to a minimum and to find ambassadors who represent Combine well and *"actually love their service,"* as one of the managers puts it. So far, Combine has not yet reached out to the most popular influencers in Norway but instead focused on ambassadors with smaller audiences – around 5 - 15 000 followers on Instagram – who are, thus, more likely to accept the Combine membership as their sole compensation for promoting the platform. However, they do consider to get more famous influencers onboard soon and are currently looking for a celebrity or influencer with a strong brand that *"reflects the values of Combine"*. This person should not only market their platform but also join as a team member and employee. One of the managers points to Tise and their influencer as an example of what they want to achieve – *"It would have helped to get someone like Tise's influencer, which reflects our values and can convey the message of a healthy lifestyle"*.

Social and referral features

Combine considers exercise to be a social activity for many of their users and thus aims to take advantage of this by facilitating user growth through word-of-mouth. To further amplify the growth effect of word-of-mouth, Combine is testing multiple referral features, including a referral program where users can invite friends, and in exchange receive a month of free membership for each friend that signs up. Combine also periodically offer two weeks of free membership

with promotion codes used in various marketing efforts. One of the managers explains that the referral program and promotion codes have worked well and that they will introduce more social mechanisms later this year – *"You'll be able to invite your Facebook friends to classes, and refer new members to get a week of membership for free"*. Let's Deal has taken a similar measure to boost organic growth by experimenting with referral programs where users can invite friends and receive an in-app gift card.

During its first couple of years, Learnlink did a lot of what they refer to as *"guerrilla marketing"* on Facebook – posting in numerous student and university groups promoting the opportunity to have a part-time job as a freelance tutor. The word-of-mouth effect among tutors has now become so significant that Learnlink has stopped marketing towards potential tutors through Facebook. One of the managers estimates that 50% of tutors come from word-of-mouth, and they claim to *"have an unlimited supply of students that can become tutors"*. To further facilitate increased user-led growth, tutors have their own Learnlink-profile accessible online that can be easily shared in social media. Although some profile shares have occurred, one of the managers states that it has been quite infrequent, and not led to any significant growth in either tutors or parents. Additionally, they have tried using referral programs for tutors, but have not experienced notable results from this either.

Tise also regards their social features to be one of the most important mechanisms for growth. Being inspired by Instagram, Tise users can build their social profiles and follow and interact with other users. Tise finds that users are sharing their profile on other social platforms because they want more people to follow them on Tise. This social aspect has led to the majority of Tise's new users coming from such referrals.

Word-of-mouth

Learnlink has noticed word-of-mouth to be a vital source for parents coming to the platform. They estimate that one-third of new parents come from word-of-mouth, making it the second largest channel for new pupils and parents. The word-of-mouth effect is very limited between pupils themselves, while it can be quite strong among the parents. Measuring word-of-mouth effects is difficult, if not impossible, as the parent might have heard from Learnlink from multiple sources. One of the managers exemplifies this – *"What if a parent heard about Learnlink from a neighbor, and then three months later googled 'Learnlink' and clicked on an ad. Our system will consider them to be a lead generated through Google Adwords, not through word-of-mouth"*. A

manager from FundingPartner also points out that it is hard to measure word-of-mouth because users might not consciously know where they first heard of the platform – *"You might've heard about us from a friend, but before that, you've also read an article about us. Is it then word-of-mouth?"*

Before launch, FundingPartner expected the word-of-mouth effect among companies to be strong, and that their most important focus would be to get the investors on-board. However, this turned out to be the opposite – today there is a strong word-of-mouth effect among investors, which have led to unexpected growth on the investor side of the platform, while the number of companies seeking loans is lagging. This results in loans being filled within minutes after publication, and a group of dissatisfied investors that rush to the platform upon receiving a notification, only to find out that the loan has already been filled. One of the managers draws a parallel to traditional stores and explains – *"We have a long line outside our store. It's the classic platform problem – you try to balance the sides, but never do"*.

Combine has begun experiencing word-of-mouth effects as gyms now contact them after hearing about the platform from peers or competitors. A manager from Nabobil also claims that they have a large amount of organic traffic and that much of their growth stems from word-of-mouth among consumers. The manager also believes the name Nabobil, which means 'neighbor car' in Norwegian, has a positive impact on brand recognition and how consumers talk about the platform. Word-of-mouth has also helped Teston grow the number of testers. They have observed that new testers often belong to the same group of testers, with regards to age and education, as those who potentially referred them.

Partnerships

Some of the case companies have entered into partnerships with other companies as a way to grow their platform. FundingPartner has established a partnership with a large, Norwegian bank. The deal involves the bank referring loan-seeking companies to FundingPartner if their original loan application gets rejected due to risk. *"The large banks are only able to give out low-risk loans, so we're complementing their own services,"* explains a FundingPartner manager. This partnership creates a new distribution channel for the platform while also helping the bank to become a one-stop-shop for all banking services. Furthermore, the partnerships give FundingPartner credibility towards both investors and companies as the bank has a solid reputation in the Norwegian market. They have also recently revealed a similar partnership with another bank,

which forwards companies to FundingPartner if they fall outside the bank's target segment. The bank then receives a percentage cut of the revenue generated by the loan through the FundingPartner's platform.

Another example is Nabobil's partnership with a Norwegian government-owned railway company. If a user books a longer-distance round-trip with train or bus through their online service, he or she will be suggested to also rent a car through Nabobil during their stay – similarly to how travel booking websites suggests car rentals through third-party companies. One of Nabobil's managers explains that this partnership has become one of their significant channels for new users. The partnership model is akin to FundingPartner's partnership with banks, as the railway company also strive to become a one-stop-shop for all transportation services.

Physical and digital marketing

A large share of the parents using Learnlink come from Google Ads, where Learnlink pays to show up on all the most relevant keywords. However, they have reached the point where more money spent on Google leads to Learnlink showing up on irrelevant keywords that do not convert users. *"I wish we could find a channel for new customers that worked great and throw money at it. But we haven't found that channel yet,"* explains one of the managers. In search of new marketing channels, Learnlink has recently started to apply a media strategy to increase consciousness and recognition for private tutoring services among the general public. So far, the media coverage has shown to be most effective in rural areas of Norway, where awareness and use of private tutoring services are not as high as in the Oslo metropolitan area.

Combine points at marketing and visibility as one of the most critical factors for growth. The primary sources for new members come through content marketing from ambassadors and other members on Instagram. Through social media advertisement, Combine is promoting the platform itself, but also use the advertisement as a way to recruit ambassadors, as the managers consider these also to be important for growth.

Nabobil has spent significant amounts on marketing and is actively attracting new users through Facebook and Google advertisements. Especially through the summer of 2017, Nabobil had a vast, continuous marketing push. They ran massive campaigns with outdoor advertisements on all buses and trains in Oslo. While user growth was especially strong during the summers of 2016 and 2017 due to the advertisement, one of the managers admits to having overspent on marketing. The manager further explains that it is not enough to get the users registered on

the platform – they also have to be activated by either renting a car or putting up their own. In addition to traditional advertisements, Nabobil has also focused on content marketing through blog posts and other social media activity. They create blog posts, articles, interviews with users and car owners, share testimonials and stories, and add useful guides such as '5 steps to rent out your car'. This type of content marketing has been effective channels for driving traffic to the site, according to one of the managers.

Similarly to Nabobil, Teston uses advertisement on social media to attract new users. When Teston gets requests from companies that require testers with a very narrow set of skills or characteristics, they have to go outside their existing user base to acquire new testers with the required attributes. In these cases, Teston uses targeted marketing on Facebook to find and onboard testers that meet the requirements.

Let's Deal experienced increased growth when they started with TV advertisements. They also run marketing campaigns regularly in online newspapers and social media. In 2015, Let's Deal's biggest competitor, ceased operations in Norway, and Let's Deal believed they could easily target and convert the competitor's existing customers and vendors. However, this was not as successful as they initially thought – one of the managers reasons that many of the users were probably already using both services. *"We thought 50 + 50 would equal 100. But it didn't – it was more like 50 + 50 equals 60"*.

In their traditional marketing, Tise has focused on promoting the items that are sold on Tise. This tactic is contrary to their competitors, who instead communicated messages such as 'sell your stuff here' or 'get rid of that old sweater today' in their advertisement. Tise has been highly successful in its product and marketing strategy, according to the managers. With regards to growth through paid marketing, they explain that they have reached a point of diminishing returns, as they have already captured almost 70% of their target segment.

Similarly to Tise, Tiltspot's marketing strategy also includes promoting individual games available on the platform, not just the platform itself. They have experienced that games with more visually appealing covers attract more players to the platform. FundingPartner, on the contrary, has chosen not to use its companies for marketing purposes. While several of their competitors encourage their loan-seeking companies to promote a loan after it has been published, FundingPartner believes companies themselves should not need to actively promote the platform or try to draw investors to the platform. This decision is justified by how the companies might feel vulnerable seeking a loan through a crowdlending platform and do not want to invite friends

and peers to invest in a higher-risk loan.

Tiltspot meets a lot of its potential users through attending game conferences, and have participated in several of the largest gaming conferences in Europe. At one of the conferences, the manager remembers that *"I think we had 700 people visiting our stand in one weekend"*. These conferences help them build brand recognition, receive feedback from players and game developers, and increase the recognition of the platform. Teston has also gotten many of its companies by attending conferences and events. In the fall of 2018, they sponsored a design and innovation conference. Although requiring a high up-front cost, it resulted in more than 100 new interested companies. Teston has experienced that meeting the potential clients at such events significantly shortens the time-to-close in comparison to traditional cold-calling sales.

5.2 Locking the users to the platform

Multi-homing occurs when platform users are simultaneously active on other competing platforms, usually because a single platform cannot satisfy their needs. Two or more users can also decide to avoid interacting through the platform after their initial connection completely – often to avoid transaction fees charged by the platform provider. We call such actions *off-platform activities*.

According to the managers, both phenomenons are considered harmful as they can lead to a reduction in the number of transactions on their platforms. This reduction limits growth and can reduce potential income from transaction fees. To tackle these challenges, the case companies have implemented a broad set of initiatives to create more significant lock-in effects in their platforms and give the users stronger incentives to stay. These initiatives range from specific lock-in functionality, integrations or incompatibility with competing platforms, non-core services providing extra functionality, social communities to strengthen the ties with and among the users, as well as monitoring user activity.

Table 5.2: Measures to handle multi-homing and off-platform activity

	CO	LL	LD	NB	TS	TI	UL
Measures to handle multi-homing							
Lock-in functionality						**X**	
Integrations with competing platforms					**X**		**X**
Incompatibility with competing platforms				**X**			
Measures to mitigate off-platforms activity							
Complementary services				**X**		**X**	
Strengthening user ties	**X**	**X**		**X**			
User activity monitoring		**X**	**X**				

5.2.1 Dealing with multi-homing

A majority of the case companies that have competing platforms in the Norwegian market, experience some degree of multi-homing among their users. Moreover, multi-homing is present among both sides of the platforms, and the manager's response to the phenomena varies greatly. Some implement specific functionality or features to increase lock-in effects as a way to mitigate multi-homing, such as Tise and Nabobil. Others try to leverage the multi-homing by building direct or indirect integrations to competing platforms, including Tiltspot and Unite Living. Lastly, some of the case companies experience multi-homing due to a lack of volume on the supply side, such as FundingPartner. These companies instead focus on growing the lagging side of the platforms, as a means to reduce multi-homing.

Lock-in functionality

To mitigate multi-homing and create a new revenue stream, Tise introduced their an in-app currency in 2017. The users earn units of value through activity on the platforms, such as buying and selling items. The in-app currency can then be used to access premium features in the app. For example, a user can spend the in-app currency to give their listings increased exposure by pushing them to the top of other users' feed. One of the managers explains that the initiative helped to grow the platform further and increase the stickiness among its users as they do not want to leave the platform if they have an outstanding balance in their account. *"People actually care about the [in-app currency]"*.

For almost two years, the users earned one extra daily unit of the in-app currency for each day they had opened the app consecutively. While this scheme was implemented to increase the retention rate among the users, it had an unexpected side-effect – *"we noticed several users who had been active every single day for almost two years, which gave them up to 700 points for each day they logged in,"* explains a manager. This scheme inflated the value of the currency, and thus, they decided to remove the daily reward scheme.

As a crossbreed between traditional classified advertisements websites and Instagram, Tise emphasizes the social aspects of its platform and focuses on building strong ties between its users as a way of reducing multi-homing. Users can create profiles and follow each other, and see other users' previous listings, similarly to the photo grid in the widely popular social media platform, Instagram. The follower system can potentially lead to stronger ties between the users. If the buyer is satisfied with their first purchase, Tise sees many repeating transactions between the two users. Two factors can explain this – their body size and style of clothing is likely to match. *"We try to educate our users on the importance of building a good profile,"* one of the managers explains. Another interesting effect of the Instagram-inspired features of Tise is how users tend to start by selling their items cheaper to build up a follower base, to then increase the prices.

Integrations with competing platforms

The manager of Tiltspot explains that game developers are inclined to develop for the platforms with a high number of players. To tackle the challenge of multi-homing among the developers on the platform, they have approached the problem in two different ways. Firstly, Tiltspot has paid game developers to produce exclusive content for their platform. Secondly, they have arranged so-called game jams – time-constrained game developer competitions – to gain access to exclusive titles from up-and-coming and hobby developers. By releasing exclusive titles on their platform, Tiltspot is limiting developer multi-homing. Secondly, they have accepted the fact that multi-homing is very common among game developers, and decided to develop a plugin for a popular game engine to both encourage and lower the barrier for multi-platform releases to include Tiltspot. This strategic move will be detailed in Section 5.4.1: Managing third-party complementors.

As for multi-homing among players, the manager of Tiltspot explains that this is very hard to avoid with all the different gaming consoles and smartphone games available in today's market. For this reason, they have neither encouraged or dismayed it – *"It's a very competitive industry*

with three main players running the show – Sony, Microsoft, and Nintendo".

In the first version of Unite Living's platform, the focus was to match young adults seeking shared housing. After finding a match, the users went to the dominant Norwegian marketplace for property listings to find an apartment for rent. In later revisions of the platform, users still go to competing property listing platforms to find apartments, but they are further locked in to Unite Living by having to sign the contract in their property management tool offered to the property owners. While the dominant Norwegian marketplace for property listings can be considered a competitor according to the manager, Unite Living is currently building an integration to the competing platform such that the property owners can share their apartment listings directly from Unite Living. This is a way to piggyback on the competing platform, as both the tenants and property owners are already actively using both platforms.

Incompatibility with competing platforms

While Tiltspot decided to accept multi-homing among its developers with their game engine plugin and Unite Living with their planned integration with the competing platform, Nabobil mitigates multi-homing by creating incompatibility with other platforms. A manager in Nabobil explains that while they do see some users renting out their cars on a competing, but smaller peer-to-peer car rental platform, they do not consider it a significant problem. In addition to being a larger platform, there is a logistical challenge present for these users – Nabobil does not provide calendar integrations with other platforms – thus, a car owner must manually update and sync all calendars on the different platforms to avoid double bookings of their car.

In addition to the calendar incompatibility with the smaller competing platform, Nabobil reduces multi-homing through their choice of integrations with keyless lock systems in cars. Rentable keyless cars were fully introduced to the Norwegian market in 2018 with the launch of a new car rental platform. The entrant's car fleet consists of both platform-owned cars as well as cars owned by individuals, like Nabobil. Furthermore, the new competing platforms require all of the cars to be fitted with keyless lock systems. So-called keyless cars have been retrofitted with a combination of software and hardware that allows the renter to unlock the car with a mobile app instead of a physical key. This means that the car owner does not have to meet the renter before and after the ride, which can increase the car owner's probability of accepting a rental request, according to one of the managers in Nabobil.

As a response to a new competitor's launch, Nabobil updated their mobile app the same year

to support a keyless system. However, Nabobil chose a different keyless system than the competitor, thus making the two systems incompatible. This choice meant that a car owner had to choose between Nabobil and the new competitor if they wanted to rent out their car with a keyless system. As of today, Nabobil supports a total of 3 keyless systems – 2 third-party systems in addition to a built-in API-based lock system in all cars from a particular electric car manufacturer. One of the managers explains that the two third-party systems currently create a strong lock-in effect for Nabobil, but this might change when more car manufacturers integrate API-based keyless systems in their cars by default. Additionally, the integration with the keyless lock system simplifies the process of renting out cars on the Nabobil platform. While the car owners have to pay for the system themselves, the upgrade allows them to increase the usage of their cars significantly by removing the need for a physical meetup with the car renters before and after each ride. Thus, the upfront cost is covered through an increase in rental income, according to one of the managers.

Platform size

Tise has noticed that in addition to using Tise to buy and sell clothes, some of their users are active on other platforms as well. One of the managers explains that they experienced a higher degree of multi-homing during the platform's first years. When Tise launched in 2016, there already existed a dominant Norwegian marketplace for selling smaller, sub-1 000 kroner items. Additionally, two competing mobile classified ads platforms entered the Norwegian market. At the time, Tise noticed that sellers published their items on all the available platforms, but as they gained a substantial market share from the use of influencers, word-of-mouth, and targeted marketing, more users started to use Tise as their go-to platform. A manager explains how they heard from a user who went from using both Tise and a competing platform in parallel to solely using Tise to find second-hand clothes – *"she noticed that sellers who previously posted items on both platforms started listing on Tise exclusively, so she stopped using the other classified ads site for shopping"*. The manager further explains that the most active users on the platform still list their items on several platforms to maximize exposure. However, from random sampling among sellers who mark their items as sold, the sales tend to have happened on the Tise platform, says one of the managers.

A manager in Nabobil points out that size alone helps to reduce multi-homing among its users. *"While we have seen users renting out their cars on other platforms, it has not been considered a large problem as we're currently the largest car sharing platform in the Norwegian market"*. By

having the largest pool of cars, both car owners and car renters will have a higher probability of finding a match through Nabobil, compared to the smaller platforms.

In the more recently launched platform, FundingPartner, the managers witness another consequence of limited platform size. They experience multi-homing among investors due to a lack of users on the company side of the platform. The managers acknowledge that their users multi-home, but choose to focus on growing their platforms instead, as a means to reduce multi-homing.

At FundingPartner, published loans become fully invested in a matter of minutes. Hence, there is a large group of investors who want to invest money but are not able to do so due to the limited availability of loans. One of the managers explains that many of the platform's investors are present on multiple platforms for this reason. The manager further points out that while it is not desirable for FundingPartner as a platform, it can be valuable to the investor to multi-home to diversify their investment portfolios. On the company side, FundingPartner notices that the companies often approach several crowdlending platforms to compare terms. This is a healthy sign as it proves proper business understanding, according to one of the managers, and forces FundingPartner to stay competitive by providing the best terms possible.

Category drivers

While the managers generally considered multi-homing to be undesirable, it can also help to drive awareness for the platform's domain, and thus attract new users to the platform. A manager from Tise explains that during the years with fierce competition in the mobile classified advertisement space, up against the two other similar and recently-launched platforms, the general awareness for second-hand shopping increased due to marketing. *"They spent more than 100 times what we spent on marketing – each"*.

One of the managers in Nabobil further elaborates on the fact that competing platforms help to increase the general public awareness of car sharing and car rental as an alternative to owning a car. This includes both car owners and renters on the new and the smaller competing platforms, as well as members of local car-pooling groups. *"We're happy for not having to educate the masses by ourselves,"* the manager says.

However, category drivers can also be detrimental for the platform – one of the managers in FundingPartner explains that the variance in the screening process of loans on competing plat-

forms poses a significant risk to their platform. If multiple loans default in 2-3 years, it can have severe consequences for the whole crowdlending market in Norway.

5.2.2 Mitigating off-platform activity

The users' primary motivation to go outside the platform is to avoid transaction fees, and the platform managers try to avoid this kind of activity by providing functionality or services that incentivizes users to perform the transaction within the platform. Examples include Nabobil who provides car insurance for the car owners and Tise with their in-app escrow payment system. Other platforms try to leverage the network structure in their platform to create stronger ties – both among users, but also between the platform provider and the users – as a lock-in mechanism. Learnlink actively works to strengthen the ties of its users, while Combine and Tiltspot wish to create a social community around their platforms. Lastly, some platforms monitor user behavior to detect and mitigate the off-platform activity, including Learnlink and Let's Deal.

Complementary services

Nabobil's car insurance, provided by a third-party insurance company helps to reduce off-platform activity to the minimum, according to a manager. While there are some cases of car rental outside the platform, the managers do not consider it as a significant problem – *"People simply won't rent out their cars to strangers without insurance,"* one of the managers explains. Another manager further elaborates that platforms without such a vital service will have a tough time surviving – *"There have been many platforms that do not work simply because the users might as well go outside the platform"*.

Tise's in-app payment system is another feature built to protect its users financially. It includes an escrow service to hedge the buyers and sellers against fraud provided by a large third-party payment service. To cover the service's transaction fees and further monetize transactions on the platform, Tise currently charges a 10% transaction fee, deducted from the money received by the seller. While the payment system provides added value to its users, off-platform payments is still a significant challenge for Tise. Up to 95% of all transactions happen outside the built-in payment system, which amounts to a significant amount of lost revenue. *"We're missing out on a lot of money,"* says one of the managers. In Norway, most of the off-platform payments happen through a dominant Norwegian peer-to-peer payment service, which has zero transaction

fees. One of the managers believes this is due to the service's strong position in the Norwegian market and Norwegians general high level of trust. This hypothesis is further substantiated by finding that customers who experience scams are more likely to start using Tise's own payment system for their next transaction. As for the 10% transaction fee, one of the managers explains that they have previously experimented with reducing the fee to increase the amount of in-app payments. *"We found the breakpoint to be at a 0% transaction fee, with a substantial decrease in usage if we upped it to 1%"*. Thus, they would not maximize profits by reducing the transaction fee, even though more users would use the escrow service.

While Tise has settled with the low usage of their payment system in Norway, they see another trend in foreign markets. For instance, in Brazil, where Tise launched its platform in early 2019, the safe payment system is used substantially more even though free peer-to-peer payment alternatives also exist. *"I still believe in our in-app payment system, especially in countries where the general societal trust is weak"*.

Strength of ties between users

When Learnlink first launched its platform, few control mechanisms were applied to the tutors and pupils. For this reason, the founders were afraid of both tutors and pupils going outside the platform to avoid Learnlink's transaction fees. This fear was righteous, and after launch, off-platform activity was a significant problem. After moving towards a more niche platform with more rigorous curation and governance, the off-platform activity became less apparent – more on this in this in Section 5.2.2.

Additionally, by providing competitive terms for the tutors, such as guaranteeing monthly pay and handling all potential problems with pupils, Learnlink creates stronger bonds with its tutors and built loyalty. *"We want to be the tutors best friend,"* explains one of the managers. Furthermore, Learnlink has tried to strengthen its bonds with the tutors through social events, competitions, and gatherings in the larger cities of Norway.

Learnlink also focuses on giving the best possible terms to the other side of the platform – through continuous contact with the parents, Learnlink tries to make its user experience outweigh the potential money saved from going off-platform. A positive side-effect is that the parents get a strong relation with Learnlink as a platform, instead of only establishing ties with the tutor.

Strong ties exist between tutors and parents in Learnlink as most of the pupils are only taught

by 1-2 tutors each on average. One of the managers explains that this number was closer to 1 when starting, but through upselling and increased usage, Learnlink has managed almost to double the metric. If a parent's child has lessons in several school subjects, he or she generally has more than one tutor, as a tutor often in only a few subjects. There also exist some children who receive lessons in up to 5 subjects by two or three tutors. Tutors are also teaching a small group of children, with an average of 1-2 children per tutor.

Learnlink strives to strengthen the bonds between tutors and parents as they have experienced it to reduce churn among the parents. During the onboarding process of new parents, the Learnlink team finds the *"dream tutor"* based on the profile of the parents' child, although a manager admits that this process is significantly less tailored than what it appears, as described more thoroughly in Subsection 5.3.1: Curation. However, while the strong bonds between the tutors and the pupils and their parents create a significant lock-in effect on the platform, it can also have harmful side-effects. One of the managers explains that they often see parents churning if the tutor leaves the platform. This will almost always eventually happen as most of the freelance tutors are students themselves and will not need the tutor job after they have graduated.

While Learnlink benefits from strong ties between the two sides of the platform, Combine wishes to strengthen the ties between its members. Through in-app social features such as the possibility to invite other members to classes, as well as showing the profile pictures of attending members for each class, Combine wishes to leverage the social aspects of working out. These features are to be included in Combine's upcoming smartphone app.

Tiltspot aims to build a community for its developers and players as a way of reducing off-platform activity through the strengthening of user ties. This planned community will include a rating and feedback system, as well as access to test users for un-released games. The manager hypothesizes that this can create stronger bonds between the developers and players on the platform.

User activity monitoring

Learnlink monitors the activity level of both the tutors and pupils through continuous dialogue with all parties to detect off-platform activity. If they notice anomalies, they call the tutor or parent to identify the reason for the reduction in activity. According to one of Learnlink's managers, this has been an effective way to spot tutors and parents who bypass their platform

– *"We would follow up on a customer who hasn't paid anything in 3 months and ask if they're happy with the tutor. If they then say that everything's good and that Torstein teaches every Monday, we know what's going on"*. The managers also explain that there have been cases where the tutors themselves would give a notice to Learnlink when a parent has suggested to go outside the platform.

Similarly, one of the managers at Let's Deal explains that they sometimes notice vendors that market their deals outside the platform to avoid Let's Deal's cut of each transaction. In such cases, the sales team calls the vendors and explains that this violates the terms of the platform. *"I believe in transparency and good communication rather than punishment regimes,"* says one of the managers. Off-platform activity is especially apparent in the beauty and wellness segment. Here, customers often see the deal and call the saloon directly to book an appointment. The same manager believes there is a large number of dark figures regarding this type of behavior, as it is tough to detect, and explains that the Let's Deal team is continuously working on minimizing this.

5.3 Ensuring platform quality

To promote and ensure quality content and interactions on the platform, the case companies have implemented various curation and governance techniques. While curation and governance mechanisms typically share the same goal of strengthening the impression of quality on a platform, they have some differences. Curation techniques are often applied to help users discover the most relevant users to interact with, and browse highest-quality or most relevant content that already exists on the platform. Governance, on the other hand, typically includes mechanisms to completely exclude specific users or types of content from the platform.

Table 5.3: Applied curation and governance mechanisms

	CO	FP	LL	LD	NB	TO	TS	TI	UL
Curation mechanisms									
Rating system			X		X			X	
Personalization			X	X	X			X	X
Governance mechanisms									
Pre-screening	X	X	X	X	X	X	X	X	
Thresholds	X	X	X				X	X	
Manual review	X		X	X				X	

5.3.1 Curation

The most common curation practice among the case companies is rating systems, which allow users to rate the perceived quality of content or other users. Several of the case companies have utilized rating systems similar to those found in popular multi-sided platforms such as Airbnb and Uber. Rating systems have been introduced as a way to promote quality interactions on the platforms, as bad ratings might reduce the probability of a party being able to transact on the platform in the future. Relying mostly on actions from users, a rating system is seen as an effective and thus scalable curation measure. While these systems have proven to be useful for platforms such as Nabobil and Tise, where there is a high frequency of transactions, it did not work out as well for Learnlink due to the nature of low turnover of interactions between tutors and pupils.

Some of the platforms also use personalization as a means to show each user the content believed to be of most relevance or interest. The case companies typically make use of two types of personalization. Some provide matching, either through manual handpicking or by the help of algorithms, while others make use of personalization as a way to monetize the user base. This is typically achieved through paid promotions, where sellers on the platform can pay for their content to be more frequently visible to users that are likely to find the good relevant and interesting.

Rating systems

While their platform was open to all types of learning, Learnlink established a rating system for its tutors. The idea was that proficient tutors would receive high ratings from parents, while those less fit would receive low ratings. The tutors were able to set the price themselves and could regulate this as their rating changed, or they received more requests for tutoring. However, this solution did not lead to the desired curation effect. As tutors only had the same one or two pupils for an extended period, the ratings were given very infrequently, and there was never a natural time for the tutor to up the price of the lessons. These factors incentivized the tutors to abandon their existing pupils, and instead find new ones to whom they could charge a higher price. This resulted in pupils leaving the platform as they lost their original tutor. The pricing of lessons turned into a 'reverse auction' – tutors listed their lessons for a very high price, and gradually lowered it until they found a pupil willing to pay the price. One of the managers explains, *"The tutors that understood the pricing mechanisms spammed the platform with tutoring offers until they found someone willing to pay a way too high price"*.

Learnlink also observed that the price set by the tutor was often wrongly mistaken for quality. New tutors on the platform thought they had to price their lessons higher than the other tutor in order to give the impression of higher quality tutoring. One of the managers remembers a tutor asking, *"If I'm charging less than another tutor, will I be considered as good but cheaper – or just less skilled?"*. To avoid these negative consequences, Learnlink has now shifted away from a non-curated pricing model, to a standardized model. Tutors now receive a fixed salary per hour, that is increased if parents are consistently satisfied with the tutoring. Variation in what the end-user pays per class, thus, only affects what Learnlink earns.

Nabobil has been more successful in using a two-way rating system to improve the quality of the interactions on the platform over time. People looking to rent a car will generally choose the car owner with the highest rating. According to one of the managers, *"the rating system has worked very well"* with regards to ensuring safe interactions, as well as improving the matching system. Car owners can choose to manually accept or decline a rental request and tend to decline a request if the renter has bad reviews from other car owners. Tise also uses a similar two-way rating to ensure better transactions between buyers and sellers. By letting the users rate both the sold items and each other, this system reduces the platform providers' workload, making it an efficient and scalable curation method.

Personalization

Learnlink has a partly manual matching process in order to provide parents with the best tutor for their children. As one of the managers says, *"It is really important to them that we do the job to find the one tutor we deem a perfect match. We tell them we are going to find their 'dream tutor'"*. After a thorough conversation with the parents, the Learnlink team finds an available tutor that is marked as skilled in the relevant subject and in some cases has been trained for tutoring pupils with more specific needs and traits. To provide parents with a feeling of choice and a higher degree of personalization, Learnlink used to suggest three different tutors and let the parents decide whom they wanted. This turned out to be not ideal as the parents were uncomfortable with making a choice, and often based their decision on the tutor's profile picture rather than the actual tutoring skills. Sometimes the parents were even not able to choose a tutor at all, and, thus, ended up not completing the onboarding process. For these reasons, Learnlink returned to only offering one tutor – calling it a *"perfect match"*.

Nabobil also provides matching mechanisms in their platform. By utilizing an automated algorithm, a user will get suggestions for cars based on how likely the car owners are to accept the rental request. The algorithm takes into account several factors, such as the previous rental requests owners have accepted or turned down, time of day, day of the week, and rental duration. Nabobil has achieved a matching rate of approximately 90%, which means that the owner accepts 9 out of 10 requests to rent a car. A similar algorithm is also utilized by Unite Living when they match people looking for roommates. Matching is done using data points such as interests, age, gender, and education. At the time of launch, Unite Living wanted to avoid what they refer to as an 'empty-room' problem, meaning that the users would not be able to find any roommates in their search. They changed the matching algorithm to be less constrained. They admit that they first focused on quantity over quality, later realizing it was not the best move. As the manager says, *"It was a little like a ghost town, but we solved it with bad matches"*. Users were flooded with potential roommates, but most of the hits were not relevant. Unite Living now believes the algorithm should have included usage data as well, including how often users sign in and send messages. They claim this would have reflected how urgent it was for the users to find a roommate, improving the probability of a match.

An essential aspect of Tise is the users' ability to follow and interact with other users through social profiles. A user's feed is then adapted to their interest, displaying the most relevant content from their followers and similar users. Users can also follow hashtags, for example,

for a specific style, category, or size. People selling clothes on Tise are further able to pay for promotion in order to appear more frequently or prominently on specific hashtags, or in the feeds of potential buyers.

Let's Deal makes use of, according to the manager, both *"global trends and individual preferences"* to display the most relevant deals to users. When a new user signs up at Let's Deal, the bestsellers and newest deals are displayed on top of the front page, as these are most likely to trigger sales. Even though different deals target different user groups and personas, Let's Deal displays the same deals to all new users, regardless of age, gender, or other characteristics. The deals displayed first are therefore mostly targeted towards Let's Deal's niche focus of females aged 18-35. Through A/B-testing, Let's Deal, to their surprise, found that newer deals performed better with first-time users than the bestsellers. Therefore, the newest deals are now always highlighted first. As users begin interacting with the platform through purchasing and reviewing deals, the platform adapts to the user by highlighting and promoting deals that are found to be relevant to the individual user.

5.3.2 Governance

To make sure unwanted users or content are not allowed onto the platforms, most of the case companies have implemented governance mechanisms. The companies typically argue that governance measures are essential to ensure the impression of quality and safety on the platform. To govern the content provided on the platforms, most of the case companies have implemented screening mechanisms. As examples, Combine inspects gyms, FundingPartner thoroughly reviews loan applications, and Learnlink makes tutors go through various tests and interviews.

In addition to, or in lack of, screening mechanisms, some case companies put up barriers for their users. These barriers are typically put up in order to raise the threshold of participating in platform interactions to reduce the chance of the platform being flooded by low-quality content.

While screening and thresholds are typically used to restrict who, and what is allowed onto the platform in the first place, several of the case companies take quality control measures to continually monitor the quality of the users already on the platform. Let's Deal, Combine, Learnlink, and Tise, all review the suppliers on the platform.

Pre-screening

The loans provided through FundingPartner are typically given to projects and companies that are considered to be outside traditional banks' acceptable risk range. Therefore, all applications are thoroughly evaluated and analyzed as it is crucial to FundingPartner that the investors perceive the loans published as safe. FundingPartner has defined strict criteria the loan companies must meet to have their applications accepted, which are of both quantitative and qualitative nature. They receive a large number of loan applications from companies, but less than 10% of applications are accepted. While the number of loans provided is an obvious bottleneck for FundingPartner's growth, one of the managers believes *"it is important not to take shortcuts on quality just to increase quantity"* in order to build trust and be perceived as a consistent, and serious actor in the crowdlending market. Furthermore, FundingPartner has experienced that previously denied companies have been granted loans from competing crowdlending platforms. This tendency substantiates their claim to be more quality-oriented than other platforms, and that it is a deliberate strategic choice. One of the managers firmly states that *"If you look at our loan portfolio, you'll find that it is all high quality"*.

Learnlink has a comparably thorough process for its selection of tutors. After Learnlink moved away from a rating system, Learnlink now puts the tutors through a process similar to a typical hiring process. Upon applying, tutors must submit their grade transcripts and certificate of ethical conduct. They then perform multiple online tests that assess subject-specific knowledge as well as their general skills as educators. Finally, the candidates are evaluated by Learnlink employees in group interviews. One of the managers explains that they can have such strict governance due to the *"near unlimited amount of potential tutors"*.

Combine is focused on providing their members with access to quality gyms and therefore wants to control which gyms are allowed onto the platform strictly. As one of the managers says: *"The offering has to be high-end because the gyms we have are quality-oriented. It is important that [the gyms] are associated with a brand that is focused on premium quality"*. For this reason, gyms cannot themselves sign up and start publishing their classes to the platform, but must enter into partnerships with Combine first. Before entering into these partnerships, Combine has a strict approval process focusing on qualitative aspects of the gyms. The Combine team itself inspects the studios' facilities and services. Combine does not have a complete checklist of criteria for a gym to pass the inspection – it is instead a subjective impression. They do not want to offer their members gyms that the founders would not want to visit themselves. So far,

Combine has turned down two studios pre-partnership, because they did not meet the quality requirements.

As previously mentioned, Tiltspot limits the games allowed on the platform to repetitive multiplayer games. According to the manager, they have been talking to experts in the gaming industry to pinpoint what quality games are. Still, Tiltspot acknowledges that the reviewal of games is based on a subjective opinion of quality. An important aspect when reviewing games is the aesthetics of the graphics. Games that are more visually appealing have proven to be more successful, both in marketing and the frequency of plays. Going forward, Tiltspot considers establishing a community where game developers themselves decide what is of acceptable quality through testing, ratings, and feedback on each other's games. While such a community would be more scalable, they are well aware of the potential pitfalls of letting go of the governance control. The manager exemplifies this by pointing to one of the world's largest gaming platforms, which recently got into trouble and had to override the decision of their community to accept a rape-themed game.

Let's Deal admits to having a quite relaxed subjective governance process, and instead let the users' response, such as sales numbers, decide what a good deal is and what is not. Still, sales managers have their account managers ask themselves, *"Would I send my relatives or best friends to that restaurant or hair salon?"*. Reflecting on whether this subjective practice could lead to either too relaxed or too strict screening processes due to individual managers' preferences, the management team felt confident that sales managers would quickly notice any significant variation in the quantity of the deal offerings. Still, one of the managers believes some consumers perceive the deals on Let's Deal to be of low quality, which can be a limiting factor for growth.

Another way to enforce governance is to require user verification. FundingPartner, Nabobil, and Tise implement this mechanism. On Nabobil, both car owners and renters must identify themselves through the Norwegian national ID platform and pass a check of their credit score. FundingPartner also requires investors to be verified through the national ID portal. Also, they must complete a survey of questions about their investment knowledge and experience, which is required for regulatory reasons. Tise requires Facebook- and phone-verification for all buyers. They have found that this helps improve the average first rating of its users, as potential scammers would not want to identify themselves.

Increasing thresholds

In the Tise app, users were previously prompted to read and accept a guide on best practices for listings before they were allowed to list their first item on the marketplace. The guide showed them how to take good photos and write informative descriptions for the item they were selling. However, Tise decided to remove the guide when the volume of items increased on the platform. A manager explains that the high number of items on the marketplace incentivized the sellers to produce high-quality listings in order to get noticed.

To verify the quality of their testers, Teston makes all new users perform a sample test that is evaluated by the Teston team before they are allowed to perform a real user test for a client company. If a client company is not satisfied with the execution of a particular test, Teston will replace it free of charge, and the tester will not be paid. This way, testers are strongly incentivized to perform well.

Due to costs related to customer support and transaction fees, FundingPartner loses money on the investors that invest small amounts. Therefore, they have considered using pricing mechanisms such as introducing a lower-limit investment amount. A lower-limit would increase the threshold for investors wanting to test the platform, but FundingPartner considers the current lack of a lower limit to be an essential aspect of the growth strategy. The investors might put up a small amount for their first investment, but as they see that the service works as intended, they are likely to increase the size of future investments. Both the managers interviewed agree on the goal of this strategy – *"We would rather have a thousand investors investing NOK 1 000 000 than a million investing NOK 1 000"*.

While intentional thresholds are typical, unintentional thresholds can also lead to effective governance of a platform. A few years back, Learnlink discovered a bug in the approval process of tutors. This bug made it confusing and challenging for the tutors to upload their academic results. Interestingly, Learnlink found that the tutors who were able to share their academic results ended up receiving more positive feedback from the parents than those who signed up after the bug was fixed. One of the managers explains, *"We saw that the tutors that were able to find a way around the bug were damn good tutors"*. He reasons that the tutors who were patient enough to overcome the bug were uniquely determined to become tutors. Additionally, it showed signs of patience, which is a crucial trait in tutoring, according to the manager. Overall, the process of joining Learnlink as a tutor has been made more demanding over time as a way to increase the quality of the tutors.

Manual review

To make sure gyms continue to provide high-quality experiences after entering into partnerships, Combine regularly visits the gyms themselves. Besides, they utilize feedback from their ambassadors. If Combine experiences that studios are frequently changing or canceling classes with short notice, they receive a monetary fine. If this or other quality problems persist, studios risk being excluded from the platform. Combine is currently considering termination of an ongoing partnership due to the issue mentioned above of class cancelation. They also occasionally experience members signing up for classes without actually showing up. This problem creates a cascade of negative consequences, including other members not finding available classes, and gyms not utilizing their capacity. Combine considers this to be one of the reasons for member churn. To improve the experience for both members and gyms, Combine plan to implement another governance system – members have to register when going to the gym and will be fined if they cancel too late or do not show up. While they continually evaluate studios thoroughly, Combine believes that the capacity has not yet been negatively affected by their strict governance procedures, but rather the opposite – the general quality of their gyms is very high.

Learnlink also manually reviews the tutors. After they have had their first tutoring session, Learnlink will call the parents to collect feedback on the experience. If the parents are dissatisfied with the tutor, he or she receives a warning. If Learnlink gets a second complaint about the quality, the tutor will not be allowed to continue tutoring and will thus be removed from the platform.

To improve the quality and performance of future deals, Let's Deal makes use of historical data. When a deal expires, the team carries out a qualitative review where customer feedback is inspected. Additionally, they analyze quantitative data, such as page visits and sales numbers. If the deal review turns out negative, the vendor is unlikely to be allowed onto the platform in the future.

In its early days, Tise had a manual review process of listed items. The founders themselves scrolled through the items on Tise and manually suspended listings that looked unappealing or were of poor quality. When a listing was suspended, it would not be visible to other users. However, the seller would not be notified. As the process was not scalable, they have since moved away from this review method in Norway, and instead, seek to promote quality through the rating systems and in their marketing strategy. However, Tise is currently doing pilot projects in new markets, such as Brazil, and here, they have re-introduced the manual process

of suspending postings of low quality.

5.4 Managing complementors and complementary goods

The inclusion of complementors to a platform can be beneficial as it reduces the need for necessary in-house resources or services, and enhances the value for users beyond the core product. Examples include Tiltspot, that offers games from third-party developers, Nabobil's car insurance and integration with keyless lock systems, and Unite Living's planned integrations with a wide range of third-party tools. However, managing the complementors can be difficult, and the platform managers must carefully support and nurture the third-parties in addition to attracting them to the platform. For this reason, some platforms also decide to create their own complementary products or services for the platform, thus, moving outside their core product. Lastly, partnerships with complementors can also be a way to monetize the platform's user base, as is the case with Tise and their in-app store, and Combine that has been approached by several third-parties who want to be a part of their platform.

Table 5.4: Third- and first-party complementary goods

	Third-party complementary good(s)	**First-party complementary good(s)**
CO	Health and beauty centers*	Pop-up gyms*and e-commerce store*
LL	Web-based, digital teaching tools	Web-based, digital teaching tools
LD	Beauty salons from sister-company platform*	
NB	Car insurance from insurance provider	
TS	Games from game developers	Games developed in-house
TI	In-app store offers and giveaways from vendors	Mobile subscription plan, e-commerce store
UL	Various software and hardware providers*	

* Ideas for future complementary offerings, but not implemented

5.4.1 Managing third-party complementors

One way to retain third-party complementors on a platform is to provide a toolkit that simplifies the process of content creation, such as developer tools for game developers. Tiltspot relies heavily on external game developers to develop games for their platform, and after launching the platform, they initiated contact with several game developers who had shown interest in developing games for the platform. However, after some time they saw that many developers

walked away from the platform due to the lack of a well-documented API[1]. An API is a set of tools, definitions, and protocols that allows two applications to talk to each other – in this case, the Tiltspot platform, and a game. This situation made the management realize that they needed an API for their platform – *"To get the players we need games, to get the games we need the developers, and to get the developers, we need an API"*.

After developing an API, which included a plugin to the widely popular multi-platform game engine Tiltspot saw a surge in interest from game developers, as they had significantly lowered the barrier for developing games for their platform. Additionally, to be in closer proximity to game developers, the team decided to move into a niche co-working space created for game developers. By doing this, they were able to both further develop their API, but most importantly, test the API with actual game developers and get continuous feedback on the features and documentation. Another recent initiative has been to create an online community for their developers using a third-party chat application. Here, game developers can provide each other with support and guidance, as well as communicating directly with the Tiltspot team and their developers.

In the case of Nabobil, the inclusion of car insurance in their platform has been an essential feature for growth, as mentioned in Subsection 5.2.2. With regards to choosing between different insurance providers, one of the managers explains that they *"will always choose what's most beneficial to our users"*. Similarly to car insurance, Nabobil's integration with third-party lock-systems is also mostly hidden for the users.

Unite Living has a clear complementor strategy – they want to attract a wide range of complementors to become a *"one-stop-shop"* for both property owners and tenants. This includes complementors who provide relevant software and hardware tools such as digital lock systems, property management analytics software, as well as automatic electricity billing and handling of security deposits. *"The more integrations we build, the easier it will be to get property owners on board,"* explains the manager. On the tenant side of the platform, Unite Living wants to utilize its network to negotiate cheaper electricity for the tenants and provide simple rent payment through a popular Norwegian peer-to-peer payment service. The manager hypothesizes that these additional services will make tenants prefer to rent their apartment through Unite Living, thus attracting more property owners to their property management software.

For Let's Deal, managing their vendors while retaining a high volume of sales has been a chal-

[1] Application Programming Interface

lenge. The Let's Deal team manually reaches out to all vendors and help them publish their deals on the platform. To make the platform more scalable, Let's Deal has considered introducing a self-serve model where deal providers can publish deals directly to the Let's Deal platform. This solution will require a complete rebuild of their governance systems, to avoid malicious vendors to misuse the trust of the customers. As pointed out by one of the managers, it will also modify the value chain, potentially implying unexpected side-effects. On the other hand, with a self-serve model, Let's Deals' account managers would not be a limiting factor to growth. One of their now shut-down competitors saw a 35% increase in inventory when they introduced a self-serve solution.

The manager also explains that their core concept of providing time-limited deals has been a limiting factor for growth. For this reason, Let's Deal have considered to include more complementors to their platform through an integration with a sister company. This company provides a platform for finding and booking appointments at hair, beauty and wellness saloons, and is thus not limited by the concept of temporary deals. The advantage the sister platform has over Let's Deal is further exemplified by one of Let's Deal's managers – *"People don't want to eat a hamburger when it's on sale, they want to eat it when they're hungry,"* one of the managers argues.

Managing complementors is an essential activity for Combine, as they must continuously strive to find a balance between 'stealing' members from their partnering gyms, and losing members to the same gyms. One of the managers explains that this can be very challenging, as the gyms incentives do not always align with the incentives of Combine and its members. The gyms want to limit the supply of classes given to Combine members to incentivize them to buy a regular membership. This is often the case with the most popular gyms on the platform and can lead to a lack of supply during the most popular hours during a week, thus giving the Combine members a lower-value product. Additionally, it results in the classes of the less popular gyms are not being filled. To handle this, Combine has put restrictions on how many classes a member can have on a specific gym per month.

For their members, Combine naturally wishes to provide as many classes as possible from the most popular gyms, as these classes have the highest demand from their members. This gives the most popular gyms a stronger position in potential negotiations over the cut Combine receives for each class. One of the managers suggests that a solution to this can either be to monetize their user base through the use of other complementors or by creating their own, Combine-branded gyms.

5.4.2 Creating first-party complementary goods

While complementary goods from third-parties can be beneficial in terms of low upfront fixed-cost investments, some of the platforms create their own complementary products or services, thus, moving outside their core product. Creating first-party complementary goods can be challenging, as it makes the platform providers a direct competitor to the third-party complementors, but can also be an effective way to increase the quality of the complementary goods.

Learnlink has developed proprietary teaching tools for its tutors such as video chat, screen sharing, and digital blackboards. In addition to these tools, Learnlink also recommends a wide range of third-party tools to its tutors. This is done to provide flexibility for the tutor, as some of the tutors have been on Learnlink well before the first-party tools were developed. Additionally, third-party tools work as a backup if the in-house tools experience downtime. One of the managers explains that they do not want to force the tutors to use Learnlink's tools used during teaching, as each tutor has their own setup. Furthermore, each pupil responds differently to the various tools. While this kind of openness towards teaching tools creates variation in Learnlink's offering, it also keeps the tutors more contented.

Another example of added value through first-party complementary goods is Tise's new mobile subscription plan, launched in 2019. Tise brands this plan as an environmentally-friendly alternative to the traditional subscription plans, as Tise is donating money to UN and CO2-reducing projects, making it the first 'climate-positive' mobile subscription plan, according to their marketing material. This initiative speaks well to the sentiment among their target niche. Additionally, this new service is integrated with the platform's in-app currency such that a user can buy additional cellular data for their plan using previously earned Tise Points.

Combine has considered offering member-exclusive excursions and workshops, as a complement to the regular gym classes. One of the managers explains that this can be trips to yoga retreats, rock climbing courses, or surf camps. As previously mentioned, the manager also contemplates whether Combine should create their own gyms, as a solution to the capacity problems Combine experiences for their most popular gyms. By setting up temporary 'pop-up gyms,' Combine could handle the varying demand for the most popular types of classes, without the need for new partner gyms. *"We know exactly what type of activities our members want,"* the manager explains. This concept has already been proven by a similar European platform, according to a manager. While this would solve the challenge of supply, it would also make Combine a direct competitor to their partnering gyms, as opposed to an indirect as they currently are.

5.4.3 Monetizing the user base with complementary goods

Platforms who are not able to generate sufficient revenue from the transactions performed on the platform, e.g., through transaction fees, decide to include additional complementary goods as alternative revenue streams. Examples include Tise with their previously mentioned mobile subscription plan, their in-app store with third-party vendors, as well as a stand-alone e-commerce store.

In the Tise platform, the in-app currency can be used in the in-app store to buy special offers, discount codes and participate in giveaway competitions from third-party vendors, such as event companies, e-commerce stores, insurance providers and gyms. In addition to justifying the value of the currency itself, Tise gets a small cut when a user buys and proceeds with an offer. The platform also runs its own e-commerce store. Here they sell third-party produced physical products specifically tailored for their 18-35 female niche segment.

Similarly to Tise, Combine considers monetizing their user base, either by selling gym clothing and exercise-related products from their own webshop or integrating with third-party stores. However, one of the managers explains that their primary focus now is first to build their user base and core product. On a similar note, Combine has also been approached by several physiotherapy and chiropractor clinics, as well as more general well-being centers such as massage studios. These third-parties want to reach out to Combine members with discounts on their services. One of the managers describes this as a potential new revenue stream in the future.

Chapter 6

Discussion

Critical mass is defined as the point where the network connected to a product becomes more valuable to the user than the product itself (Afuah, 2013; Stremersch et al., 2007; Rogers, 2010; Evans, 2003a). This can result in self-enforcing growth and is considered a necessary condition for a platform's success (Ondrus et al., 2015; Evans and Schmalensee, 2010). The findings and analysis show that the early-stage companies interviewed appear not yet to have reached the point of critical mass. Hence, they are working on ways to reach critical mass to take full advantage of network effects. One could argue that they are *facilitating* future network effects. While much of the literature does not claims that early-stage platforms should focus solely on size and reaching critical mass as fast as possible, both Cennamo and Santalo (2013) and Eisenmann et al. (2006) propose that growing too fast might have a negative long-term impact on platform performance. The findings of this study show that few, if any, of the platforms have a sole focus on growth in size, but have implemented more holistic, long-term growth strategies by simultaneously balancing the various drivers of network effects. Throughout this chapter, the most apparent strategies applied by the case companies to achieve long-term growth through network effect facilitation are discussed.

6.1 Build expectations through media and influencers

Most of the investigated companies have relied on traditional marketing mechanisms such as online advertising as channels for growth, while others have also had success with media exposure and influencer strategies. The findings suggest that it is critical for these early-stage platforms

to spark expectations and build hype in order to establish an initial user base and facilitate network effects. Several bodies of work have discussed user expectations and appear to have reached a consensus stating that before platforms reach critical mass, customers will turn to the network they believe will be the market leader in the future (e.g. Caillaud and Jullien, 2003; Fuentelsaz et al., 2015; Katz and Shapiro, 1994). Users' expectations are shown to be an important antecedent of direct network effects (Fuentelsaz et al., 2015). Therefore, firms can drive network effects by launching signals that will spark a user's expectations (Fuentelsaz et al., 2015). In the findings, such signals were mainly found in the case companies' strategies to generate hype for their platform before launch. FundingPartner and Nabobil's media strategies are examples of this, as they both experienced significant growth from the media articles, with FundingPartner going from *"1 or 2 sign-ups per week, to 4 or 5 sign-ups per day"*. The news articles published by well-renowned newspapers may have given potential users an impression of credibility and an indication of future dominance. Another example is the TV advertising campaign of Let's Deal. The manager called the launch of this campaign *"a game changer"* as it *"drastically improved the top-of-mind awareness of our brand"*, suggesting it to be an indicator of future dominance.

Although users tend to join the platform they believe will become dominant in terms of network size (Fuentelsaz et al., 2015), other drivers might also create expectations that increase positive network effects, such as the presence of marquee users. At launch, Tise experienced fierce competition from a dominant classified advertising marketplace, in addition to two similar, newly established platforms. Tise's decision to hire a well-renowned social media influencer, considered as a marquee user, seems to be the strongest contributors to Tise's sudden rapid growth. When asked on the initiatives most crucial to growth, one of the Tise managers simply answered *"Launching with our influencer, obviously"*. As the other competitors shut down their platforms soon after, this outcome is consistent with the winner-take-all outcome in platform markets found in the literature (e.g. Evans and Schmalensee, 2007; Lee et al., 2006; Eisenmann et al., 2006). With Combine adopting a similar marquee user strategy through their ambassador program, the strategy appears to be similarly aligned with previous findings of Eisenmann et al. (2006) and Rochet and Tirole (2003), stating that marquee users can have a strong attracting effect on other users. However, the power of influencers as marquee users is arguably a newer phenomenon, and it is thus not widely covered in the existing literature on platforms and network effects.

6.2 Reach critical mass by targeting niches

There is consensus in the literature that in the early days of a platform, the provider has strong incentives to grow the network as quickly as possible in order to reach critical mass (Cennamo and Santalo, 2013; Sheremata, 2004; Eisenmann et al., 2006). One of the most prominent findings of this study is that most of the case companies are, to some degree, focusing their early offerings on fast growth within a niche segment. They either do this by targeting a defined market segment with certain characteristics, or by narrowing the scope of the platform offering itself. It can be argued that by reducing the scope of the product or target market, the threshold for critical mass is lowered correspondingly. Overcoming the chicken-and-egg problem requires approaching all sides in a multi-sided platform to get them on board and drive network effects (Katz and Shapiro, 1994; Rochet and Tirole, 2006; Caillaud and Jullien, 2003). By narrowing the scope and target groups of the platform, the platform providers can cater to users with more homogeneous preferences, and thus have more homogenous user groups to balance.

The empirical evidence suggests that the case companies have decided to focus on niches to be able to achieve network effects within the specific niches sooner than they would have if the platform was completely open. Since their decision to focus on clothing for women aged 18-35, Tise has been able to gain nearly 70% market share in this segment in 3 years – arguably reaching critical mass within their target niche. As one of the Tise managers says, they *"were for a long time afraid of narrowing down the scope"* as they feared it would reduce the potential for growth. In hindsight, they have deemed it an important strategic decision to not try to grow in multiple segments simultaneously. This might suggest that a platform's choice of utilizing a wide or niche strategy, could yield distinct results related to reaching critical mass. This adds a possible new dimension the literature's view on growing as quickly as possible. This aligns with the findings of Afuah (2013), pointing out that some of the literature fails to explain how networks of the same size can have different strengths of network effects. There is, thus, not always a consistent relationship between network size and network effects, as the structure might have an impact as well.

Figure 6.1 illustrates the difference between a wide focus and a niche focus with regards to reaching critical mass. Learnlink and Tise are examples of platforms that have moved from a wide to a niche strategy. This has arguably allowed them to grow faster, as the network effects across niches are weaker than within niches (Rindfleisch and Moorman, 2001). Most of the other platform companies interviewed had a wide focus from launch. An exception is Nabobil who

first considered a niche focus by only launching in a limited geographical market *"to reduce the chicken-and-egg problem"* but decided against it because multiple launches would require vast marketing resources.

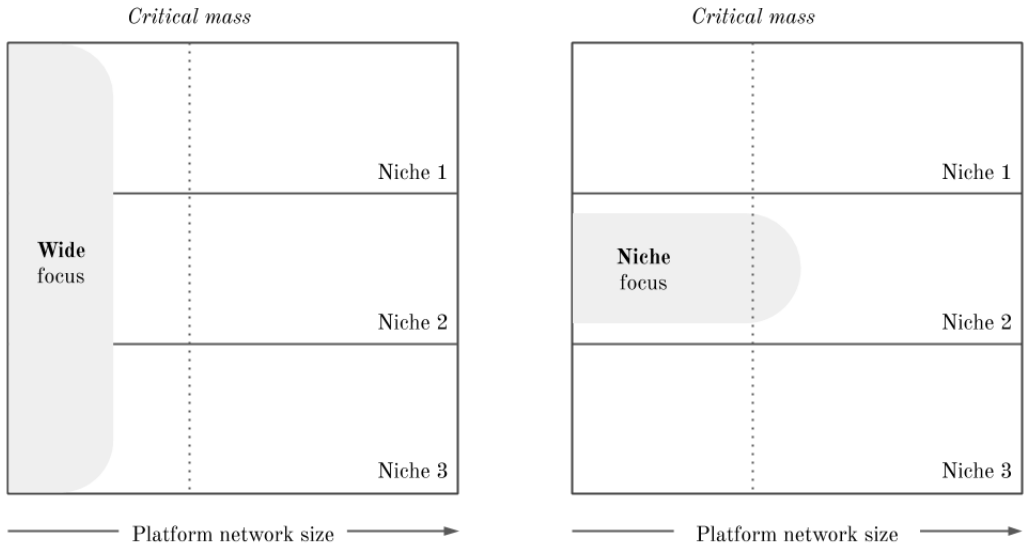


Figure 6.1: Wide versus niche focused strategies to reach critical mass

The niche focus strategy observed contradict the likes of Cennamo and Santalo (2013), who indicate that niche platforms will forfeit their positions when there is a large, more general platform available. Eisenmann et al. (2006) also mention heterogeneity among users as one of the main criteria for a winner-take-all outcome in platform theory. It might appear, based on the findings, that the investigated platforms try to dominate one niche at a time on their way to total market dominance, through potential spillovers between niches. This is further exemplified through FundingPartner, who started out by only targeting real estate and growth companies. As one of their managers stated – *"We try to expand to new industries if we receive a significant amount of applications within that industry"*. Their plan is, thus, to gradually expand their offerings to new types of companies and industries as they are successful within a specific target niche.

6.3 Mitigate multi-homing with lock-in functionality and niche focus

Multi-homing can be both a positive and negative driver of network effects (Evans and Schmalensee, 2007; Evans, 2003b). The findings show that all of the case platforms experience some degree of

multi-homing among their users, and apply a broad set of strategies to deal with it. The most common way is to build functionality that creates lock-in effects, such that the user's switching costs exceed the increased value they would get from moving to another platform. Examples include Nabobil's incompatibility with their competitors' calendar and keyless lock systems, Tise's in-app platform currency and social media-inspired follower system, as well as Tiltspot's exclusivity deals with game developers. These strategies resonate well with the previous research of Farrell and Klemperer (2007), Fuentelsaz et al. (2015) and Sheremata (2004), who suggest that incompatibility can make the platform more resistant to competition.

Furthermore, the findings suggest that another way platforms can reduce multi-homing, is to narrow their scope with a niche focus. The investigated platforms with a strong niche focus – often resulting in a user base with similar preferences – are seen to experience less multi-homing than the platforms with a wide focus. In the case of Tise, by targeting a specific user group (women 18-35) and item type (clothing), the platform can facilitate an assortment of items specifically tailored for their user base, rather than a more general offering of items as seen on competing generalist platforms. By doing so, Tise increases its chances of becoming the go-to platform for young women shopping for second-hand clothing. Similarly, one can argue that the pupils using Learnlink has akin preferences. That is, to receive tutoring in primary to high school subjects, and thus, Learnlink increases its chances of becoming the go-to platform for such type of tutoring. According to previous literature, multi-homing is rooted in the preferences of heterogeneous consumers Rysman (2009); Sheremata (2004). By catering to users with more homogeneous preferences through a niche focus, the platform companies investigated seemingly reduce the need for its users to be active on more than one platform. This is echoed in Evans's (2003b) findings which suggests that users tend to stick to one platform if it is not efficient or beneficial for them to be part of more than one network.

However, a niche focus alone does not mitigate multi-homing. FundingPartner still experiences multi-homing among both its loan-companies and investors, despite having a niche strategy. This might be explained by their limited network size and supply of loans. In FundingPartner's case, one can argue that both multi-homing and platform size as drivers of network effects affect each other, and therefore can not be isolated when they strategize for growth.

Furthermore, the findings deviate from previous literature on compatibility versus incompatibility. Several authors have argued that compatibility is a preferred option for smaller firms that want to challenge an existing platform market Ondrus et al. (2015); Benlian et al. (2015); Sheremata (2004), while platforms who have obtained a larger market share and benefit from

self-reinforcing network effects, strive to be incompatible with other platforms (Fuentelsaz et al., 2015; Sheremata, 2004). Nabobil applies incompatibility strategies, despite not yet having reached critical mass. One can argue that this is coherent with their lack of niche focus, resulting in a user base with a wide range of preferences. According to one of their managers, the requirements of their users vary greatly – from hour-long trips to transportation of goods and trips over multiple days. Therefore, Nabobil chooses to mitigate the potentially large degree of multi-homing from a heterogeneous user base through incompatibility with competing platforms. This strategic choice does not align with previous literature which suggests that early-stage platforms should strive for compatibility to speed up the process of reaching critical mass (e.g. Fuentelsaz et al., 2015; Sheremata, 2004). However, Nabobil's lack of openness towards other platforms might also be due to them being the first car rental platform in the Norwegian market, and thus not having the opportunity to integrate with other platforms when they launched.

6.4 Balance curation and governance with size

The findings also show that all of the interviewed companies have, to some degree, implemented and enforced curation and governance mechanisms. Several of the platforms have had rather strict governance mechanisms since launch, and perform curation on the users and content available on their platform. While curation and governance can strengthen positive network effects, it might also dampen network growth as user access is restricted or interactions are limited (Van Alstyne et al., 2016). The screening processes of Learnlink, FundingPartner, and Tiltspot, as well as the review processes used by Combine, Tise and Let's Deal, show that the balance between quality and quantity can be challenging for platform providers. The empirical findings, thus, reflect the literature's ambiguity on the matter.

Furthermore, the literature has numerous examples of how unregulated growth can lead to problems with noise and congestion in a network, triggering the need for increased curation and governance (e.g. Van Alstyne et al., 2016; Boudreau and Hagiu, 2009). However, scholars tend to agree that size can become more of a concern rather than a benefit only after a platform has reached critical mass (Cennamo and Santalo, 2013; Afuah, 2013; Evans and Schmalensee, 2007). Still, being at an early stage, the case companies are applying such mechanisms before having reached critical mass. These observations contradicts the literature's tendency to focus on platforms striving for quick growth before reaching critical mass, and later sustain the growth in order to avoid or reduce issues with noise and congestion (Boudreau and Hagiu, 2009;

Van Alstyne et al., 2016; Cennamo and Santalo, 2013; Afuah, 2013).

Several scholars have emphasized the importance of content quality on a platform (e.g. Van Alstyne et al., 2016; Eisenmann et al., 2006). As a means to promote quality, platforms such as Combine, Learnlink, and FundingPartner all have strict screening processes on their supply sides. Learnlink has implemented strict governance on their tutors, and the process is comparable to an actual hiring process. Similarly, FundingPartner has a strict screening process for companies seeking loans. However, the processes in these two cases have a widely different impact on growth. Learnlink is able to enforce strict governance as they claim to have an *"unlimited supply of potential tutors"*. This implies that stricter governance on the tutors will not negatively affect growth through size – it will only increase quality. However, in FundingPartner's case, companies seeking loans is the most constrained side of the platform, as the lack of qualified loan applications is said to be the biggest bottleneck for growth. Thus, while FundingPartner claims to have implemented strict governance to sustain quality, it negatively impacts growth – making it harder to reach critical mass and experience network effects. As one of their managers said – *"We could slack on the criteria and approve more loan applications"* – confirming that it is, indeed, an intentional trade-off between quality and quantity. Correspondingly, Cennamo and Santalo (2013) showed how a nearsighted focus on quick user growth can have a negative long-term impact on platform performance. It appears that the case companies align with these previous findings, by adopting a more long-term quality growth strategy, rather than a short-term quantity growth strategy.

Most of the case companies have also implemented governance mechanisms that are arguably not scalable. Manual screening and review processes would be major bottlenecks for platforms such as Learnlink, Combine, and FundingPartner if their user base were to increase dramatically. The findings suggest that, at some point, manual governance should be replaced by more automated and user-driven curation. An obvious example is Tise, where the managers themselves manually went through and removed postings they deemed to be of low quality. When they experienced a drastic increase in volume, the manual screening process had to be replaced with user-controlled curation mechanisms such as a rating system and automated content suggestions. On the contrary, Learnlink started with a user-driven rating system, but *"that did not work well at all"* and they changed the strategy to focus more on governance. However, this was primarily due to the low volume of transactions, with the manager stating that *"rating systems only work if you have a lot of customers"*. While papers such as Boudreau and Hagiu (2009) look at both regulating platform access, as well as regulating interactions between users, little is written on

the trade-offs between different curation and governance tactics. The eventual trade-off can pose great challenges for many of the case companies.

Chapter 7

Conclusion

Previous literature in the field of strategic management has examined and affirmed network effects as important for platform growth, but little attention has been dedicated to early-stage platforms and how managers strategize to drive network effects before reaching critical mass. This study provides an overview of strategies applied by early-stage platforms to facilitate network effects, collected through interviews with managers from nine Norwegian platform companies. Additionally, the study has sought to provide the field with qualitative empirical data on platform companies from a wide range of industries for further analysis and research.

As an answer to the proposed research question – "How do managers in early-stage multi-sided platforms facilitate for network effects?" – the study has identified several aspects that managers take into account when forming strategies. These include building the initial user base, dealing with the challenge of multi-homing and off-platform activity, ensuring platform quality and balancing network growth with curation and governance mechanisms, as well as managing complementors and complementary goods. The findings also suggest that the platform managers do consider drivers of network effects when strategizing and that they are both aware and considerate of their effect on growth towards critical mass. This is in contrast to previous literature claiming that platform managers tend to develop and rely on strategies that do not account for network effects.

Furthermore, several strategies applied by the managers to achieve long-term growth through network effect facilitation have been observed. These include 1) The use of influencers and media to spark expectations among potential users and establish the initial user base, 2) A niche focus to more quickly reach critical mass and create network effects within a specific user segment,

3) Mitigate multi-homing through a niche focus, resulting in a homogenous user base, and 4) Enforce strict governance mechanisms to ensure platform quality from launch. Although these strategies touch upon a wide set of barriers for early-stage growth, a common characteristic is that the strategies involve several drivers of network effects. Therefore, platform managers must consider the trade-offs between drivers when forming strategies for growth.

Implications for further research

While several of the empirical observations have shown indications of consistency with existing literature on network effect drivers, some deviations imply a need for further research.

The findings of this study indicate that the use of influencers as marquee users, as well as pre-launch media strategies, can increase users' expectations towards the platform, and have a positive impact on short-term growth. In the literature, *expectations* are described as an important antecedent of networks effects but are mostly related to the future size of the platform's network (e.g. Fuentelsaz et al., 2015; Caillaud and Jullien, 2003). The findings in this study suggests a need for a broader understanding of the strategic role expectations can play on a platform's way towards critical mass – particularly the use of influencers, which is still a relatively novel phenomenon and is primarily covered in marketing management literature, where the use of influencers is mostly tied to brand value (de Veirman et al., 2017). In platforms, influencers can also actively participate on the platform themselves, and can interact directly with their addressable audience on social media. This proposes an interesting area within the field of strategic platform management, where studies can seek to further connect the use of influencers with an increased probability of sustained platform growth through network effects. Future studies should examine such initiatives to build expectations in more detail, for example by examining how the short-term use of influencers and media coverage can entail long-term effect on growth.

Furthermore, the tendency for the case companies to focus on a specific niche appears to be an area yet to be explored in the literature on network effects. Departing from the early literature's primary focus on the necessity of initial rapid growth (Cennamo and Santalo, 2013; Sheremata, 2004; Eisenmann et al., 2006), researchers should look further into the actions and strategic choices early-phase platforms face when they approach critical mass within their primary niche and must expand to other niches. Further studies on the matter could yield valuable insights into the potential spillovers of network effects between niches. By inspecting two platforms with

a similar value proposition, but one with a wide focus and the other with a niche focus, the two strategies can be compared with regards to the eventual occurrence of a winner-take-all outcome.

The findings also suggest that platform managers might face challenging trade-offs between the various network effect drivers, particularly size, curation, governance, and multi-homing. By only focusing on a strategy for a single driver, a firm may experience short-lived advantages. Even though combining different strategies is a complex affair of balancing trade-offs, it can benefit the platform's growth. Most of the case platforms apply strict curation and governance before reaching critical mass, even though it can make it more challenging to reach critical mass. Significant trade-offs can also be found within the individual drivers of network effects, such as the balance between different governance and curation mechanisms at the occurrence of exponential growth. As literature often considers each driver individually, researchers should look into how *combinations* of individual drivers interplay, and the combined impact they have on growth through network effects. More empirical investigations on the trade-offs between the various drivers of network effects, as well as within each driver, might improve the literature's understanding of how platforms can strategize for competitive advantage before reaching critical mass.

While much of the literature on network effect drivers consider critical mass *a priori*, this study has focused on how network effect drivers are leveraged in platforms that have not yet reached critical mass. Still, more empirical research is needed to better understand the managerial implications of network effects before reaching critical mass. This includes examining the shift from facilitating to exploiting network effects. Lastly, as this study solely consider Norwegian platform companies, the literature would benefit from the addition of studies conducted in other geographical markets and industries for further generalizability of the findings.

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Appendix A

Selected studies on drivers of network effects

Authors	Year	Type of study	Industry	Key findings
Farrell and Saloner	1986	Theoretical	N/A	Excess inertia and excess momentum may inhibit innovation
Katz and Shapiro	1986	Theoretical	N/A	Compatibility tend to be undersupplied by the market, currently superior technology is likely to dominate the market
Brynjolfsson and Kemerer	1996	Quantitative	Computer software	Network externalities, as measured by the size of a product's installed base, significantly increased the price of spreadsheet products
Schilling	2002	Quantitative	Operating systems, video games	A firm's learning orientation and timing of entry play significant roles in its success
Caillaud and Jullien	2003		Quantitative	Matchmaking intermediary/dating service
Evans	2003	Quantitative	Multiple industries	Overview of pricing strategies (e.g. differential pricing) utilized by platform providers
Rochet and Tirole	2003	Quantitative	Multiple industries	Price structure is influenced by several network effect drivers including governance, compatability and multi-homing
West	2003	Qualititative (case study)	Computer software and hardware	Hybrid standards strategies may be preferable to either the purely open or purely proprietary alternatives
Rochet and Tirole	2004	Theoretical	N/A	Conditions for the allocation of the total usage charge between two sides is not neutral
Sheramata	2004	Quantitative	N/A	Challengers can successfully compete against dominant firms in network markets through innovation
Clements and Ohashi	2005	Quantitative	Video games	Pricing is important in the advent of a platform; complementor variety is more important later
Parker and Van Alstyne	2005	Theoretical	Multiple industries	Platform providers can give away products with a profit
Suarez	2005	Quantitative	Telecommunications	Strong-ties network effects are key determinant of technology adoption in cases where several technologies compete
Lee, Lee and Lee	2006	Theoretical	N/A	WTA depends on structural properties of potential users
Rochet and Tirole	2006	Theoretical	N/A	Multi-homing plays a significant role with regards to pricing
Evans and Schmalensee	2007	Theoretical	N/A	Brief introduction to the economics of two-sided platform; examplifies indirect network effects in stock exchanges
Evans and Schmalensee	2008	Theoretical	N/A	Many two-sided platforms in practice subsidize one side and earn profits on the other
Boudreau and Hagiu	2009	Qualititative (case study)	Social media, digital platforms, real-estate, education	Regulating access to the platform or interactions between members can decrease negative network effects

Authors	Title	Type of study	Industry	Key findings
McIntyre and Subramaniam	2009	Theoretical	Multiple	Future research framework on network effects and strategies
Rysman	2009	Theoretical	Payment cards, newspapers, operating systems	Presents typically commonly used strategies among platform providers
Boudreau	2010	Quantitative	Handheld computers	Higher levels of access to hardware developers accelerates the rate of new handheld device development
Srinivasan and Venkatraman	2010	Quantitative	Video games	Platform dominance is positively influenced by support from a greater breadth of titles by complementors and lesser degree of overlap with other platforms
Soh	2010	Quantitative	Local area network	Demonstrates the independent and contingent effects of alliance network properties
Afuah	2013	Theoretical	Multiple	A network's structure and its conduct have a significant impacts on a network's value to users and to network providers
Cennamo and Santalo	2013	Quantitative	Video games	Combining strategies involving complementor variety and complementor exclusivity lead to lower platform performance
Hagiu and Spulber	2013	Theoretical	N/A	First-party complements can reduce third-party complementors' competitive ability
Kapoor and Lee	2013	Quantitative	Healthcare	Complementors play an important role in the firm's ability to coordinate accompanying changes in complementary activities
Takakuwa	2013	Theoretical	N/A	Moral hazard problems between multi-sided platform operators and complementors cause the market failure of multi-sided platform to destroy their ecosystem
Bhargava	2014	Theoretical	N/A	Established firms face lower uncertainty about developer participation, and should expand when fixed costs of expansion are low
Benlian et al.	2015	Quantitative	Mobile applications (apps)	A new framework to comprehensively conceptualize and operationalize platform openness
Boudreau and Jeppesen	2015	Quantitative	Video games	Complementors without monetary incentives respond to platform growth
Fuentelsaz et. al	2015	Quantitative	Telecommunications	Companies can leverage network effects and network value and benefit from the existence of network effects through their strategic choices
Ondrus et. al	2015	Qualititative (case study)	Mobile payment	Illustrate the effects of opening different levels of a multi-sided platform
Van Alstyne et al.	2016	Theory	N/A	Summary of strategies in the context of platforms competing with pipeline businesses
Boudreau	2018	Quantitative	Mobile applications (apps)	Lower barriers for "amateurs" increase the number of high-quality complements available

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