DIGITAL PLATFORM GROWTH UNDER CONTEXTUAL LIMITATIONS

A CASE STUDY OF GROWING A COMPLEMENTARY DIGITAL MARKETPLACE

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Abstract

With the advent of digital technologies, platforms have become a digital business model with the power to disrupt organizations and industries. Firms are eager to exploit digital platforms' immense potential for user growth but find themselves facing challenges and limitations that cannot be overcome with traditional business expertise. Our study focuses on exploring what roles *user volume*, *transaction efficiency,* and *producer capability* play in digital platform growth and how such interact and impact the aforementioned growth. Further, the study aims to gain insights into how to foster platform growth under certain limitations and proposes a framework by combining two acknowledged growth models. The combined framework aims to help firms to comprehend the mechanisms behind platform growth and to guide their efforts in growing a digital platform. The study adopts a qualitative approach employing a case study of a young central European software firm. Data was collected through semi-structured interviews and analyzed using thematic analysis. The findings suggest practice to differ substantially from theory and firms facing contextualities and limitations on their platform journey might have difficulties applying models and theories as proposed in literature. Our study sheds light on various strategic challenges when building a platform, especially when pursuing a hybrid business model with a digital marketplace. By critically discussing the observed platform journey of building a digital marketplace, the study helps firms and leaders to be aware of the challenges and risks, and aids to make informed decisions. The combined framework is expected to help firms to understand the importance of the suggested key variables and guide their efforts.

Keywords

digital platform, digital marketplace, platform growth, critical mass, hybrid business model, efficiency model, platform investment model

Foreword

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1 Introduction

Platforms as a concept, albeit referred to as marketplaces or trade fairs, have existed ever since medieval times where buyers and sellers came together to enjoy a great offering and efficient exchange of various goods and services (Tadelis, 2016; Tiwana, 2014). However, the advent of modern technology enabled the evolvement of the platform into becoming digital. Technology's pervasive penetration, together with its highly flexible and open affordances, effectively improved the platform's capabilities (Yoo et al., 2012), and subsequently, the digital platform has become a certainty in several industries (Asadullah et al., 2018; Constantinides et al., 2018; de Reuver et al., 2018; Edelman, 2015; Parker, Van Alstyne, & Choudary, 2016; Van Alstyne & Parker, 2017). Various examples underline how the platform model has helped companies to become dominant players in their markets: Alibaba makes out more than 75% of Chinese e-commerce transactions, Google counts for 82% of mobile operating systems and 94% of mobile search traffic, while Facebook has become the world's dominant social platform (Van Alstyne & Parker, 2017).

Not only have platforms become leaders in various markets, literature widely advocates companies operating within different fields to enter the platform business and exploit platforms as catalysts for rapid user growth (Parker, Van Alstyne, & Choudary, 2016; Van Alstyne et al., 2016) and innovation (Constantinides et al., 2018; Tilson et al., 2010; Yoo et al., 2012). Thus, many companies that have been following a traditional pipeline business model are pursuing the shift to a hybrid business model, trying to build a digital platform on top of their existing core business. Yet, building a platform that provides enough interaction value to increasingly attract platform users is rather difficult, not only due to the common chicken-and-egg problem of getting first users onboard (Caillaud & Jullien, 2003; Hein, Schreieck, et al., 2019), but also due to various limitations rooted in a firm's current and previous choices of product, market, processes, etc.

For successfully entering the platform business, literature suggests firms to deploy a hybrid business model, where a platform is built on top of the core product (Zhu & Furr, 2016). By doing so, the platform holds the potential to share and grow the already existent customer base. The advantage of starting with an already existent customer base and given value proposition is expected to help overcoming the chicken-and-egg problem. However, firms employing a hybrid business model need to convert their customer base into platform users to reap the benefits and the occurrence of an already existing core business appears to bring critical limitations due to legacy in various areas. To successfully implement a hybrid business model

and grow a platform on top of their core product, firms and leaders need to know which areas are key to platform growth and how they are interconnected. Van Alstyne and Schrage (2016) identified *user volume*, *transaction efficiency,* and *producer capability* to be key for platform growth but saw them as part of distinctive models. No research has been done to examine the interaction and impact of given variables when mutually applied for platform growth.

The objective of this study is to gain a deeper understanding of the above variables, their interrelationships, and their mutual effect on platform growth. This objective is guided by the following research question:

> RQ: What roles do the variables *user volume, transaction efficiency,* and *producer capability* play in platform growth?

The central contribution of this study is to propose a framework for platform growth that combines the key variables discussed by Van Alstyne and Schrage (2016). Knowledge about the nature and applicability of mentioned key variables as well as their mutual effect on growth, ought to help leaders managing them more efficiently and thus guide their firms through the journey of building a platform. The framework as well as additional insights that will possibly surface throughout the study will contribute to the emerging literature on digital platforms as well as to contemporary research on platform growth.

The paper begins with an overview of digital platform growth (§2) and derives the framework (§3) that will be used as a theoretical lens in the study. Thereafter, we present the method (§4), followed by the research context (§5) and findings (§6). The findings will be interpreted and reflected in the discussion (§7) and the paper ends with the conclusion (§8).

2 Digital platform growth overview

In this section, the concept of the digital platform is introduced, as well as the digital marketplace as a subcategory. Further, different platform mechanics are discussed to understand how platforms work and how value is created. Finally, challenges of initial platform growth will be highlighted, as well as recommended approaches to overcome those.

2.1 The digital platform

The digital platform will be introduced by comparing different perspectives and definitions of the concept. Special focus is given to the application marketplace as a subcategory of the digital platform since it will help to theoretically position the case firm of this study and understand its specific setup.

2.1.1 Evolution of concepts

Literature conceptualizes the digital platform based on different views ranging from technical to market-based perspectives (Asadullah et al., 2018; Hein, Schreieck, et al., 2019). Platform definitions can be placed in three categories: technical, non-technical, and socio-technical platforms. From engineering design literature comes the technical view of the platform where it is viewed as a technological architecture (Gawer, 2014). De Reuver et al (2018) define the digital platform as "an extensible codebase to which complementary third-party modules can be added" (p. 127). Gawer's (2009) definition "a building block, providing an essential function to a technological system – which acts as a foundation upon which other firms can develop complementary products, technologies or services" is commonly adopted in literature and emphasizes the integral part of the system the digital platform constitutes (p. 2) (Asadullah et al., 2018; Spagnoletti et al., 2015; Yoo et al., 2012).

In contrast to the technical view that focuses on platform innovation, the non-technical view provides insight into platforms as commercial networks or markets that enable transactions among users (Abdelkafi et al., 2019; Asadullah et al., 2018). From this perspective, Tan et al (2015) regard the digital platform as "a commercial network of suppliers, producers, intermediaries, customers and producers of complementary products and services termed 'complementors' that are held together through formal contracting and/or mutual dependency" (p. 2). Literature that focuses on this transactional aspect of the platform stresses its core function as the

orchestration of two or more interdependent user groups by matchmaking (Abdelkafi et al., 2019; Gawer, 2014; Hagiu & Wright, 2015; Ye et al., 2011).

In between the technical and the non-technical platform lies the socio-technical platform, described from a cross-functional platform perspective that accommodates both transactional and innovational aspects. Thus, the digital platform is conceptualized as a multi-sided market while simultaneously being a technological architecture. De Reuver et al. (2018) denote this as the socio-technical view of the digital platform defined as "technical elements (of software and hardware) and associated organisational processes and standards" (p. 127). Software platforms are examples of socio-technical platforms (Abdelkafi et al., 2019) which "…bring together individuals and organizations so they can innovate or interact in ways not otherwise possible, with the potential for nonlinear increases in utility and value" (Cusumano et al., 2019, p. 13). As such, this study regards the digital platform holistically as a socio-technical entity comprised of an extensive and extensible codebase that facilitates value-creating interactions between distinctive user groups (Cusumano et al., 2019; Ghazawneh & Henfridsson, 2015; Van Alstyne & Parker, 2017).

2.1.2 The Application Marketplace

Ghazawneh & Henfridsson (2015) refer to the digital application marketplace as "a platform component that offers a venue for exchanging applications between developers and end-users" (p. 198). These applications can be regarded as add-on software subsystems or complementary assets intended to extend the functionality of the basic platform (Ghazawneh & Henfridsson, 2015; Tiwana et al., 2010). Third-party developers are often responsible for the design and development of the aforementioned add-ons. Henfridsson & Bygstad (2013) consider these add-ons as "executable pieces of software that are offered as applications, services or systems to end-users" (p. 175). Add-ons lead to increased user value and reach of the platform by covering more use cases without generating further development costs for the platform owner (Ghazawneh & Henfridsson, 2015; Henfridsson & Bygstad, 2013; Jacobides et al., 2018; Tiwana et al., 2010). The digital application marketplace assists platform owners in facilitating the exchange between end-users and third-party developers (Ghazawneh & Henfridsson, 2015). The more such exchange is facilitated, the more likely it is for the platform to attract and consequently grow its user base.

2.2 Platform mechanics

This subsection lays out how digital platforms work and how value is generated on different sides. It is important to understand the logics and characteristics of digital platforms, as it differs substantially from the premises of traditional pipeline

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businesses. Several interconnected key concepts will be introduced: two-sided markets and network effects, as well as matchmaking and value creation.

2.2.1 Two-sided markets

Two-sided markets are markets that "bring together (or match) two distinct groups in a relationship where the value for one group increases as the number of participants from the other group increases" (de Reuver et al., 2018, p. 125). A classic example of a two-sided market is a platform with buyers on one side and sellers on the other, such as Apple's software application marketplace *App Store* (Asadullah et al., 2018; Hagiu & Wright, 2015). As depicted in Figure 1, users of the demand-side of the market are widely referred to as consumers while users of the supply-side are commonly referred to as producers (Van Alstyne et al., 2016).
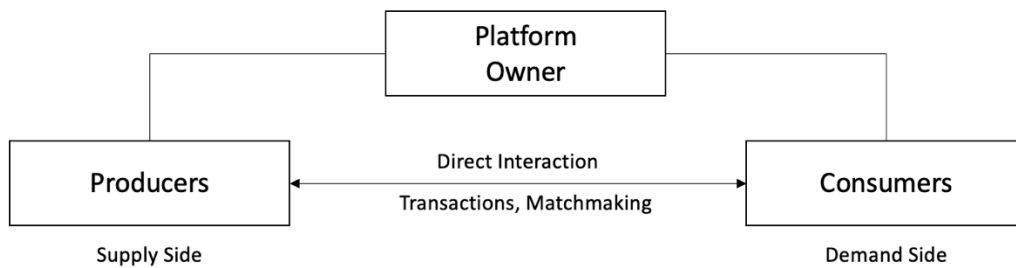

Figure 1. Visualization of a two-sided platform. Derived from *(Ivarsson & Svahn, 2020; Van Alstyne et al., 2016).*

The term multi-sided market is often used to stress the possibility of a given platform connecting more than two user groups (de Reuver et al., 2018; Tan et al., 2015). However, the operating logic of two- and multi-sided markets are identical since a two-sided market is per definition a multi-sided market. Both are driven by external value creation through network effects, a mechanism that is so essential, that literature regarding two-sided markets can be regarded as a subset of network effects (Gawer, 2014; Rysman, 2009).

2.2.2 Network effects

Network effects, or network externalities, refer to "the increasing value of platform membership to an entity as the number of other entities on the platform increases" (Tan et al., 2015, p. 250) or that "a technology's usefulness increases as its installed base of users increases" (de Reuver et al., 2018, p. 125; Katz & Shapiro, 1994; Shapiro et al., 1998). While firms traditionally create value by internally optimizing resources and processes, platforms externally create value by enabling network effects that in turn facilitate interactions in multi-sided markets (Van Alstyne et al., 2016). Network effects can either be same-side or cross-side (Abdelkafi et al., 2019; de Reuver et al., 2018; Gawer, 2014; Rochet & Tirole, 2003; Ruutu et al., 2017).

Same-side network effects take place when the value of a given platform depends on the number of users in the same user group. On the contrary, cross-side network effects arise when the value of a given platform depends on the number of users in a different user group. Cross-side network effects can be either unidirectional if the size of one user group increases the value of another, or bidirectional, if the volumes of both user groups increase each other's value leading to self-reinforcing effects (Lerner, 2019; Reillier & Reillier, 2017). This can be observed in digital marketplaces such as eBay and Amazon, where the value of the platform increases for the sellers the more buyers that are present, and vice versa (Asadullah et al., 2018).

According to Van Alstyne and Parker (2017), value creation within a firm cannot scale as easily as outside of the firm. Thus, network effects create a clear advantage over traditional market models and are responsible for the immense success of digital platforms. However, for bidirectional network effects to arise and drive self-sustaining growth, platforms are advised to reach a critical mass of platform users (Lerner, 2019; Ruutu et al., 2017; Zhu & Furr, 2016). The critical mass is achieved when, for example, customers can expect to find the services and products they need while the producers can expect to find the customers they need (Mancha et al., 2019). Once a platform reaches its critical mass, network effects are expected to take over "so that growth in demand generates growth in supply and vice versa." (Mancha et al., 2019, p. 4; Ruutu et al., 2017). As a result, connecting a critical mass of users is necessary to benefit from bidirectional network effects and hence achieve self-sustaining growth. For understanding a platform's role in connecting users and enabling network effects, different forms of matchmaking have been discussed in literature.

2.2.3 Matchmaking

Matchmaking is a multidimensional process that includes both complex resource-allocation and facilitating transactions between actors, but it also increases the "quality of matching supply with demand" (Holzmann et al., 2014; Ivarsson & Svahn, 2020, p. 5932). In essence, matchmaking improves "who gets what and why" (Roth, 2015, as cited in Ivarsson & Svahn, 2020, p. 5932). Matchmaking can be done through brokering or orchestration (Furr & Shipilov, 2018; Ivarsson & Svahn, 2020). In brokering, the matchmaker actively mediates between separated user groups (Ivarsson & Svahn, 2020). Brokering is argued to be suitable for stable environments with defined key issues, such as conventional linear value creation (Furr & Shipilov, 2018) but also non-digital matchmaking (Ivarsson & Svahn, 2020). In addition, Ivarsson & Svahn (2020) highlight that firms practicing brokering intentionally keep actors separated. This separation forces the actors to indirectly interact through the matchmaker, which provides more control to the firm but also limits scalability.

In the context of platforms, matchmaking is more commonly done through orchestration, involving direct interactions between different user groups (Ivarsson & Svahn, 2020), following less defined requirements and objectives (Furr & Shipilov, 2018). Although orchestrating matchmakers are not actively involved in actual transactions, the intermediation is understood as matching the multiple sides, facilitating direct autonomous transactions (Ivarsson & Svahn, 2020; Tiwana, 2014). Furr & Shipilov (2018) argue that successful orchestration leads to numerous connections among various actors, enabling them to identify promising opportunities by working directly together. Thus, orchestration creates the foundation for further value-creation (Tiwana, 2014) and is generally portrayed in literature as a core mechanism of digital platforms, being much responsible for their success (Gawer, 2014; Hein, Schreieck, et al., 2019; Mancha et al., 2019). To fully understand the connection between a platform's success and its transaction type, value creation will be discussed as a last key concept.

2.2.4 Value creation

According to Van Alstyne and Parker (2017), a platform's main asset is its network of producers and consumers. The authors suggest that for platforms, in contrast to pipeline firms, "resource orchestration is more important than resource control, and facilitating interactions and managing relationships have a higher priority than internal optimization" (p. 26). Offering efficient and convenient orchestration enables digital platforms to shift the focus of value creation from within the firm to the outside (Hein, Soto Setzke, et al., 2019; Parker, Van Alstyne, & Jiang, 2016). This platform logic stands in stark contrast to pipeline business where value is created linearly according to the classic value chain model (Leong et al., 2019; Van Alstyne & Parker, 2017). Instead of engaging in an end-to-end linear refinement process, platform businesses and digital platforms "are designed with network-centric thinking based on horizontal collaborations among participating users" (Ivarsson & Svahn, 2020; Leong et al., 2019, p. 1531; Van Alstyne et al., 2016). Consequently, for platforms, it is of utmost importance to prioritize and optimize the value creation through orchestrating of resources owned by external actors, rather than concentrating on customer value or the firm's product in isolation (Leong et al., 2019; Parker, Van Alstyne, & Jiang, 2016; Van Alstyne et al., 2016).

Despite orchestration generally being seen as a core mechanism of digital platforms enabling external value creation and vast scalability (Gawer, 2014; Hein, Schreieck, et al., 2019), brokering can still be used in a given platform as a complementary transaction type (Ivarsson & Svahn, 2020). In doing so, potential brokering should arguably be decoupled from the core platform transaction mode, to not become an obstacle for external value creation and scalability.

2.3 Initial platform growth

This subsection discusses the so-called chicken-and-egg problem and the common approach to overcome it through subsidization. In addition, less common approaches will be introduced, to get a holistic picture of possible solutions proposed in literature.

2.3.1 The common approach

Digital platforms that base their value proposition on cross-side network effects commonly face the so-called chicken-and-egg problem when trying to achieve initial growth (Caillaud & Jullien, 2003; Hein, Schreieck, et al., 2019). To provide value for potential customers, a sufficient number of producers must be providing their service or products on the platform. Producers, however, only see value in joining the platform if a satisfactory group of customers will be reached with the product or service (Mancha et al., 2019). The issue of growing the user base while none of the user groups is willing to join without adequate value from an already existing user base on the opposing market side was coined the chicken-and-egg problem by Caillaud & Jullien (2003). To realize the core value of a platform, the critical mass must be reached, assuring that a sufficient number of customers and producers will meet each other's needs (Mancha et al., 2019).

Widely observed among firms and commonly recommended in literature to overcome the chicken-and-egg problem is to subsidize one of the two market sides to subsequently grow both market sides (Gawer, 2014; Parker & Van Alstyne, 2005; Rochet & Tirole, 2003). The choice of which market side to subsidize, or even attract with a free good, can be either done by examining the relative contribution of the different sides to network effects (Parker & Van Alstyne, 2005) or by assessing which side shows the higher price-sensitivity (Evans & Schmalensee, 2016). Consequently, decisions about the pricing structure respectively which side to charge or subsidize, need to be made on top of the decision about the general level of pricing (Rochet & Tirole, 2003). Reaching the critical mass through subsidizing is an expensive approach, which makes undercapitalized platforms usually fail at this point (Mancha et al., 2019). Moreover, forecasting the critical mass is difficult and hence makes it challenging to raise or dedicate sufficient capital for subsidizing.

2.3.2 Alternative approaches

Focusing on increased interaction value as a catalysator for initial growth might be a less discussed but effective approach to overcome the chicken-and-egg problem in a sustainable and less costly way. Although reaching a sufficient volume of users is inevitable for self-reinforcing network effects, the critical mass can be reduced by increasing the value producers add to the platform (Mancha et al., 2019).

Empowering producers to create more value increases the interaction value as well as the overall platform value and should be done strategically (Van Alstyne & Schrage, 2016). The effect of increased producer-added value on lowering the critical mass can be argued to be amplified by reduced transaction costs, making the value of different user groups more accessible to each other. Thus, focusing on both producer capabilities and transaction efficiency might be used to lower the critical mass and foster network effects. In fact, Van Alstyne and Parker (2017) claim that most successful platforms have initially focused on a single type of interaction with a high value, before going for a larger volume. This is exemplified with Facebook, having started with a narrow focus before expanding the platform.

Another solution to the chicken-and-egg problem is applying a hybrid business model (Zhu & Furr, 2016). When a platform is built on top of an existing business, the pre-existing installed base of users can be used to a firm's advantage. The successful combination of employing both a product and a platform business model leads to the hybrid business model that intends to capture the benefits of both models. By using a hybrid business approach, a firm enjoys the advantage of using the immense potential of a platform for value creation, growth, and innovation, while not abandoning its core business that continuously attracts new customers. Starting with a defensible product and a critical mass of users helps to avoid the chicken-and-egg problem, on the condition that both existing and new users can be encouraged to rapidly migrate to the new platform (Zhu & Furr, 2016).

3 Conceptual Framework

In this section, two different platform growth models proposed and discussed by Van Alstyne & Schrage (2016) are introduced. Combining the two models leads to a framework that will be used as a theoretical lens for the study.

3.1 Platform growth models

Network effects are discussed in literature as the main asset of digital platforms (Mancha et al., 2019; Ruutu et al., 2017; Van Alstyne & Parker, 2017). A high volume of users increases the average value per transaction and improves the matchmaking between distinct users of a given platform. As previously discussed to successfully promote growth, digital platforms have commonly been advised to focus on reaching a critical mass, where self-reinforcing network effects become dominant (Ivarsson & Svahn, 2020; Mancha et al., 2019; Van Alstyne & Parker, 2017; Zhu & Furr, 2016). Based on the importance of reaching a critical mass, platforms are widely driven by an *efficiency model* (Van Alstyne & Schrage, 2016) whose widespread use is reflected in digital platform literature (Leong et al., 2019). The efficiency model promotes enlarging the user base and reducing transaction costs as the two main focus areas to improve matchmaking and foster platform growth (Van Alstyne & Schrage, 2016).

In contrast to the common efficiency model, Van Alstyne & Schrage (2016) introduced the *platform investment model*, arguing that sustainable growth is based on user capabilities of value creation. Platforms that empower their supply-side users by strategically increasing their capabilities to create and provide value to other platform participants, increase the average interaction value. Thus, the platform investment model promotes cultivating producer capabilities which is argued to be equally important as reducing transaction costs to grow a platform (Van Alstyne & Schrage, 2016).

3.2 Deriving the framework

When combining the efficiency model and the platform investment model, three variables can be identified as key areas for platform growth: *user volume*, *transaction efficiency,* and *producer capability*. As shown in Table 1, each variable is identified in literature as being key to increase the average transaction value and foster platform growth (Mancha et al., 2019; Van Alstyne & Parker, 2017; Van Alstyne & Schrage, 2016; Zhu & Furr, 2016).

Table 1

Overview of derived platform growth variables.

Variable	Relevance
User Volume	More users participating on a platform lead to a higher average value per transaction and improved matchmaking (Van Alstyne & Parker, 2017). When reaching the critical mass, network effects become the dominant force of further user base growth (Mancha et al., 2019; Van Alstyne & Schrage, 2016).
Transaction Efficiency	Reducing transaction costs, such as information or coordination costs, improves exchange efficiency and matchmaking (Leong et al., 2019). Digital platforms usually employ direct interactions between digital platform users which enables external value creation and orchestration through the platform owner (Ivarsson & Svahn, 2020).
Producer Capability	Strategic investments into producer capability increase producers' competence to generate value and hence increase the average value per transaction. Investing into producer capability is argued to make platform growth sustainable (Van Alstyne & Schrage, 2016).

The combination of the efficiency model and the platform investment model can be motivated by the logical deduction that the three key variables are interdependent, as illustrated in the following examples. The more users on a platform, the more possible transactions can be executed. In return, the better the transaction efficiency, the better both user groups can access each other and take advantage of the vast offer. The value provided by increased producer capability is amplified by the number of producers but depends on the transaction efficiency to be accessed by demand-side users. The examples show that the variables are not only adding up to each other but seem to be interlinked in a reinforcing manner. Likewise, any variable equaling zero is likely to eliminate possible network effects regardless of the other variables being present or not, as shown by the following. If there are no users on a platform, no transactions can be executed. If the transaction efficiency is low, user groups struggle to access each other and to take advantage of the value offering. If users are not capable of offering value to others, neither large user numbers nor high transaction efficiency can invigorate the platform.

Consequently, a dynamic relationship between the three variables can be assumed, with the variables amplifying respectively limiting each other. The combined

framework leads to two assumptions: 1) Firms that want to grow a platform need to focus their efforts on all three variables to facilitate self-reinforcing network effects. 2) Firms that are limited in any of the presented variables can try to compensate for the limitation by intensifying efforts on the other key variables of growth.

The combined framework provides a theoretical lens to the study. As such, it guides the collection and categorization of empirical data in the Method. Further, it will be used to discuss the findings in the light of literature and derive implications for theory and practice.

4 Method

In order to address the research questions, a qualitative case study was conducted. This method was adopted as it allows for in-depth insights into specific phenomena within their environmental context (Ridder, 2017; Yin, 2017) while also capturing the complexities of real-life situations (Zainal, 2007). Consequently, the method of choice was deemed suitable for the study as it allowed thorough exploration of the growth variables as underlying principles of platform growth. However, opting for a single-case study also brought limitations in terms of the study's generalizability. As the empirical scope of the study was limited to the case firm and its context, the study's relevance outside this context can be derived from literature but not from the researched case. Yet, as the proposed framework and growth variables originate from models intended for no pre-established context, it is likely that the study contains general insights regarding platform growth. The data were primarily collected through semi-structured interviews and complemented with unstructured interviews as well as secondary data. The data was analyzed using thematic analysis and categorized according to the theoretical lens provided by the conceptual framework. The following subsections outline the research setting, data collection, and data analysis.

4.1 Research setting

The single-case study was conducted between January and May 2021 and focused on a young central European software firm. Since its foundation in the early 2010s, the software firm, hereby denoted as the case firm, has scaled up significantly and now possesses a workforce in the hundreds with an international presence of both offices and customers. The case firm offers a professional Software as a Service (SaaS) application. In addition to the application's core functionalities, additional features and functions are offered through a digital marketplace. The application marketplace houses complementary add-ons, commonly referred to as applications or apps, which enable further customization of the core product according to the users' needs and wishes. Currently, the digital marketplace is undergoing a strategic transition where the focus is shifting from maximizing the number of add-ons to leveraging the existing marketplace offerings. The particular case firm was selected as they provided generous insight into their platform growth efforts by providing access to a wide range of respondents and data, opening for scrutinization of the growth variables.

4.2 Data collection

The data collected in the study consist of three different data types: semi-structured interviews, unstructured interviews, and secondary data (see Table 2 below for further details). The data collection started with the unstructured interviews to provide a general understanding of the case firm and its context as well as interview candidates and secondary data relevant to the study. The semi-structured interviews obtained data directly relevant to the research questions while the secondary data provided insight into the case firm's formal internal processes and strategies.

Table 2
Overview of the data collected during the study.

Data type	Description	Amount	Time
Interviews	Unstructured	3	January 2021 – February 2021
	Semi-structured	7	March 2021
Secondary data	Internal documentation	6	2018 - 2021

The interviews were conducted remotely via videoconferencing software which by then had become widely normalized due to the ongoing COVID-19 pandemic. Besides, the remote interviews allowed the authors to disregard the vast geographical distance to the respondents. Notes were taken during the unstructured interviews while the semi-structured interviews were also recorded (after consent was given) and transcribed. The interviews lasted between 60 and 90 minutes. All respondents were informed that the case firm would be anonymized in the study. Lastly, to uphold internal anonymity, the respondents were assigned a random letter apart from the C-level executive, see Table 3 below.

Table 3
List of interview respondents

Role	Respondent
C-level executive	A
Product Manager, Senior Product Manager, Customer Success Manager/Engineer, Technical Partner Manager	B, C, D, E (no reflective mapping)

E-Mail was used for follow-up questions and when clarifications were needed. The unstructured interviews proved useful to understand in what context and on which premises the case firm operates but it also played a major role in identifying relevant interview candidates for the semi-structured interviews. Secondary data was obtained from the respondents either via e-mail or during the interviews through the videoconferencing software and complemented the unstructured interviews in providing general knowledge and context regarding the case firm.

The semi-structured interview approach was adopted as it provides a natural flow which creates space for the respondent to fully express themselves, the ability to improvise follow-up questions based on the responses, as well as the ability to probe into specific relevant issues and topics (Kallio et al., 2016; Longhurst, 2003). Conducting the interviews remotely through videoconferencing enabled the respondents to partake in the interviews from wherever they pleased. Consequently, it can be argued that conducting the interviews remotely may in fact improve the communication and hence information exchange as a result of the respondents enjoying high comfort in their physical interview environment (Bolderston, 2012; Seitz, 2016). Adams (2015) and Kallio et al. (2016) emphasize the importance of developing and following interview guides to conduct objective and trustworthy semi-structured interviews. Thus, such were developed following the study's conceptual framework, ensuring that the interviews would progress in a relevant direction and hopefully provide valuable insights.

4.3 Data analysis

For analyzing the collected data, thematic analysis (TA) was used to identifying, analyzing, and reporting patterns in the data (Braun & Clarke, 2006). TA offers great flexibility through its compatibility with different data types and provides a robust and acknowledged approach with the potential for "nuanced, complex, interpretative analysis" (Braun et al., 2016, p. 1; Clarke & Braun, 2013).

After each interview, the notes taken during that interview, which constituted the filled-in interview guide, were scrutinized by the researchers to absorb, and annotate relevant initial analytic observations. Simultaneously, the notes were converted into transcripts with the help of the recordings to ensure that they accurately reflected what was said during the interview. Besides, as the recording was in video format, situational factors such as environmental contexts, behaviors, and nonverbal cues, which are typically lost when recording sound only, were maintained (Sutton & Austin, 2015). Such practice did not only result in *familiarization with the data*, the initial step of TA according to Braun & Clarke (2006), but it also helped to continuously refine the interview guides which are argued to be a work in progress (Adams, 2015). In the next step, the data was repeatedly read and systematically

examined to identify relevant segments and code them according to the conceptual framework. The relevant segments were transferred to a separate digital catalog where they were bundled according to their coding into topics and after further refinement eventually subtopics (see Appendix for coding example). Accordingly, segments that were concluded irrelevant remained uncoded and hence were not transferred to the catalog. As the interview guides were organized according to the conceptual framework and its three variables, most identified segments were already under a relevant topic and hence inherently pre-labeled with an applicable code, if not, they were coded accordingly. This simplified the analysis process significantly by having segments likely to be related pre-bundled. The above-described process was done non-linearly, meaning that the catalog was complemented with more segments and codes as the analysis and the interviews progressed. Once the interviews were concluded and the catalog was finalized, it was used to create the narrative leading through the findings.

5 Case firm's research context

In this section, the research context derived from the collected data is presented to provide a comprehensive background description of the case firm. The context is categorized into subsections describing its platform strategy, journey as well as current setup.

5.1 Strategy and Vision

Although partially described as a start-up, the venture-funded firm has reached a size and growth where it can be seen as a permanent and scalable business. In 2018, the case firm decided to build a digital marketplace and reshape its strategy around pursuing a hybrid business model. According to Respondent B, the vision was defined as: *"SaaS enabled marketplace (SEM): Hybrid model where the product is standalone software supplemented with a marketplace. This is what [the case firm] will become as we build out our marketplace."*.

Since building the marketplace has become an unquestioned part of the case firm's efforts, the term hybrid model is not used internally anymore. As stated in 2018, the envisioned hybrid business model consists of the core product, a SaaS application, and a platform for complementary applications. Although the basic setup has been built and functionalities have been put into practice, the hybrid business model is seen more like a vision rather than the current state. Additionally, even though the core product was seen as standalone software, it is hard to strategically separate the core product and the marketplace. As Respondent E stated:

> *"Our marketplace has always been focused on [the case firm]. It is hard to imagine what the marketplace would look like without [the case firm] because every tool in the marketplace ties into [the case firm]."*

After a heavy focus on organizational growth from 2018 to 2020, the case firm has now moved its focus on increasing organizational efficiency, which created a profit-oriented vision for the marketplace. As Respondent C stated: *"This requires us having proper margins. For me, the marketplace is a feature, way to up-sale additional functionality to existing user base, in order to increase per user-profitability."*. Turning the marketplace into a business case calls for a focus on positive margins and low installation and maintenance costs. If done successfully, the user-profitability could be improved by selling several additional features to existing customers without a substantial cost of sale.

Besides the profit-oriented vision, there is also a growth-oriented vision for the marketplace, stressing the potential of the marketplace as a *growth engine*. Respondent A explained that vision as:

> *"Marketplace as a lead generation tool […] you attract developers to have more apps. […] When we have more apps on the marketplace, that should help us attracting more customers. […] Developers get attracted by a strong customer or user base."*

Consequently, efforts in attracting external developers and partners ought to lead to an increased number of available add-ons increasing the number of use cases of the case firm's software. More extensive coverage of use cases is expected to work as a user magnet that generates general user growth for the case firm.

A third view on the marketplace is that instead of being used for profit or user growth, it should be used for retention by binding customers to the case firm's core product and hence preventing them from switching to competitors. Being able to use various tools and external platforms through the extended core product is expected to increase the costs of switching to a competitor's software. Respondent E explained: "*We can see that if we have customers using our marketplace apps, they are less likely to churn, they are more likely to stick around. […] I see them [add-ons] as an investment in keeping our customers as customers.*". With this perspective, running the marketplace and installing add-ons for customers is seen as a long-term investment that does not need to create financial profit in the short run.

5.2 The platform journey

As repeatedly pointed out during the interviews, the current marketplace setup which is deploying brokering to connect producers with customers might be seen as an inefficient, yet not necessarily wrong transaction type per se. Rather, brokering is perceived as the natural solution to foster matchmaking and transactions given where the case firm currently is in its journey of building a digital marketplace. Respondent B explained:

> *"At our level (companies that are similar in size to [the case firm]), most prospects and customers care more about the volume and diversity of marketplace apps than the marketplace infrastructure (purchasing integrations directly from the marketplace)."*

Thus, brokering is seen as a transitional solution. Respondent B pointed out what they regard as a typical platform journey, based on their assessment of firms building similar platforms on top of their core product:

1) *Pre-marketplace*. Firms in this stage usually provide a webpage where they list partners, sometimes with descriptions of possible integrations.
2) *Marketing marketplace*. Firms deploy a marketplace page with referral listings. Prospects and customers cannot install applications directly through the marketplace but need to get in touch with an account executive or customer success manager.
3) *Automated marketplace*. Firms deploy a marketplace where IT-affine prospects and customers can install and configure applications without substantial help from the platform owner.
4) *Advanced marketplace*. Applications are completely out of the box and do not require any back-end configuration by the platform owner. The financial transaction is also done through the marketplace. ADP Marketplace and Slack App Directory are examples of advanced application marketplaces.

At the time of the interviews being conducted, the case firm is deploying two marketplaces simultaneously, resulting from their followed platform journey. The earlier built marketplace is what they see as a marketing marketplace, publicly accessible through their webpage and mainly used for marketing purposes. Owned and designed by the marketing department, this marketplace has no installation process in place, but a call-to-action (CTA) button leading to a contact form to get in touch with the case firm and ultimately, request a free demo of possible applications.

In a subsequent step, the so-called *dashboard marketplace* got created, to deploy a marketplace where installation and configuration could be automated. This marketplace is only accessible for customers through their core product profile and provides a CTA for installing the single application. However, when pressing the CTA button, a ticket will get created within the case firm and the customer will have to wait for the case firm or a firm's partner (in case of a third-party application) to reach out and undertake the setup and configuration. Thus, brokering will continue to be the inevitable transaction type as long as no further automation will be put in place.

5.3 Current setup

The producer side of the marketplace consists of the case firm itself, marketplace partners that have signed a partner agreement, and regular external developers. The different available applications can be separated into first and third-party applications, not depending on whether they were built in-house or externally, but rather depending on whether only internal data is involved, or the application connects with an external product or platform. Respondent B explained:

"A first-party app would be something like installing form templates, Home widgets, or checklist templates - all of the data involved is within [the case firm]. Most of the time, 1st party apps are developed by the company itself, but this is not always the case - the company could employ external developers to do it."

Consequently, first-party applications either highlight functionalities of the case firm's core product or provide any kind of additional service that does not involve externally hosted data. Third-party applications on the other hand are integrations to existing external services, either to major actors (mainly built in-house) or to smaller players that see an interest in joining the case firm's platform. At the current state, all the applications on the marketplace built by external parties are integrations.

6 Findings

In this section, the findings regarding the key variables of platform growth are presented together with their interconnection before the summary of the key findings.

6.1 User volume

As previously mentioned, the marketplace consists of a producer and a customer side which together make up the user volume. The volume of each side was throughout the interviews described as essential. Producer volume was regarded as important to increase the number of add-ons on the marketplace which in its turn enhances the product's use case coverage. For instance, Respondent A argued that add-ons are necessary for the case firm realizing its strategy: *"[the case firm] wants to be this single point of contact for the end-users and we can only achieve this product ambition if we integrate with other most relevant tools, otherwise it is not doable."*. The customer volume, on the other hand, is not only essential for the overall platform growth but also determines the attractiveness for producers to provide add-ons and can be utilized as a revenue stream.

During the interviews, network effects were repeatedly brought up regarding user volume. Considered very desirable, some respondents emphasized that cross-side network effects, to some degree, were already present on the marketplace despite its limited size. The critical mass of customers needed to trigger network effects was seen as unique to each producer. Respondent A commented on the critical mass of customer volume: *"It is not really black and white; it really depends on the company"* and exemplified his statement with the following:

> *"A developer would not build on top of a platform that does not have any users. […] The exact number probably also depends on the partner. I think for a start-up, or a pre-series A company, we already have a very interesting number of customers and users. But for a company like Microsoft, we don't. I think that a pre-series A start-up would build things on top of [the case firm]. But for companies like Microsoft, we actually have to build the integrations, or we have to ask a partner to build the integrations for us."*

When asked to describe the current focus regarding user volume, Respondent B expressed that *"You caught us in a major transformation, [the newly appointed Product Manager] will be shaping it from now on."*. Around the same time the data collection for the study was initiated, a Product Manager was recruited to *define and*

redefine the marketplace strategy; a process that would exceed the study's timeframe and thus not be further followed. The initial strategy focused on producer volume as a vehicle to increase the number of add-ons available on the marketplace. Once the marketplace offering grew sufficiently, the focus started to shift towards the customer side in terms of volume. The shift could be observed through increased efforts directed towards selling and increasing the value proposition of the existent marketplace offering. Respondent B commented: *"I don't see it [producer volume] expanding drastically in the near future because we are really focusing on getting deeper with our existing integrations."*.

The user volume is limited by the fact that the marketplace is not open, meaning that actors cannot take on the role of either side without fulfilling certain criteria. Firstly, for customers to access the marketplace, they must hold an active subscription of the core product where the marketplace is embedded. Secondly, the complementary add-ons offered on the marketplace provide no value themselves as they only function as complements to the core product. Consequently, marketplace customers must inherently be customers of the case firm's core product. As Respondent D explained: *"Customers don't just show up by themselves, they need to close a contract with [the case firm] first."*. As such, the marketplace customer volume will always be a subset of the core product's or, as expressed by Respondent E: *"ideally, 100% [of our] customers would be using apps"*. Furthermore, producers cannot easily build and deploy add-ons to the marketplace. Respondent C explained that:

> *"It is not an open marketplace where you have an idea, you write it up and publish it to the marketplace. If someone wants to build something, it still goes through either our partners or product teams, so there is no open app development path right now. You can look at the APIs and so on, but there is no way, no mechanism, to post that app on the marketplace. [...] Because of that, we do control what is needed, what is being built, and what we will provide."*

The reason for the case firm to stay in full control of the marketplace is not only described as ensuring quality, but also the integrity of the core product. Respondent A exemplified:

> *"There are some legal compliance things. For example, where is the data hosted? If someone is creating a third-party app, [these applications] are also going through a different data center. We claim that we are GDPR compliant – can we still be GDPR compliant if the data is going through a different data center?"*

Consequently, the case firm, alike the platform owner, acts as a gatekeeper which provides full control of the producer volume. However, a producer is not limited to

providing only a single add-on, although that has been the norm until now (apart from applications developed by the case firm itself).

Lastly, the customers of the marketplace are not necessarily the end-users but more commonly internal functions responsible for IT system purchasing. Consequently, the actual end-users are unlikely to have a major impact in making decisions concerning the tool. When talking about contextual limitations regarding user volume, Respondent A described their current environment:

> *"What is also a bit special in the case of [the case firm] is that the users are in many cases not the buyers. I think that is a bit unique. Because when you think of products like Slack or Atlassian, you can probably add certain bots on your own, but our users would not add an integration to [the case firm]."*

Respondent D elaborated on the involvement of end-users with the following:

> *"[...] there might not be an incentive to actually do this [end-users visiting the marketplace]. [The case firm] is a B2B tool, so it gets set up in a company through some internal function, like internal communication or operations or HR and then they make it available for the employees to be used. So usually there is a certain context where the marketplace is being used. And it is usually in the setup phase that it is usually set up with everything that is needed."*

6.2 Transaction efficiency

Within the case firm, the transaction process set up for the marketplace is widely perceived as inefficient. While some employees stress out the potential of improving the automation to scale the marketplace further, others see improving automation rather as causing high costs that would not be reasonable at the current state of the platform. Respondent B shed light on both sides:

> *"I don't think it's possible to bypass talking about automation when we talk about the growth of [the case firm]'s marketplace. It's the natural next stage: usually the initial goal of a company is to add a larger number of integrations and offerings on their marketplace [...] then you have a problem of scale, as most marketplace processes will probably be manual."*

> *"It only makes sense to invest the time and resources to automate when there's a critical mass of offerings on the marketplace and the manual processes are too much to handle, [...]"*

Thus, the key question discussed in the case firm seems to not necessarily be whether the marketplace is efficient or not, but rather whether the transaction process

currently in place is efficient enough for the current state of the platform. It seems generally agreed, that in case of extensive growth, the case firm would have to invest in further automation. Possible improvements for efficient transactions are mainly visioned in three areas according to Respondent A.

1. *Discovering applications*. In the ideal case, customers explore the marketplace by themselves. They should be able to find all the information needed to make a purchase or be able to directly try the application through a free trial or a light version.
2. *Buying applications*. In the ideal case, customers should be able to directly buy and pay through the marketplace, without separately conducting a monetary transaction.
3. *Deploying applications*. In the ideal case, partners and external developers should be able to easily upload applications on the marketplace and independently change application descriptions.

Out of the mentioned areas, the first one is most commonly seen by the respondents as the main area hindering marketplace growth. The process of uploading and deploying an application to the marketplace as well as the process of buying is said to be sufficiently addressed through manual work. However, several employees agree that customers need to be able to discover and experience applications. The fact that applications in the marketplace are not out of the box, might be a reason for customers to lose interest and not come back to the marketplace for further exploration. Yet, Respondent E pointed out that customers might be used to the rather inefficient process and perceive it as normal for a software provider of the size of the case firm. Even with a fully automated *self-service* marketplace in place, a customer company might not be able to make use of directly executable transactions, due to internal hierarchy, budgets, and decision making.

Finally, even the employees that favor a more automated marketplace see it as a resource problem and mostly prioritize other projects. As expressed by Respondent A:

> *"It is a lot about resources, we cannot do everything. […] Efficiency is a nice problem to have. I think you should set it [the marketplace] up with a manual process and if it's not scaling anymore you can invest in efficiency. But investing into efficiency from the beginning might be the wrong investment.*

6.3 Producer capability

When coding the collected data, producer capability was found to consist of several subthemes. The findings regarding those three subthemes are presented in this subsection.

6.3.1 Building applications

In terms of producer empowerment, several employees stressed out the case firm's strong focus on boundary resources, especially when it comes to *application programming interfaces* (API) which can be observed to be prioritized over *software development kits* (SDKs). As commented by Respondent A: "*API first. For every feature you add, the platform should have an API that is documented and that can be used by third parties.*". Providing extensive and well-documented APIs is hoped to improve value-creating capabilities among external parties and enable them to build integrations with less involvement from the case firm.

Another way to empower producers to build applications and integrations is through what the case firm sees as *partner enablement*. In a structured process, the case firm provides material to make sure that partners know the core product, invites them to explore and test the different features, and informs them about updates and possible improvements. Talking about partner enablement, Respondent B exemplified: "*I think it is important to train our partners. For partners to know the basic features of our product is not sufficient. We send a branding book and established a standardized form of integration description.*".

The potential to increase the capabilities of producers is also seen in terms of uploading and deploying applications to the marketplace, which is still a very manual process. However, priority is given to enable independent building rather than independent uploading of applications. Yet, with a growing number of applications, the case firm could imagine investing in an easier and therefore more autonomous process of uploading and deploying.

6.3.2 Deciding for a user-case

To guide developers in their choice of what kind of application to build, the case firm brokers information between developers and customers, and supports with the case firm's own expertise. Respondent B explained:

> "*The partner and I create a list with use cases, show it to customers and see if the list of use cases covers what they want. If not, I look at the partner and come up with use cases to discuss with them. We have a common list of like two to three use cases that could be standard for each integration.*"

Apart from the developer-specific elaboration of possible use cases, the case firm holds a list with possible use cases, ranked by their importance. When customers report the need for additional functionality, the requests get recorded, bundled, and assessed by importance and the potential number of interested clients. Talking about their process to support developers in providing the right applications and integrations, most employees seemed to be confident that sufficient support is given. Respondent D commented: *"We don't have integrations where we do not cover the critical features of that integration. There might be nice-to-haves and could-haves, but the must-haves are there."*.

6.3.3 Possible feedback loop

Although information is brokered through the case firm, most employees agreed that a direct feedback loop is missing, connecting customers with developers. Only if a bug is encountered in an add-on, customer companies might get directly in touch with the responsible developer. Additionally, there is also an information gap within the customer companies. Respondent E commented on such information gap: *"There might be integration possibilities that we just do not know because we have not talked to people on the ground."*.

According to Respondent E, in an ideal world, a feedback loop would be in place for customers and end-users to provide such information to the case firm and external developers. While rolling out the product within customer companies, the case firm realized that even with such a feedback loop in place, end-users could not necessarily be expected to provide feedback. Firstly, it would not be part of their job and secondly, many customer companies would not appreciate if employees would use valuable working time to provide feedback to the platform owner. Yet, investigating end-user feedback is perceived as extremely valuable. Regardless, such value is mainly seen in terms of generating new use cases rather than improving existing ones. Respondent E stated:

> *"Feedback on already existent apps has not happened until now. Once we realize something, that is it. Especially with the apps that we currently have, it is mostly maintenance that we have to take care of. […] I can't think of a single case where we have taken an integration and then completely revamped it or continued developing it […] Typically once it is released, it is in its final state."*

This is explained by the case firm's previous heavy focus on using its limited resources to diversify the offering of use cases. To get as many customers as possible to try marketplace applications, the number of applications was pushed to be sufficient to cover various needs. Thus, the recent focus was on providing a vast number of applications rather than increasing the value of single applications. However, while conducting the interviews, the case firm's general strategic objective

for the marketplace had just shifted from focusing on increasing the volume of add-ons towards making them more accessible and used. Respondent E stressed, that once the marketplace would be economically viable, the focus might shift to improving single applications. Respondent A suggested the ability to rate and comment on applications within the marketplace to allow the case firm and customers easy access to application usage and perception. Nonetheless, Respondent A added that such an initiative would be given low priority:

> *"Until we don't have a lot of apps, we can also share this feedback directly with the developer. Definitely automate this part of the process, but it is about resources and where to invest those resources. [...] With the resources we have at the moment, I would not invest there."*

6.4 Interconnection

Although the respondents substantially differed in their assessment of the variables' importance, all respondents articulated an interconnection between the variables and that they should be balanced according to the particular context of the case firm. Other than suggesting that the variables indeed interact in some interconnected manner, producer capability and transaction efficiency were seen as enablers for user volume. The indicated interconnection was verbalized by Respondent C when talking about other successful marketplaces as:

> *"[...] every big or significant marketplace has quite strong developer capabilities beneath it. Same with transaction efficiency. Take any pieces of the puzzle out of the equation, and they would not have a huge user volume [...] and everything falls apart. Those are kind of the three bread and butter elements that are somehow interconnected to each other, they don't work without each other."*

User volume constitutes as aforementioned of customer and producer volume. Respondent D elaborated further on the interconnection and explicitly reasoned around how the variables interact:

> *"Developer capability is essential to ramp up the volume of inventory. Ramping up that is extremely important so that there is a larger number of inventories for users to find whatever their needs might be. Because with developer capability, we enable developer volume. Or actually, growing developer volume without developer capability probably does not make any sense. [...] developer capability enables developer volume. Transaction efficiency enables customer volume."*

Nevertheless, Respondent A also highlighted that good producer capability and transaction efficiency without a sufficient customer base may be insufficient for

achieving sustainable platform growth. The respondent provided a concrete example of Microsoft's discontinued mobile operation system:

> *"[...] Microsoft with their mobile ecosystem or marketplace, I'm sure they invested a lot into developer capabilities, and the transaction efficiency was probably okay. But they did not have the volume and they just tried to pay developers to build apps. But without the user volume, it just did not work. So even if you are paying developers to build apps for you, if you don't have a strong user base, then it is not working."*

6.5 Key findings summary

The case firm laid out their view of a typical platform journey as incremental; starting from providing a static webpage listing partners, all the way to offering a fully automated marketplace where applications are out of the box and do not require any back-end configuration by the platform owner. In between these extremes lie platform states that rely on manual processes to different degrees. The reasoning for not building a fully-fledged platform right from the start was mainly articulated as being due to lack of resources but also inherent as the platform grew out of a marketing initiative. Generally, building a platform on top of their core product made the case firm face different contextual limitations. Not only did the platform emerge as rather restrictive to maintain the quality and integrity of the core product, but user growth proved to be naturally limited due to the need to convert marketplace customers from the core product.

The findings confirm literature in that the three variables were all regarded as key to platform growth in the case firm's setting, although with varying priorities. In addition, all respondents articulated an interconnection between the variables, reinforcing respectively limiting each other's impact on platform growth. Producer capability and transaction efficiency were seen as enablers for user volume while the latter effectively could inhibit the formers' impact on increased growth.

The rather manual transaction process deployed on the marketplace was generally seen as inefficient but not necessarily hindering the platform to be successful. Given limited resources, the case firm perceived brokering as a sufficient transitional solution. Investments into further automation would only be considered when the number of transactions would exceed the case firm's capacity to carry out such. Consequently, improved transaction efficiency was generally seen as a consequence rather than a driver for growth.

Last but not least, cross-side network effects were regarded as partly present despite the limited size of the marketplace. Depending on the size of potential partners, the customer volume of the core product was perceived as already providing a critical

mass. This helped the case firm to attract initial partners to their marketplace. Once the producer volume was large enough to provide what the case firm regarded as sufficient add-ons, the strategy shifted towards the current focus on attracting core product customers to the marketplace.

7 Discussion

All variables have proven to be interlinked and amplify each other's impact on platform growth. Transaction efficiency, however, has stood out as a variable that plays a special role in platform growth which calls for a deeper reflection. Since the study captures the given state of the case firm, the insights ought to be understood as reflective of platform dynamics and platform strategy in the making. In this section, we discuss the nature and applicability of transaction efficiency, shedding light on the benefits and downsides of a retroactive perspective on this variable. Further, we discuss the idea of understanding the critical mass as a scale that can be impacted by transaction efficiency as well as other variables.

7.1 Nature of transaction efficiency

Literature widely advocates for setting up digital platforms optimized for minimal transaction costs (Leong et al., 2019) and maximal autonomy of users to independently execute transactions (Ivarsson & Svahn, 2020; Van Alstyne & Schrage, 2016). Our findings confirm that transaction efficiency plays indeed an essential role in scaling a platform. However, the findings give reason to regard transaction efficiency as a consequence rather than a driver of growth, which challenges the common assumption in literature that optimal transaction efficiency should be set up right from the start. Respondents expressed that investments into increased transaction efficiency are only seen as necessary when the previously set up transaction mechanisms are no longer efficient enough to support the growing demand for transactions. The retroactive perspective also challenges the idealization of orchestration as the dominant transaction type for digital platforms (Gawer, 2014; Hein, Schreieck, et al., 2019). The findings indicate brokering to be generally regarded by the case firm as sufficient for the current state of their marketplace. Orchestration, on the other hand, viewed as a state of maximized transaction autonomy and efficiency, is rather seen as a vision than as a necessity.

The findings generally suggest that in the case of pursuing a hybrid business model, the common journey to build a platform in the form of a digital marketplace consists of several consequent steps. This incremental platform journey challenges previous work, where deploying a platform has usually been metaphorized as making a leap (Van Alstyne et al., 2016; Zhu & Furr, 2016). In parallel with the observed platform journey, transaction efficiency is expected to incrementally increase, ultimately resulting in a fully automated marketplace. Nevertheless, the observed platform journey brings technological, organizational as well as strategic legacy issues. Often

growing out of a marketing initiative, a digital marketplace is initially set up to generate leads and support the core business. To avoid such legacy-related limitations, practitioners are recommended to regard the platform as a standalone product with its own logic and mechanisms. Employees working on the platform ought to have fresh mindsets to break out of previous ways of thinking and working. As such, firms need to separate the logic, premises, and assertions on which the core product and the platform are based to fully harvest the potential of the platform. Nevertheless, the findings generally indicate that the incremental platform journey is not only undertaken for strategic reasons, but also due to limited resources that prevent a firm from going full speed ahead with a fully automated platform right from the start.

Driving rapid conversion to the new platform has been identified in literature as key to successfully deploy a hybrid business model (Zhu & Furr, 2016). Additionally, literature commonly advises to concentrate on one side of the platform to grow the other, and subsequently both sides through bidirectional network effects (Gawer, 2014; Parker & Van Alstyne, 2005). The case firm has successfully leveraged unidirectional network effects to attract external developers and ensure that the marketplace provides various valuable add-ons. Nevertheless, they are struggling to leverage bidirectional network effects that would also drive the conversion of core product customers into marketplace customers. Applying our framework as a conceptual lens uncovers that the absence of bidirectional network effects is likely to be the result of low transaction efficiency. This sheds light on the downsides of a retroactive perspective on transaction efficiency. Customers are not able to sufficiently explore add-ons on the marketplace, and costly and time-consuming processes need to be executed before the add-ons can actually be experienced. Although the case firm stresses out that brokering is a sufficient way to bridge between producers and customers, it might be the focus on brokering that distracts the case firm from investing in sufficiently efficient transaction mechanisms that enable network effects.

To sum up, the perception of growth and transaction efficiency seems to differ between practice and what literature generally proposes. While literature emphasizes that high transaction efficiency is of utmost importance from the inception of a platform, our findings show that the case firm holds another opinion in that it is rather preferable to increase transaction efficiency incrementally and retroactively as the platform grows. Consequently, in order to address this inconsistency, further research is called upon to bring clarity whether it is the contextual limitations, lack of resources, state on the platform journey, or any other reason that is the origin for this mismatch.

7.2 Critical mass as a scale

Reaching the critical mass has been described in literature as essential to allow network effects to take off and drive self-reinforcing platform growth (Mancha et al., 2019; Van Alstyne & Parker, 2017; Zhu & Furr, 2016). Firms are advised to costly subsidize one market side, to reach the critical mass and consequently grow both market sides (Gawer, 2014; Rochet & Tirole, 2003). However, little attention has been given to whether the critical mass can be lowered rather than forcing the volume of one market side to reach a magic threshold. Literature has suggested that there is a link between critical mass and producers (Mancha et al., 2019), but very limited literature addresses the underlying building blocks of the critical mass and how the critical mass can be altered. Our findings suggest that the critical mass depends on certain factors and should be treated as a scale rather than a binary threshold. In line with the key variables amplifying each other's impact on platform growth, the critical mass is expected to not only be lowered by increased producer capability but also substantially by increased transaction efficiency.

As the study only examines a rather limited scope of variables, it is likely to only scratch the surface as to what critical mass depends on. As for now, practitioners are advised to lower the critical mass by making producer contribution more valuable and easier accessible. A lower critical mass will in its turn make it easier, and alike faster, to enjoy self-sustainable growth and thus grow the digital platform. This is practical implication can be illustrated by the case firm struggling to convert customers to the marketplace even though the developer and add-on volume had been fostered and was regarded as sufficient to attract customers. Shedding light on the scalability of the critical mass as well as its dynamic relationship with certain variables opens the general discussion to what factors influence the critical mass and how it can be reduced. Research on this topic would be valuable for further elaboration of platform growth models, and potentially challenge the current focus on user volume to reach the critical mass.

7.3 The framework

The findings confirm literature in that the variables *user volume*, *transaction efficiency*, and *producer capability* are key to foster platform growth. Further, the findings support the suggested dynamic relationship, where the variables amplify respectively limit each other's impact on platform growth. The importance and dynamic relationship of the presented variables support our new framework that better represents the complexity of platform growth and thus helps practitioners to guide their efforts in growing a platform. In essence, practitioners ought to focus on all three identified variables since any overlooked variable can limit the overall growth. If one variable requires significantly less effort to be improved than another,

it can be an opportunity to reinforce the other variables' impact on platform growth. Similarly, if one variable is restricted, intensifying efforts on the others can partly compensate for such limitation. Consequently, we recommend practitioners to frequently assess the variables to spot any major unbalances which latently hamper platform growth.

In the specific context of a hybrid business model, our findings indicate that the literature on platform growth and actual practice particularly differ due to contextualities and limitations arising from the core business. This can be exemplified in that platform users need to be converted from the pre-existing customer base of the core business, or in that the case firm controls the content provided by external developers to keep up the quality and integrity of the core product. Deploying a rather closed marketplace with a limited volume of producers, customers, and provided products/services, changes the basic premises platform literature is based upon which seems to make hybrid business platform growth especially challenging.

The issues arising from pursuing a hybrid business model underline the importance of applying our proposed framework, since it helps leaders to understand the variables and mechanisms behind platform growth. Consequently, our framework allows for greater applicability of platform growth theory than individual growth models.

8 Conclusion

Our study provides insights on the roles that the variables user volume, transaction efficiency, and producer capability play in platform growth. The findings show that the variables are interconnected, mutually amplifying respectively limiting each other's impact on the overall platform growth. Additionally, the study contributes with four key insights about the platform journey, the nature of transaction efficiency, and how the variables impact critical mass. 1) Building a digital platform can be seen as an incremental journey. The envisioned journey is not necessarily undertaken for strategic reasons, but also due to limited resources that prevent a firm from going full speed ahead with a fully automated platform right from the start. 2) Consequently, transaction efficiency is regarded as a consequence rather than a driver of growth (which challenges the common assumption in literature that optimal transaction efficiency should be set up right from the start). 3) The findings suggest that the absence of bidirectional network effects might result from low transaction efficiency, shedding light on the downsides of a retroactive perspective on transaction efficiency. 4) Our findings suggest that the critical mass depends on transaction efficiency and producer capability as well as possible other factors and thus should be treated as a scale rather than a binary threshold.

The framework proposed in this study will help firms to foster platform growth by better representing the complex and dynamic reality and hence allowing greater applicability as a single growth model. As a conceptual lens, the framework has helped the researchers to guide the study's focus and uncover the lack of bidirectional network effects that results from low transaction efficiency. Lastly, the study calls for further research that focuses on the nature of the critical mass, the retroactive handling of transaction efficiency, and the applicability of the combined framework in different contexts.

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10 Appendix

Table A1

Example excerpt of coding from the digital catalog.

Code	Subcode	Example quotations
User volume	Producer volume	*"I don't see it [producer volume] expanding drastically in the near future because we are really focusing on getting deeper with our existing integrations"*
	Customer volume	*"Customers don't just show up by themselves, actually, they need to close down a contract with [the case firm] first"*
	Critical mass	*"A developer would not build on top of a platform that does not have any users. [...] The exact number probably also depends on the partner. I think for a start-up, or a pre-series A company, we already have a very interesting number of customers and users. But for a company like Microsoft, we don't. I think that a pre-series A start-up would build things on top of [the case firm]. But for companies like Microsoft, we actually have to build the integrations, or we have to ask the partner to build the integrations for us."*
	Network effects	*"Marketplace as a lead generation tool [...] you attract developers to have more apps. [...] When we have more apps on the marketplace, that should help us attracting more customers. [...] Developers get attracted by a strong customer or user base."*