# Digital Transaction Platforms: Forms, Mechanisms and Outcomes

**A collection of essays**

Mikko Hänninen



Aalto University

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A collection of essays

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**Abstract**

In this dissertation, I explore the forms, mechanisms and outcomes of digital transaction platforms for both customers and complementors. Understanding these questions is important, as despite the large theoretical and managerial interest towards digital transaction platforms and the platform economy, there is yet little theoretical and empirical understanding of their full transformative effects. Therefore, the purpose of this dissertation is to contribute more reliable empirical generalizations of digital transaction platforms in the retail and consumer services context.

This dissertation consists of an introduction chapter, followed by five distinct essays. These essays draw on a combination of qualitative and quantitative methods. The first essay captures what we know, and we don't know about digital transaction platforms, through a broad review of research on digital transaction platforms in marketing journals. The second essay explores the changes mediated by digital transaction platforms across the marketing and retail domain by drafting a multi-sided marketplace service system framework to characterize digital transaction platforms. The third essay explores the platform business model and the mechanisms through which digital transaction platform are transforming the retail sector, through a study of four leading digital transaction platforms. The fourth essay focuses on identifying the effects of digital platform use and adoption for complementors, through a study of complementors using a digital transaction platform. Finally, the fifth essay explores how digital transaction platforms are changing customer behavior, through a study of customer behavior on a digital transaction platform.

The results of this dissertation contribute to literature by defining and understanding how firm and customer behavior changes when transitioning from traditional marketing and sales channels to digital transaction platforms. This dissertation shows that digital transaction platforms are fundamentally changing how customers and complementors interact and transact. Besides opening new markets, for example by reducing transaction and search costs that previously made many transactions inefficient and costly, the essays show that digital transaction platforms are changing the behavior of platform users by empowering new digital control tools and making offerings more standardized and commoditized. This is making many marketing concepts, such as customer loyalty less relevant today, as through digital transaction platforms, customers are able to move away from long-term customer relationships, and towards individual, infrequent, transactions with a large number of potential transaction partners. Here the platform provides the interface for customers to continuously search for the best possible bargains and deals.

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Espoo, 06.03.2020

Mikko Hänninen

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# List of Publications

This doctoral dissertation consists of a summary and of the following publications which are referred to in the text by their numerals.

**1.** Hänninen, M. 2019. Review of Studies on Digital Transaction Platforms in Marketing Journals. *International Review of Retail, Distribution and Consumer Research,* 30(2), pp. 164-192.

**2.** Hänninen, M., Mitronen, L. and Kwan, S., 2019. Multi-Sided Marketplaces and the Transformation of Retail: A Service Systems Perspective. *Journal of Retailing and Consumer Services.* 49, pp. 380-388.

**3.** Hänninen, M., Smedlund, A. and Mitronen, L., 2018. Digitalization in retailing: multi-sided platforms as drivers of industry transformation. *Baltic Journal of Management*, 13(2), pp.152-168.

**4.** Hänninen. M., and Smedlund, A. Same Old Song with a Different Melody? Examining the Consequences of Digital Platform Adoption for Complementor Performance. (Unpublished)

**5.** Smedlund, A., Graham, B., Hänninen, M. and Kumar, A. Should I Stay or Should I Go? Exploring the Consequences of Platform Adoption with Machine Learning. (Unpublished)

# Part 1. Introduction

# 1. Introduction

*"When wireless is perfectly applied the whole earth will be converted into a huge brain, which in fact it is, all things being particles of a real and rhythmic whole. We shall be able to communicate with one another instantly, irrespective of distance. Not only this, but through television and telephony we shall see and hear one another as perfectly as though we were face to face, despite intervening distances of thousands of miles; and the instruments through which we shall be able to do this will be amazingly simple compared with our present telephone. A man will be able to carry one in his vest pocket."*

*Nikola Tesla (1926)*

## 1.1 Overview

Digitalization is transforming society's and industries. In the early 1990's Internet technologies enabled firms to sell online to complement their offline business and open new marketing and sales channels, and today these same, albeit more advanced, information and communication technologies, are enabling customers and suppliers to bypass existing intermediaries in the value chain and creating new markets in the process (e.g. Cusumano et al. 2019). Particularly, through these developments, new digital intermediaries have now enabled a progressive shift in market power from producers and retailers, to service providers and distributors (Dimitrova et al. 2019; Nuccio & Guerzoni, 2019).

A large enabler of these developments has been the digital transaction platform, and the resulting platform economy (e.g. Kenney et al. 2019). Digital transaction platforms are by definition "*intermediaries or online marketplaces that make it possible for people and organizations to share information or to buy, sell, or access a variety of goods and services*" (Cusumano et al. 2019, p.20). By intermediating interactions and transactions between independent customers and complementors, i.e. third-party product and service providers, digital transaction platforms create online structures for a wide range of human activities (Kenney & Zysman, 2016). Therefore, by matching customers and complementors, digital transaction platforms arguably enable higher volumes, lower prices combined with minimum transaction costs (e.g. Parker et al. 2016). For example, as a result of the platform economy, the combined market value of the four largest digital transaction platforms Alphabet, Amazon, Apple, and Facebook, is now around $3.5 trillion. Many digital transaction platforms are also among the most valued start-ups at the moment and to continue to receive large amounts of venture funding.

The roots of platforms and the platform construct are in product development and innovation literature. From closed internal product development and innovation platforms, in the 1990's platforms became open ecosystems that enabled external members to join and for example create their own modules of top of the standardized platform core. In this setting, platforms have been defined as purposefully built technology architectures enabling firms to tap into the innovation capabilities and resources of external firms, which are not directly part of its immediate supply chain (Gawer, 2009). For technology firms, this now equates to standardized technology interfaces, through which an array of peripheral firms connects to a central platform via shared or open source technologies, such as technology standards (Jacobides et al. 2018). For example, firms such as Intel have based much of their recent competitive advantage on a platform-based business model characterized by open interface standards, in which Intel provided the interface and standards for third-party complementors to connect to its proprietary technology (Gawer & Phillips, 2013). However, unlike product development and innovation uses for the platform construct, in the marketing and retail domain the role of a digital transaction platform is not to develop, manufacture or sell products and services *per se*, but rather to connect and intermediate a multi-sided market and marketplace in which third-party providers as complementors now provision the products and services offered by the platform (Zhao et al. 2019). As such, the digital transaction platform can be labeled as a business model that uses platform economics (Nooren et al. 2018).

As a business model, the digital transaction platform is an intermediary that mediates transactions between firms and individuals, who may not be able to transact as efficiently without a platform as an intermediary (McIntyre & Srinivasan, 2017). More specifically, the platform enables the direct interaction between two or more distinct sides of users as a facilitator and intermediary (Hagiu & Wright, 2015), essentially acting as a matchmaker between customers and complementors (De Reuver et al. 2018). This matchmaking is possible through the combination of a platform-based online marketplace and ancillary services. The platform-based online marketplace enables the value co-creation between customers and complementors, while the ancillary services add-value to its users (Cusumano et al. 2019). For example, complementors selling on Amazon have access to both the Amazon Marketplace as well as the ancillary services offered by Amazon such as Fulfillment by Amazon (FBA) (Hänninen & Smedlund, 2019). Therefore, digital transaction platforms are responsible for the coordination of more advanced service systems that enable value co-creation between platform users (Böhmann et al. 2014). This service system empowers more efficient transactions, for example by enabling platform participants to bypass the "*middleman*" and reduce transaction costs (e.g. Banker et al. 2011). Thus, for example, Kiesling et al. (2018) argue that digital transaction platforms often create and enable new markets by enabling interactions and transactions that were not possible previously through traditional marketing and sales channels.

The mechanisms driving the growth of digital transaction platforms are, thus, indisputable, and widely recognized in the literature. Yet, their consequences and implications for both the platforms customers and complementors are unclear and not yet supported by much empirical and theoretical evidence. This difficulty to understand and capture the essence of digital transaction platforms

stems from the contemporary nature of digital transaction platforms and the resulting lack of knowledge regarding their full transformative power. While there are many, more or less, conceptual advances on understanding the effects of digital transaction platforms from both a customer and complementor perspective, many of the claims made in the extant research are not supported by empirical evidence and the arguments are, at best, anecdotal (e.g. Langley & Leyshon, 2017; Kenney & Zysman, 2016). In addition, many of the few existing empirical studies provide mixed evidence about the effects of digital transaction platforms for actors using the platform, in addition to incorporating many different viewpoints (Burtch et al. 2018). Some studies report that digital transaction platforms have the potential to transform industry structures and dynamics from the point of view of traditional firms (e.g. Zervas et al. 2017), whereas others posit that such platforms pose a paradox for participating actors when, for example, the benefits of engaging on digital transaction platforms, such as freedom and transparency, are outweighed by their negative effects, such as, the marginalization of complementors (Deng et al. 2016). So, although studies acknowledge that digital transaction platforms are providing many benefits to both the customers and complementors using such platforms, simultaneously, their full effects for customers and complementors are unclear and often paradoxical.

Thus, there is much potential to expand the theoretical and empirical understanding of digital transaction platforms. While many studies have focused on specific examples of digital transaction platforms, such as crowdsourcing and sharing economy platforms (Hänninen, 2019), the impact of digital transaction platforms in the marketing and retail domain, where businesses are migrating to digital transaction platforms to partially or fully replace their existing marketing and sales channels, has received less interest (e.g. Reinartz et al. 2019). Therefore, there is room to build more reliable empirical generalizations of digital transaction platforms, particularly, in order to account for their effects for both the customers and complementors using such platforms, as well as the society at large. This promises to significantly contribute to the currently "*limited*" state of the research on digital transaction platforms in marketing and retail journals (e.g. Perren & Kozinets 2018, p.21).

To address the above theoretical and managerial challenges, this dissertation aims to increase understanding of digital transaction platforms for both the customers and complementors using such platforms. As a theoretical lens, this dissertation examines these issues from both a theoretical and behavioral perspective, focusing on how digital transaction platforms change both the nature of transactions and the behavior of individual actors after the adoption and use of digital transaction platforms. While concepts such as transaction cost economics (TCE) and behavioral economics have often been used to examine B2B exchange, advances in information technology now make many of these concepts relevant also from a customer point-of-view, for example, as electronic markets lower transaction costs for customers by making markets more transparent and reducing friction that has previously prevented many economic transactions and interactions from taking place altogether (Alt, 2017). At best, the digital transaction platform can, therefore, create new markets when the platform now increases trust and transparency between transaction partners, as the examples of platforms such as Airbnb and Uber show.

This dissertation, therefore, contributes to marketing, management, and strategy literature by defining and understanding how firm and customer behavior changes when transitioning from traditional offline marketing and sales channels to online digital transaction platforms. From a marketing perspective, the most important contribution is understanding how relevant concepts, such as customer loyalty, are in a multi-actor platform setting, while from a management perspective this dissertation contributes to our understanding of how firms engage with digital transaction platforms, and how these new digital business models shape industry structures and dynamics. This understanding is important as many firms that traditionally guarded their customers in their own online and offline marketing and sales channels, have now migrated to open platform-based online marketplaces to reach customers. The emphasis of the five essays included in this dissertation is on both the proposed and observed value to customers and complementors in order to understand how the benefits proposed to both customers and complementors are realized through platform adoption and use.

## 1.2    Research Questions and Outline of the Dissertation

By and large, all the five essays included in this dissertation address the main research question concerning understanding the effects of digital transaction platforms for the customers and complementors using such platforms from both a transactional and behavioral perspective. This research question is examined both in terms of the proposed and observed value for platform users. In addition, five supporting research questions are considered in the five essays comprising this dissertation. The empirical focus of the research is on the marketing and retail domain and, specifically, the retail and consumer services sector.

Main research question (RQ):

**RQ:** What are the transactional and behavioral effects of digital transaction platform use and adoption for both customers and complementors?

The following sub-questions (SRQ) are addressed in the corresponding five essays:

**SRQ1:** What do we know and what do we not know about digital transaction platforms? (Essay I)

**SRQ2:** What are the characteristics of digital transaction platforms in the retail and consumer services sector? (Essay II)

**SRQ3:** What are the proposed transactional and behavioral effects of digital transaction platforms for both customers and complementors? (Essay III)

**SRQ4:** What are the observed transactional and behavioral effects of digital transaction platforms for complementors? (Essay IV)

**SRQ5:** What are the observed transactional and behavioral effects of digital transaction platforms for customers? (Essay V)

This dissertation is organized as follows. Part 1 gives an overview of the essays and presents the theoretical background. The ontological and epistemological perspectives of the research are also  discussed, followed by the methodological choices of each individual essay. The findings of each essay are finally briefly summarized, alongside the overall theoretical and managerial implications of the research. Part 2 includes the five essays.

# 2. Theoretical Background

The discussion in this chapter covers the tenets of digital platforms, as well as the theoretical lens through which they are interpreted. The focus then turns to defining the theoretical framework of this dissertation.

## 2.1 Digital Transaction Platforms: Backgrounds and Definitions

The platform construct has evolved from being rooted in product development and innovation literature, to being recognized as a business model in which a digital transaction platform enables and intermediates the interactions and transactions between customers and complementors.

### 2.1.1 Background

The concept of platforms emerged in the product development and innovation literature in the 1980s (e.g. Gawer, 2014). In this context, platforms refer to a particular system architecture that enables firms to achieve economies of scope in the design and development of new products and services. Thus, a platform was initially viewed as a set of common components, elements or assets that can be shared across the organization (e.g. Robertson & Ulrich 1998; Meyer & Lehnerd, 1997).

Critical to the historical roots of the platform construct is the re-use of components across production (Gawer, 2014). By breaking components into interdependent and independent interfaces, in other words, modules, firms have been able to reduce the complexity of new product development and production (Tiwana, 2014). Thus, the platform can, more specifically, be defined as a "set of stable components that supports variety and evolvability in a system by constraining the linkages among the other components" (Baldwin & Woodard, 2009, p. 19).

While initially platforms were characterized internal platforms, geared at helping firms reduce the complexity of their production and manufacturing processes internally, in the 1980's and 1990's platforms were also in many cases opened to external firms who could produce the individual modules that link to the standardized platform. By enabling more modular forms of production, platforms enable firms to tap into the innovation capabilities of external firms, which are not directly part of the firm's immediate supply chain (Gawer, 2009).

The platform thus provides a standardized interface on top of which external collaborators, complementors, can create complementary products, services, and technologies, as modules, to (e.g. Nalebuff & Brandenburger, 1997). Platforms, therefore, have enabled firms to innovate more quickly and systematically as modules have become common templates for product innovation that now can also be shared across product families (e.g. Gawer, 2014). For example, both Sony and Black & Decker have famously utilized a platform-based design in their production, to enable them to scale their production globally and across product families.

### 2.1.2 Digital platforms

Through advances in information technology, the same platform design principles have now been applied by digital businesses (e.g. Ceccagnoli et al. 2012). This change has particularly been possible as Internet technologies now enable innovation to be increasingly distributed and collaborative, rather than vertically integrated (e.g. Baldwin & von Hippel, 2011). More specifically, on digital platforms, Internet technologies are used by the platform for all communication between users, on all sides of the platform (Nooren et al. 2018).

Many businesses, therefore, leverage platforms to enable third-party application and software developers to innovate and add their own products or services on top of the, more or less, standardized technology interfaces (Gawer, 2014). For example, the Apple iTunes store serves as the platform to which external complementors (app developers) can build their own content (applications) according to the rules and guidelines set by the platform owner (Tiwana 2014). Similarly, Intel moved to a platform business model over time which enabled it to become a global leader in microprocessors during the PC era (Gawer & Phillips, 2013).

Digital platforms "often create fertile ground for sharing of assets, development of digital capabilities, sharing of knowledge and facilitating governance" (Grover & Kohli, 2012, p.229). What, however, sets digital platforms apart from other types of digital infrastructures and IT systems is the control arrangements, that "may be anchored in an organization or consortium of firms that owns the core platform technologies" (De Reuver et al. 2018, p.131). For example, Karhu et al. (2018) argue that platforms have shifted from simply cooperative to increasingly hostile environments, where various forms of openness, boundary resources and shared resources are used as part of platform strategies. First, openness, ie. "the trade-off between retaining and relinquishing control over a platform" (Benlian et al. 2015, p. 210), is critical for guiding a platforms governance choices and control mechanisms, as well as how the complementors can gain access to the platform. Boudreau (2010), for example, found that in the context of handheld computing systems, opening up a platform and giving up control increased innovation rates by roughly 20%. Secondly, boundary resources, i.e. the "software tools and regulations that service as the interface for the arm's-length relationships between the platform owner and the application

developer" (Ghazawneh & Henfridsson 2013, p. 174), are critical for guiding how the platform is controlled, and how complementors can participate and contribute to it. Eaton et al. (2015), for example, find that the boundary resources of platforms are reshaped through the participation of platform actors, involving processes of resistance and accommodation across the heterogeneous and distributed actors, and the platform interface.

Digital platforms are therefore dynamic and purposeful internal and external networks in which platform users create value through their interactions with other users (Tiwana et al. 2014). Platform owners such as the technology providers simply orchestrate the interactions between participating actors. Rather than production units, on digital platforms, the modules developed by third-party developers are rather technology interfaces (Gawer, 2014). For example, Ghazawneh & Henfridsson (2015, p. 199) define digital platforms as a software-based system that provides core functionality shared by the modules that interoperate with it and the interfaces through which they interoperate". Therefore, the digital platform can be regarded as a collaborative network (Gawer, 2014). As a collaborative network, the digital platform is, however, distributed and intertwined with institutions, markets and technologies (e.g. de Reuver et al. 2018).

### 2.1.3 Digital transaction platforms

Through digitalization, digital platforms are increasingly used to refer to digital transaction platforms, i.e. multi-sided markets and marketplaces in which the platform enables the interaction between customers and complementors (e.g. Täuscher & Laudien, 2018). As such, a digital transaction platform is characterized as a business model that uses and operationalizes platform economics (Nooren et al. 2018). A general characteristic of digital transaction platforms is that they intermediate transactions between independent buyers and sellers, without substantially trading or producing the products and services that they intermediate themselves.

Compared to early uses of the term marketplace or market space to describe the first Internet enabled electronic commerce portals (e.g. Dutta et al. 1998), now marketplaces refer to businesses centered on a platform-based online marketplace and ancillary services, rather than only a loosely-defined technology interface and portal (Cusumano, 2019). For example, Parker et al. (2016) argue that platform businesses radically change how economic activity is organized in many sectors of the economy. This is possible as on digital transaction platforms the value for one group of platform users, for example, customers, increases as the number of users on the other side of the platform, for example complementors, increases (De Reuver et al. 2018).

As a marketplace, the central characteristic of the digital transaction platform is as a multi-sided market and marketplace. Therefore, the platform enables the

direct interaction of two or more sides of distinct groups of platform users (Cennamo & Santalo, 2013). Evans & Gawer (2016), further narrow down this definition to define such platforms as transaction platforms. These transaction platforms essentially function as matchmakers that connect one group of users with another group of users, and intermediate transactions between them. For example, ridesharing apps like Uber and Lyft connect both drivers and riders together. Here the mediation of transactions is the critical feature of such businesses. For example, according to Cusumano et al. (2019, p. 20), digital transaction platforms are "*intermediaries or online marketplaces that make it possible for people and organizations to share information or to buy, sell, or access a variety of goods and services*". These digital transaction platforms consist of both an online marketplace, as well as ancillary services. The ancillary services add-value, and for example, help lock-in both customers and complementors to the platform (Cusumano et al. 2019).

### 2.1.4    Theoretical perspectives to digital transaction platforms

By enabling the value co-creation between customers and complementors, digital transaction platforms catalyze service systems (Chandler, 2018). Theoretically, service systems refer to a "value coproduction configuration of people, technology, other internal and external service systems and shared information" (Spohrer et al. 2007, p. 72). Service systems, therefore, enable value co-creation through the configuration of actors and resources (Vargo & Lusch, 2004). Actors are the groups of actors that participate in value co-creation, while resources refer to, for example, technology, information, and physical artifacts. Therefore, service systems are socio-technical systems that enable value co-creation, guided by a value proposition (Böhmann et al. 2014).

Value is not only created between the customer and the provider but through the parallel processes involving multiple actors (e.g. Grönroos & Ravald, 2014). Digital transaction platforms are, however, not the service system itself, but rather they bring together disparate actors as service systems. Indeed, digital transaction platforms only become valuable once a critical mass of a service system has joined the platform. As value emerges from the multitude of relationships centered on a platform, value is a property of the system – if any component of the service system changes over time so does the value it delivers (Chandler, 2018).

As the economic value of the digital transaction platform is dependent on the ability to attain a critical mass to the platform, the economic value of platforms rests on a few fairly basic economic principles. Network effects mean that the size of users on one side of the platform increases the value of the platform for the other side of platform users as well (Eisenmann et al. 2006). Therefore, through network effects, digital transaction platforms have the potential to capture exponential growth in value when new users join the platform (Parker & Van Alstyne, 2005). This exponential growth is possible as a digital transaction platform must have both a high number of complementors and a high number

of users, as complementors attract customers, and vice versa (Katz & Shapiro, 1985). This mechanism largely explains the large valuation of platform-based businesses, whose economic value generally takes into account the potential to monetize its large user base.

On the other hand, through Internet technologies switching costs for platform participants are lower than through traditional channels and there may only be loose contractual relationships towards other participants of the platform, which may promote multi-homing i.e. the use of multiple platforms simultaneously (e.g. Rochet & Tirole, 2003). This means that while in some industries a dominant platform, and a winner-takes-all situation may emerge, in others the low switching costs may enable the existence of many rival platforms (Eisenmann et al. 2011). For example, in the transportation sector customers and complementors multi-home as users of both Uber and Lyft, while in the accommodation sector no viable competitor has yet emerged for Airbnb.

### 2.1.5 Synthesis

In this dissertation, digital transaction platforms are defined as a multi-sided market and marketplace. More specifically, this dissertation focuses on platforms as platform-based online marketplaces that function as an intermediary for the interactions and transactions between independent customers and complementors (e.g. Täuscher & Laudien, 2018). Given that there are numerous ways of defining digital platforms and digital transaction platforms, in this dissertation, the focus is on the platform as an intermediary and a business model. Consequently, the following definition put forward by McIntyre & Srinivasan (2017, p. 141) is adopted:

> [Platforms] facilitate transactions among firms that and/or individuals who may not have been able to transact otherwise.

The definition highlights the conditional nature of digital transaction platforms and thereby differs from the other definitions discussed above. Particularly the strength of this definition is the argument by McIntyre & Srinivasan (2017) that digital transaction platforms open new markets and opportunities in many sectors of the economy. This is important as the literature generally does not explicitly focus on the motivations for customers and complementors to use digital transaction platforms, besides the economic principles underlying them. Studies on digital transaction platforms have traditionally been more concerned with identifying the mechanisms through which digital transaction platforms grow (e.g. network effects) and affect industry structure and dynamics, rather than observing the real-time dynamics of platform use and adoption for both customers and complementors, for example, with transaction data.

## 2.2 Theoretical Lenses for Understanding Digital Transaction Platforms

The theoretical roots of platforms lie in many, fairly basic, economic principles such as transaction cost economics (TCE) and behavioral economics. These theories are drawn on to create a theoretical framework for this dissertation in order to understand the effects of digital transaction platforms for both customers and complementors.

### 2.2.1 Transactional lens to understanding effects of digital transaction platforms

From a transactional lens, the main benefit of digital transaction platforms, over other intermediaries, is their transaction enabling effects. Theoretically, these effects are largely explained by transaction cost economics. Transaction cost economics explain why firms engage in markets and open platform-based online marketplaces, and move away from vertically integrated, in-house, production. While originally used in B2B contexts, transaction costs are increasingly relevant also in B2C and C2C markets, where advances in information technology and the increased adoption of electronic marketing and sales channels, now enable customers to reduce transaction costs, for example, by making transactions between customers and businesses more efficient than they would be through traditional channels, and also less complex when coordination and logistics are outsourced to a digital market intermediary such as a digital transaction platform (Alt, 2017).

Transaction costs economics is concerned with the organization of specific economic activities within and across organizations (Conner, 1991). Traditionally it has been assumed that firms produce products in-house due to the high transaction costs incurred from finding suppliers, negotiating and enforcing contracts, compared to organizing production in vertically-integrated forms (Coase, 1937). However, already since the emergence of the Internet, it has been argued that new digital technologies enable the reduction and elimination of many of these costs (Bakos, 1998). Thus, particularly when transactions are infrequent, uncertain and when they require transaction partner-specific investments, organizations may particularly favor hierarchical, more vertical modes of governing transactions (i.e. making products), rather than using the market (i.e. buy) (Williamson, 1991).

Williamson, (1975) distinguishes between six sources of transaction costs, three human factors (i) bounded rationality, (ii) opportunism, and (iii) atmosphere, and three transactional factors, (i) uncertainty, (ii) small numbers bargaining, and (iii) information impactedness. Transaction costs are, therefore, primarily related to the governance of transactions, where human factors such as bounded rationality and opportunism mean that decisions made by organizations are never perfect and often opportunistic as organizations not only optimize their own actions but also actively seek to exploit contracts. On the other hand, information impactedness refers to a situation where one transaction partner has more information related to a particular transaction than the other.

Transaction costs therefore particularly explain the importance and popularity of digital transaction platforms. By minimizing transaction costs between transaction partners, digital transaction platforms create markets in sectors were markets were previously not possible, for example, due to high transaction costs (Kiesling et al. 2018). Digital technologies have been a larger enabler in reducing these transaction costs. While in the early days of the Internet, Internet technologies merely provided an online environment for customers and sellers to transact, now digital transaction platforms are active intermediaries between customers and complementors, taking care of many of the transaction-related factors that were previously at the discretion of the transaction partners (Lehtovirta et al. 2019). For example, Airbnb screens customers and complementors, and offers insurance in case of issues with service delivery, in addition to providing a reputation management system in the form of reviews and ratings in order to increase trust between the transaction partners (Akbar & Tracogna, 2018). This has created much new demand for third-party accommodation and solved many of the problems regarding information asymmetry and contracting in the sector, particularly for short-term accommodation rental. Thererefore by mediating transactions from start to finish, digital transaction platforms exist as digital intermediaries that take care of tasks such as making and enforcing contracts, which make it more economical to engage in transactions through open platform-based online marketplaces, rather than as vertically integrated manufacturers (Kiesling et al. 2018). Most importantly, however, the platform now enables many of these transactions to be more infrequent, compared to the, often, long-term customer-provider relationships that exist on traditional marketing and sales channels.

Digital transaction platforms thus arguably solve a transaction cost problem that made it difficult for transaction partners to transact both immediately and dynamically (Evans & Schmalensee, 2002). However, despite now intermediating markets and reducing friction in the economy, digital transaction platforms at the same time impose strict rules and regulations on platform users which may limit some of the gains from the reduced transaction costs, and indeed, may even add additional costs to users both directly and indirectly. Wood et al. (2019), for example. characterize rules and regulations on a digital transaction platform as "*algorithmic management*", including tools such as rating and reputation systems. On the other hand, Langley & Leyshon (2017) describe digital transaction platforms as a discrete mode of socio-technical intermediary and capitalist business arrangement in which the platform owner exerts large power on customers and complementors. Langley & Leyshon (2017) labels the fees taken by platforms as monopoly rents, on top of which, digital transaction platforms enforce strict contractual terms on both customers and complementors. Therefore, although digital transaction platforms reduce many frictions in the economy, and create new markets, some of these benefits may be limited by the excessive power and control of the platform owner on both the customers and complementors.

### 2.2.2 Behavioral lens to understanding the effects of digital transaction platforms

The benefits of digital transaction platforms are also relatively well-founded from a behavioral perspective. By definition, behavioral economics refers to the study of the economic decision-making processes of individuals and institutions. The purpose of behavioral economics is to increase the explanatory power of economics by providing it with more realistic psychological foundations (Thaler & Ganser, 2015). Particularly, behavioral economics can explain decision-making in the platform-based online marketplace. It treats decision-makers as boundedly rational and focuses on how psychological, cognitive, emotional, cultural and social factors affect customers' choices in the marketplace (Hursh, 1984).

As digital technologies have elevated customer choice to a new level, digital transaction platforms now enable customers to find the highest quality, variety, and value from a global marketplace (Lund & Manyika, 2016). This information is now available for a much lower search cost than previously possible (Haucau & Heimeshoff, 2014). Digital transaction platforms, therefore, lower search costs for a number of products and services.

This reduction in search costs is possible as digital platforms aggregate product and price information, and for almost zero cost (Allen, 2017). For example, on digital transaction platforms, sophisticated review and ratings systems enable customers to lower search costs and improve the quality of the matches between customers and complementors (e.g. Langley & Leyshon, 2017). In addition, through advanced recommendation algorithms, digital transaction platforms make increasingly accurate product suggestions based on historical purchase behavior (Belleflamme & Peitz, 2018). Therefore, digital transaction platforms offer customers access to services that are generally cheaper, and which possess different qualities and features to those offered through traditional channels (Langley & Leyshon, 2017).

On the other hand, digital transaction platforms also promote new kinds of behavior, such as choice overload and variety seeking, for customers. The choice overload effect states that customers feel regret and dissatisfaction with their selection when there are many choices to choose from, instead of a few (Schwartz, 2004; Iyengar & Lepper, 2000). Studies on online dating platforms, for example, show that customers choosing from a larger set of potential partners were less satisfied than those choosing from a smaller set. In addition, as platforms lower search costs they also make it possible for customers to experiment with a larger set of transaction partners. Variety seeking is influenced mainly by non-utility-based factors (Huang et al. 2019) and is often responsible for customers' switching behavior (Givon, 1984). For example, customers seek variety in sensory and functional attributes for both hedonic and utilitarian product categories (Baltas et al. 2017).

Therefore, from a behavioral perspective, digital transaction platforms may change buying behavior. For example, Landini (2012) argues that by limiting

the actions of users through strict rules and regulations on a platform, digital transaction platforms enforce digital control over users. This control includes activities that enforce the rules of the platform, for example, by deleting or temporarily blocking accounts that infringe platform rules. In addition, increasingly complex learning algorithms are producing a form of organizational control, where ratings and evaluations now dictate how work is evaluated and compensated on digital transaction platforms (e.g. Faraj et al. 2018). Furthermore, through their vast body of information on customers, digital transaction platforms can engage in price discrimination, by using data from transactions on the platform to fuel predictive models capable of probabilistically determining preferences and purchase behavior (Nuccio & Guerzoni, 2019).

## 2.3 Theoretical Framework

The theory suggests that digital transaction platforms change how customers and complementors interact and transact (e.g. Täuscher & Laudien, 2018). Yet, there is very little empirical evidence about how these effects play out in practice. For example, to add to the reduction in transaction and search costs, algorithmic control in the form of platform-based review and rating systems can add new forms of friction between transaction partners which may lower some of the potential benefits from using digital transaction platforms altogether (Wood et al. 2019).

Against this backdrop, the purpose of the five essays in this dissertation is to contribute to our understanding of the effects of digital transaction platforms for customers and complementors from both a transactional and behavioral perspective. Each of the five essays draw strongly on the literature on platforms and platform economics, as the contextual grounding of the research, while each of the empirical studies, in particular, draw on the introduced literature on transaction cost economics and behavioural economics. Essay 3, takes an explorative approach to study the business models of digital transaction platforms, and particularly the mechanisms driving the growth of such businesses. On the other hand, essays 4 and 5 ground their hypothesis in transaction cost economics and behavioural economics and use these perspectives as a theoretical basis for the research.

The five essays in this dissertation not only directly contribute to our understanding of digital transaction platforms, but also demonstrate the explanatory potential of transaction cost economics and behavioral economics to advance our understanding of them. The focus of the empirical research is on understanding both the proposed (i.e. a promise of value to be delivered) and observed (i.e. the actual value captured through a statistical test) value of digital transaction platforms for both customers and complementors.

Figure 1 presents an illustration of the general framework for this dissertation. The focus of the research is on understanding both the transactional and behavioral effects of digital transaction for both customers and complementors by drawing on both transaction cost economics and behavioral economics.

**Transactional perspective**
**Theoretical foundation:** Transaction cost economics (TCE)

**Behavioral perspective**
**Theoretical foundation:** Behavioral economics

**COMPLEMENTOR**

Proposed value

Observed value

**PLATFORM**

Observed value

Proposed value

**CUSTOMER**

**Effects for complementors identified in the literature**

| Theoretical construct | Proposed effects |
|---|---|
| • Transaction costs | • Platforms lower transaction costs |
| • Market creation and expansion | • Platforms open new markets |
| • Algorithmic control | • Platforms impose new governance and coordination mechanisms (e.g., review, ratings) |

**Platform characteristics**

• Service system (configuration of actors and resources )
• Online marketplace (enables interaction and transaction)
• Ancillary services (enables added value)

**Example.** *Amazon Marketplace*

**Effects for customers identified in the literature**

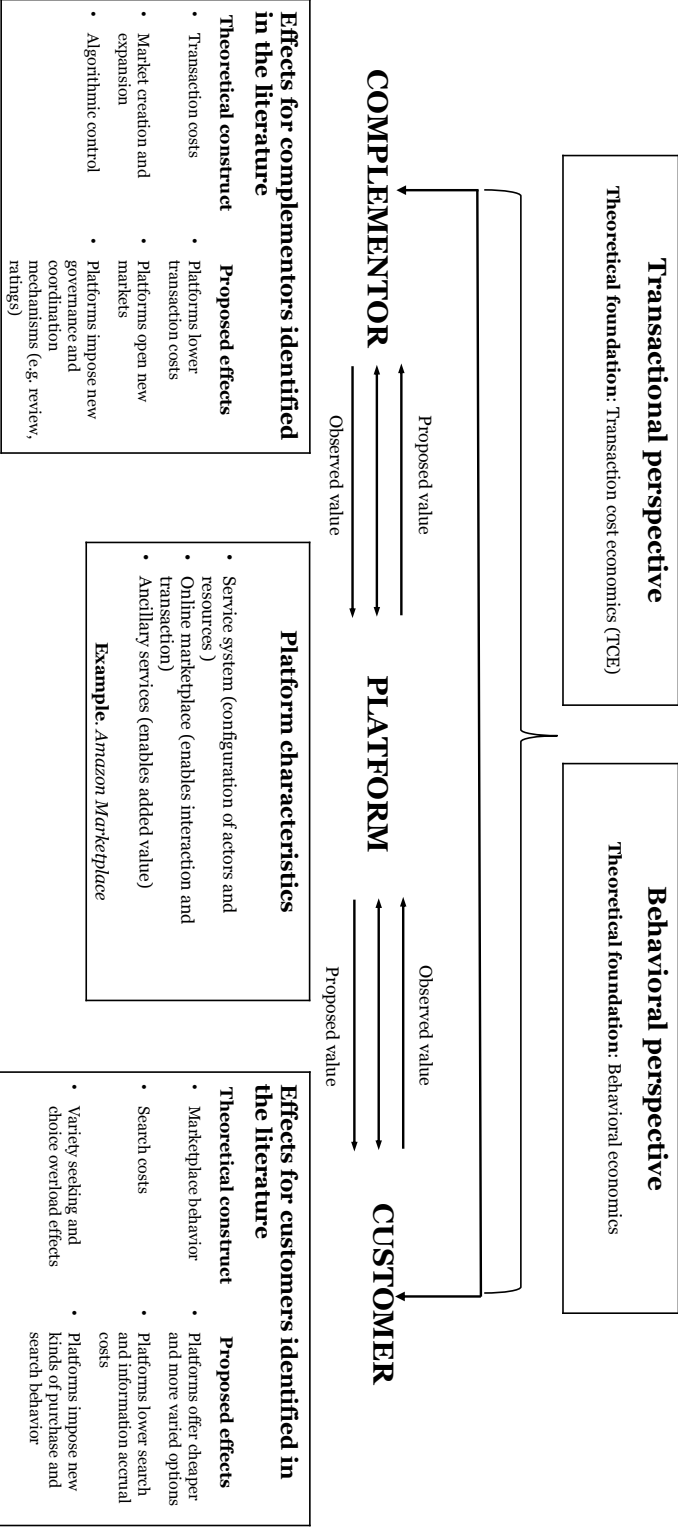| Theoretical construct | Proposed effects |
|---|---|
| • Marketplace behavior | • Platforms offer cheaper and more varied options |
| • Search costs | • Platforms lower search and information accrual costs |
| • Variety seeking and choice overload effects | • Platforms impose new kinds of purchase and search behavior |

**Figure 1.** Research framework

In the empirical essays, the general framework is broken down into more detail. Essay 1 and 2 focus on understanding the forms and mechanisms underlying digital transaction platforms, while essays 3,4 and 5 focus on understanding their outcomes in terms of the observed value.

While the mechanisms underlying digital transaction platforms are well understood, and there is much anecdoctal evidence of, for example, the mechanisms lowering transaction costs for both customers and complementors on digital transaction platforms, empirical examinations and generalizations of digital transaction platforms are largely missing from literature, and specifically, in a retail and consumer services context. For complementors, drawing on transaction cost economics, market creation and expansion, and algorithmic control, the literature review shows that digital transaction platforms may lower transaction costs, open new markets, and impose new governance and coordination mechanisms, in the form of, for example, review and rating mechanisms, respectively. On the other hand, for customers, drawing on marketplace behavior, search costs and variety seeking, and the choice overload effect, the literature review shows that digital transaction platforms offer cheaper and more varied options, lower search and information accrual costs, and impose new kinds of purchase and search behavior, for example, by making a larger market offering available through one place and channel, respectively. These effects, and their potential impact on the value captured by customers and complementors from the use of digital transaction platforms, are further explored in the empirical essays.

Figure 2 shows how the empirical framework is applied in the empirical essays to study the effects of digital transaction platforms for both customers and complementors. Essay 3 focuses on understanding the proposed value of digital transaction platforms, for both customers and complementors, by identifying the mechanisms through which digital transaction platforms are shaping the retail sector based on a case study of four digital transaction platforms using secondary data, while essays 4 and 5 focus on the observed value of digital transaction platforms for both customers and complementors by analyzing actual transaction data from a digital transaction platform.



**Figure 2.** Focus of empirical research

# 3. Research Methods

This chapter introduces the ontological and epistemological perspectives of the dissertation as well as the applied research methods. In table 1 the selected research designs, data sources, and analytical methods used in each of the essays are summarized.

| Dimension | Essay 1 | Essay 2 | Essay 3 | Essay 4 | Essay 5 |
|-----------|---------|---------|---------|---------|---------|
| **Focus area** | Concept and theory | Concept and theory | Theory and method | Theory and method | Theory and method |
| **Design** | Systematic review | Conceptual analysis | Case study | Transaction data + survey | Transaction data |
| **Data** | Literature on digital transaction platforms (51 articles) | N/A | Study of 4 digital transaction platforms | 435,867 transactions with 1,856 hairdressers + survey sample of 143 hairdressers | 98,563 repeat transactions, 28,180 customers, 784 beauty salons |
| **Method** | Content analysis | Conceptual analysis | Case analysis | Structured equation modelling | Machine learning |

**Table 1.** Research designs, data sources, and analytical approaches

## 3.1 Ontological and Epistemological perspectives

This dissertation takes a critical realist perspective (Bhaskar, 2008). Critical realism assumes that there is a realism which exists independent of our knowledge of it (Bhaskar, 1978). Critical realism suggests that one can only know if an opportunity exists by observing and then measuring it (Alvarez & Barney, 2013). Rather than asking how we can know something, critical realists are primarily concerned with understanding what the world must be like to generate a particular phenomenon (Smith, 2006). Critical realism is, therefore, a realist approach in that it defends against both classical positivism, that reduces the world to that which is empirically observed and measured, as well as the various forms of constructivism, that reduces the world to our human knowledge of it (Mingers et al. 2013). Therefore, critical realism sits largely between positivism and constructivism (e.g. Archer et al. 2016).

Critical realism acknowledges that knowledge is always historically, socially and culturally situated. The scientific reality is not just constant conjunctions of observable events but about objects, entities, and structures that generate the events we observe (Mingers, 2000). Importantly, knowledge is produced by humans and occurs in the transitive dimension (Bhaskar, 1989), i.e. by drawing on existing theories, results, anomalies and conjectures. Therefore, knowledge can not be understood independently of the social actors in the knowledge derivation process (Archer et al. 2016). Critical realism, thus, accepts that there are different types of knowledge, with different ontological and epistemological characteristics (Mingers et al. 2013).

Indeed, according to Roy Bhaskar, the reality is both intransitive (existing independently of humans) and stratified (Archer et al. 2016). As Bhaskar (2008) denotes, the reality is decomposable to multiple layers: the domain of the empirical, actual and real. The domain of the empirical includes experiences, i.e. events that are observed and experienced, while the domain of the actual and the domain of the real includes events generated by mechanisms that are both observed and unobserved, as well as the structures that can generate events, respectively. Therefore, the empirical domain comprises of our experiences which are social products, as they are constructed by our limited sense-perceptions and socially influenced interpretation of reality (Bhaskar, 1989). These experiences can be, for example, the behavior of people and events that have happened before. Thus, a critical tenet of critical realism is that we cannot perceive and identify or observe everything (e.g. Bhaskar, 2008).

As our observations and research are generally informed by theory, it is difficult to capture what is happening in the world around us. Successful theories are therefore representative of what exists (Smith, 2006). As such, critical realism is primarily concerned with understanding the real mechanisms and structures underlying perceived events (Searle, 1995). Indeed, the main tenet of critical realism is to move away from the description of empirical events or regularities to understanding their causal mechanisms, and the interaction of which could potentially have generated the observed events (Mingers et al. 2013).

Since knowledge is always historically, socially and culturally situated, a particular object of research will have different characteristics. Therefore, critical realism proceeds by trying to discover underlying structures that generate particular patterns of events (or non-events) (Mingeers, 2000). However, as critical realism allows researchers to only make inferences concerning systems of the material world and their causal relationships, research hypothesis can be supported or rejected, but not confirmed. This is particularly important as, according to critical realism, making propositions about the existence of opportunities that have yet to be observed and measured is not an empirically meaningful exercise (Alvarez & Barney, 2013). Thus, critical realism accepts a mixed-method approach (Mingers et al. 2013).

In this dissertation, a combination of qualitative and quantitative methods are used in the five essays to understand the patterns of events instead of tracing their generative mechanisms. For example, Mingeers (2000) argues that in crit-

ical realism statistical analysis help detect particular patterns in the data, including through the use of factor analysis, cluster analysis, and regression. While often a starting point for more substantive investigations, many statistical techniques can yield themselves towards identifying underlying structures and patterns, as well as in validating or falsifying potential explanations (e.g. Mingers et al. 2013).

Thus, the purpose of this dissertation is to, particularly with the quantitative methods, to identify and capture patterns related to digital transaction platforms. The data gathered are context-dependent, and thus the subjective realism of the empirical world are expected to change over time. Nevertheless, this research provides a good starting point for understanding the effects of digital transaction platforms for both customers and complementors. From the epistemological as well as the methodological perspective, I believe that using a combination of both qualitative and quantitative methods yields valid and reliable knowledge about a phenomenon that is subject to both conscious and unconscious decisions, particularly when exploring the behavior of both customers and complementors within such settings. In capturing the decisions made, behavioral measures from survey data are particularly useful.

## 3.2  Data and analytical techniques

This dissertation combines both quantitative and qualitative methods. These two methods are combined in an integrated, holistic manner in order to test out different dimensions of the same phenomenon (e.g. Jick, 1979). First, a systematic literature review was utilized in Essay 1 to examine how research on digital transaction platforms has been published in marketing journals. Second, a qualitative case study was used in Essay 3 to examine the value proposed by digital transaction platforms for both customers and complementors. Third, a longitudinal quantitative dataset was used in Essays 4 and 5 to examine the effects of digital transaction platforms for complementors (Essay 4) and customers (Essay 5).

In the next subsections, the data used in the empirical essays are described in further detail.

### 3.2.1   Systematic literature review data

The systematic literature review data was collected by means of a broad literature search of research on platforms published in marketing journals prior to December 2018. The objective was to take a snapshot of what we know and what opportunities lie ahead to expand theoretical and empirical understanding of digital transaction platforms in the marketing and retail domain. To ensure that only the most relevant studies were selected, the articles found using the search syntax and review protocol were analyzed in-depth through content analysis of the abstracts and full papers. Thereafter, the short-listed articles were classified,

organized and analyzed. The first step in article extraction generated 7,784 results for the 'platform' keyword. The results were then narrowed down to only include journals within the marketing discipline, and the remaining texts were read to exclude irrelevant studies. This final step in article extraction generated 51 articles published between 2011 and 2018, and in 21 different marketing journals ranked in the 2018 ABS Journal Guide.

The identified articles were analyzed through a comprehensive classification framework focusing on broad thematic, theoretical and methodological dimensions. The thematic dimension was denoted by the type of digital transaction platform studied and theoretical focus. The theoretical dimension was denoted by the definition of a digital transaction platform, and the theoretical contribution. In addition, the methodological dimension was denoted by research design, which enabled to understand the research designs and empirical data used to study digital transaction platforms. The framework was enacted through a comprehensive coding scheme, including coding variables that were coded through reading the full text of the 51 articles.

### 3.2.2 Qualitative research data

The qualitative research data was collected by means of a broad in-depth study of digital transaction platforms. The objective was to identify the key components of the business models of such platforms. The focus was on the four largest digital transaction platforms, Alibaba, Amazon, eBay and Rakuten, each with over $1 billion annual global sales. The qualitative case study approach was chosen because the research field on digital platforms is still emerging, and as there is little research on the implications and impact of multi-sided digital platforms, particularly, in the retail context.

The data analysis followed a process common to case study research (Yin 2003). We took three steps to data analysis and interpretation. Firstly, we aggregated the data from each company, interpreting common patterns and differences. Secondly, we combined, sorted and linked the data from the four cases. We then organized the data according to the business model canvas framework (e.g. Johnson et al. 2008; Osterwalder 2004) in order to identify the value propositions, the profit formula, resources and processes of the four companies and understand how digital transaction platforms compare with the traditional approaches to retailing.

### 3.2.3 Quantitative research data

The quantitative research data was collected from a digital transaction platform in the beauty industry. The platform enables small businesses and freelancers, the platforms complementors, to post appointments to a platform-based online marketplace in addition to offering access to a host of ancillary services. Customers can access the platform via a website and a mobile app.

The data consists of both transaction data and a survey targeted to hairdressers. A survey was targeted to hairdressers using the platform in Summer 2017. The survey asked hairdressers to answer questions related to background information about their career and their use of the platform. From the population of 1,856 hairdressers, a total of 143 hairdressers using the platform's cash and payment system answered the survey. In addition, we received full transaction data from June 2015 to Summer 2018. Different aspects of this dataset were used in essays 4 and 5 to study the effects of digital platforms for both customers and complementors. For example, in essay 4 we limit our analysis to the survey data, as by focusing on those hairdressers using the platform's cash and payment system, we were able to compare their survey responses with the full transaction data.

In essay 4, both the transaction (offline and marketplace) and survey data were used. The data was analyzed through statistical modeling. In this essay, the empirical focus was on a 5-month observation period around the survey, between April and October 2017. In addition, some data from before the observation period is used to enrich the analysis and provide further descriptive statistics. The models examined the effects of the platform-based online marketplace and ancillary service use on the complementors sales and share of new customers. The statistical modeling began by comparing the distribution of the dependent variables in the sample (N=143) to the population (N=1 856) by using the Kolmogorov-Smirnow tests and noted no difference. To test the hypotheses, linear regression analysis with OLS estimation was used. Also, visually examining the scatterplots of the association between the variables indicated a linear relationship between the two variables. To control for non-normality and heteroskedasticity, robust standard errors were used in the estimation of the models.

In essay 5, the transaction (marketplace) data was used. The data was analyzed through machine learning methods. In this essay, the empirical focus was on a 32-month period between June 2015 to March 2018. The final dataset consists of 28,180 customers who have 98,563 repeat bookings for 106 various types of services across 1943 beauty industry professionals in 784 beauty salons. Three machine learning algorithms were applied to the transaction data collected from the platform with the aim of predicting whether a customer uses the same vendor in their subsequent bookings, or whether they switch to a different vendor. To predict customer repeat purchase behavior, two tree-based algorithms were used – recursive partitioning (RPART) and gradient boosted machines (GBM), as well as a generalized linear model (GLM). The GLM algorithm models the relationship between the predictors and the outcome using a logit link function.

# 4. An Overview of the Findings

## 4.1   Essay I

The first single-authored essay, Hänninen (2019), and published in the *International Review of Retail, Distribution and Consumer Research,* reviews research published on digital transaction platforms in marketing journals. The purpose of the essay is to examine what we know and what opportunities lie ahead to expand the theoretical and empirical understanding of digital transaction platforms.

The study presents a systematic literature review to understand how digital transaction platforms have been studied in marketing journals. The essay reviewed and synthesized the current state of research on digital transaction platforms in marketing journals. In total, 51 articles published in 21 marketing journals were reviewed according to broad thematic, theoretical and methodological dimensions.

I find that despite large multi-disciplinary and managerial interest towards digital transaction platforms and the platform economy, these topics remain largely unexplored in marketing journals, and the existing research and theorizing attempts remain fragmented. While there is growing interest towards topics, such as the sharing economy, these are very much out of sync with the larger discussion on digital transaction platforms in sister disciplines such as strategic management.

As a main contribution to the literature, the study sets three distinct suggestions for future research. First, a more precise definition of digital transaction platforms is needed in marketing journals in order to integrate the largely fragmented state of research. Second, there is a need for research on the more macro-level processes and mechanisms through which digital transaction platforms impact marketing and retail activities. And thirdly, there is potential to draw on large longitudinal, and cross-sectional data sets to make more rigorous contribution to the theory about digital transaction platforms and their effects across the broad marketing and retail domain.

Within the overall scope of the dissertation, the first essay draws the conceptual and empirical background on previous research on digital transaction platforms and identifies and describes the state of understanding regarding digital transaction platforms specifically in the retail and marketing domain. Also, the essay

defines and identifies the research gap which this dissertation, in part, aims to fill.

## 4.2 Essay II

The second essay, co-authored with Lasse Mitronen and Stephen Kwan, Hänninen et al. (2019), and published in *Journal of Retailing and Consumer Services,* explores the changes mediated by digital transaction platforms across the marketing and retail domain. The purpose of the essay is to understand how digital transaction platforms are structured and how they are distinguished from the traditional approaches to retail business models, from a service system perspective.

We argue that a new logic for retail has emerged through the platform economy, where the intermediation of transaction between buyers and sellers, rather than efficient distribution and a large network of stores, is winning over customer's minds and wallets. Drawing on prior research on retail business models and service science, we create a multi-sided marketplace service system framework.

As the main contribution to literature, we argue that digital transaction platforms take customer experience to a new level by way of shared products, information and services, through the integration of the backstage to provide for the backstage processes in the service system.

Within the overall scope of the dissertation, the second essay offers a conceptualization and a detailed account of the changes and impact that digital transaction platforms are having for actors across the retail value chain and presents anecdoctal evidence of some of these effects for both customers and complementors.

## 4.3 Essay III

The third essay, co-authored with Anssi Smedlund and Lasse Mitronen, Hänninen et al. (2018), and published in the *Baltic Journal of Management,* explores the platform business model and the mechanisms through which digital transaction platforms are shaping the retail sector. The purpose of this essay is to understand how digital transaction platforms are transforming the retail sector, and the transactional and behavioral implications as well as the impact that platforms have for both customers and complementors.

The study presents a qualitative case study in which we identify the key components of the business models of the leading digital transaction platforms. In our data collection, we focused on gaining an in-depth understanding of platform businesses. This meant gathering data on factors, such as new product and service launches, acquisitions and divestments throughout the histories of the case companies. As the platform economy is yet an emerging phenomenon, and there

is little research on the implications and impact of digital transaction platforms on the retail sector, the qualitative case study approach yields important data about such an unexplored research area.

We find that digital transaction platforms redefine the basic competitive dynamics of the retail sector, as digital transaction platforms now simply intermediate transactions between buyers and suppliers rather than handling the entire supply and logistics chain themselves. We argue that the business models of digital transaction platforms are thus unique compared to traditional business models because of the sheer volume and depth of the ecosystem mediated by digital transaction platforms.

Our findings contribute to marketing, management and strategy literature and fill a gap of empirical evidence and theoretical understanding of digital transaction platforms and their implications and impact on traditional sectors of the economy. Furthermore, the study shows that digital transaction platforms aim to create value to consumers through their digital ecosystem that facilitates several types of consumer value to lock-in consumers to the specific platform. We suggest that transaction data is one such factor that distinguishes digital transaction platforms from traditional businesses, and based on our findings, expect that data generated through digital transaction platforms will form an even greater competitive advantage in the future as these platforms can collect data from a multitude of interactions with their user base, both online and offline.

Within the overall scope of the dissertation, the third essay underscores the challenges posed by digital transaction platforms on existing marketing theory, and the need to re-evaluate many of the fundamental concepts and theories in the marketing and retail domain in light of the platform economy. Empirically, the third essay contributes evidence of the proposed value to customers and complementors from using and adopting digital transaction platforms, particularly in the retail domain.

## 4.4   Essay IV

The fourth essay, co-authored with Anssi Smedlund, explores the transactional and behavioral effects of digital transaction platform for complementors.

The study presents a quantitative analysis of the business performance (incl. sales, new customer acquisition), of complementors using a digital transaction platform in the beauty industry. Our data consist of daily transaction data of 1,856 complementors using the platform with 435,867 transactions over a 5-month observation period, in addition to a survey with a sample of 143 complementors.

We find that the use of a digital transaction platform has both positive and negative effects for complementors, as to counter the increased market reach through digital transaction platforms in terms of an increase in the share of new customers acquired through digital transaction platforms, complementors using a platform-based online marketplace where found to have lower sales.

As the main contribution to literature, we provide empirical evidence on what happens when complementors adopt and use a platform-based online marketplace to reach customers. Furthermore, we contribute to the emerging criticism about the "dark side" of digital platforms, such as their commoditizing effects (Langley & Leyshon, 2017), by identifying an important paradox: complementors using a platform-based online marketplace were found to have lower sales. In addition, our findings add to the growing literature on the impact of digitalization and digital business models on industry dynamics and structures (e.g. Cozzolino et al. 2018), as well as contributing new insight to the ongoing debate about firm strategies in the digital age. As many firms are now migrating to highly competitive platform markets, the essay contributes to our understanding of how firms should position themselves within such competitive markets and marketplaces (Barlow et al. 2019).

Within the overall scope of the dissertation, the fourth essay provides a conceptualization and detailed account of the effects for complementors from digital transaction platform adoption and use.

## 4.5  Essay V

The fifth essay, co-authored with Anssi Smedlund, Byron Graham and Ashish Kumar, explores the transactional and behavioral effects of digital transaction platforms for customers.

The study presents a machine learning analysis, in particular, decision trees and regression analysis, of customers using a digital transaction platform in the beauty industry. Customers can access the platform either through a mobile app or website to book various kinds of services from the beauty salons participating as complementors on the platform. Our dataset consists of 98,563 repeat transactions from 28,180 customers across 784 beauty salons for over a period of approximately two and a half years.

We find that on that the likelihood of customers to engage in repeat transactions with the same vendor is lower through time on the platform, and the price paid for the subsequent appointment is on average lower than the price paid for the previous appointment. Put simply, the more transactions customers have through a digital transaction platform, the more likely it is for a customer to book their subsequent appointments from different vendors and with a lower price. Thus, on digital transaction platforms, customers have high switching probability and bargaining power, thereby diminishing their loyalty towards any particular vendor. We expect that over time many service sectors, such as the beauty industry, will experience a transformation from quasi-vertical integration of loyal customers towards a marketplace bidding-type of customer relationship, intermediated by a host of digital transaction platforms as such platforms lower the overall transaction and search costs in the market.

As the main contribution to literature, we contribute to emerging marketing literature on the impacts of digitalization and digital technologies on customer behavior, within the context of the platform economy, by providing the first empirical paper in which customer transaction behavior has been studied with actual transaction data from a digital transaction platform. In addition, our study shows the potential of using machine learning methods to analyze customer behavior as both a methodological and managerial contribution. For example, predicting customers switching probability, firms can retarget their marketing efforts to focus on retaining such customers.

Within the overall scope of the dissertation, the fifth essay provides a conceptualization and detailed account of the effects for customers from digital transaction platform adoption and use.

# 5. Summary and Conclusions

In this chapter, the theoretical contributions and managerial implications of the dissertation are discussed as a whole, to add to the contribution laid out in each individual essay. In addition, future research avenues are proposed together with a discussion of the limitations of the research. Table 2 summarizes the main theoretical and managerial contribution of each essay as well as their limitations.

| | Research question (SRQ) addressed | Theoretical contribution | Managerial contribution | Limitations |
|---|---|---|---|---|
| **Essay 1** | What do we know and what do we not know about digital transaction platforms? | Future research agenda on digital transaction platforms | Highlighting areas for collaboration between academia and practice, e.g. through data access | Methodological (articles selection and analysis) |
| **Essay 2** | What are the characteristics of digital transaction platforms in the retail and consumer services sector? | Multi-sided marketplace service system framework | Conceptualizing retail evolution and management | N/A |
| **Essay 3** | What are the proposed transactional and behavioral effects of digital transaction platforms for both customers and complementors? | Platform business model analysis | Understanding capabilities needed to compete with platform businesses | Methodological (data collection and data analysis) |

| Essay 4 | What are the observed transactional and behavioral effects of digital transaction platforms for complementors? | Identifying paradox of digital transaction platforms for complementors | Drafting firm strategies for engaging with digital transaction platforms | Methodological (data analysis) |
|---|---|---|---|---|
| Essay 5 | What are the observed transactional and behavioral effects of digital transaction platforms for customers? | Understanding customer behavior on digital transaction platforms | Introducing machine learning as a managerial tool to understand customer behavior in platform economy | Methodological (data analysis) |

**Table 2.** Summary of theoretical contribution, managerial contribution and limitations of each individual essay

## 5.1 Theoretical contributions

This dissertation contributes to literature in a number of ways. First, it adopts a transactional and behavioral perspective to examine the effects of digital transaction platforms for both customers and complementors. While much research has examined the transactional and behavioral implications of digital technologies (e.g. Bakos, 1998), digital transaction platforms are yet largely unexplored in the literature (e.g. Perren & Kozinets, 2018). This dissertation, therefore, contributes much-needed insight and empirical generalizations of the forms, mechanisms and outcomes of digital transaction platforms across the broad marketing and retail domain. As the essays show, from a transactional and behavioral perspective digital transaction platforms are fundamentally changing how customers and complementors interact and transact. Besides opening new markets, for example by reducing transaction and search costs that previously made many transactions inefficient and costly, digital transaction platforms are also changing the behavior of platform users by empowering new digital control tools, such as review and rating systems, and making offerings more standardized and commoditized. For example, in the service sector, the essays show that while the transactional efficiency of digital transaction platforms enables complementors to reach a larger share of new customers, for customers, digital transaction platforms have several behavioral implications. For example, essay 5 shows that digital transaction platforms enable customers to more easily switch complementors as the platform now offers a more comprehensive and transparent view of the market that enables customers to more easily compare the ratings, prices, and promotion of a large set of complementors. Therefore, on digital transaction platforms relationships between customers and complementors are more fluid and dynamic. In addition, compared to earlier forms of

e-commerce and online retail (e.g. Dutta et al. 1998), the essays show that digital transaction platforms are not just marketspaces for the loose interactions between buyers and sellers, but increasingly complex service systems that integrate a host of front and backstage processes in the online, and increasingly, also in the offline domain. This is evident, for example, in Essays 2 and 3, in which digital transaction platforms are shown to change customer loyalty, as digital transaction platforms lock-in customers through the host of digital services offered by the platform through a comprehensive ecosystem that increasingly extends from the online, to also cover many offline interactions by converging the online and offline customer experience.

Second, concerning individual streams of research, this dissertation contributes to marketing, strategy and management literature by considering the effects of digital transaction platforms for both customers and complementors. Understanding these topics is important, as digital transaction platforms form a new competitive environment that arguably requires new strategies and capabilities from both individuals and organizations (e.g. Täuscher & Laudien, 2018). While there is much anecdotal evidence about the effects of digital transaction platforms for customers and complementors (Langley & Leyshon, 2017; Kenney & Zysman; 2016) much of this extant research is, however, not backed by empirical evidence. The empirical essays in this dissertation (Essays 3, 4 and 5), therefore, contribute to the literature by showing that the benefits for customers and complementors from digital transaction platforms are largely unevenly distributed. For customers, digital transaction platforms open new markets and in addition to lowering transaction and search costs, they increase trust by aggregating market information for the customers, for example, about complementors ratings, prices and promotion. These customer-side benefits are evident, for example in Essay 3, as digital transaction platforms use transaction data to personalize the customer experience for each individual customer and make data a competitive advantage altogether over many traditional businesses. To add to the proposed benefits, essay 5 explores the actual transaction behavior of customers on a digital transaction platform. Customers were found to exhibit less loyalty towards specific complementors on digital transaction platforms, as the increased transparency and available market information leads to customers constantly looking for better deals, and thus evidently switching providers more often than they likely would through traditional marketing and sales channels (essay 5). For complementors, digital transaction platforms similarly open new markets, but these benefits are largely constrained as digital transaction platforms standardize and commoditize services by dictating the terms and conditions with which complementors can use a digital transaction platform. This strict terms and conditions may make digital transaction platforms unprofitable as a marketing and sales channel (Essay 4). In addition, the essays show that on digital transaction platforms price rather than quality is often a differentiating factor between the platforms complementors. Essay 4, for example, shows that the benefits from digital transaction platforms are paradoxical for complementors, as to counter the increased market reach in terms of the number of new customers attained, complementors using a platform-based online marketplace were found to have lower sales and less transactions than complementors not using the marketplace. Therefore, in the long-term digital transaction platforms may pose a strategic risk for complementors and indeed customers may benefit

more than complementors from digital transaction platform use, particularly if they enable lower prices and greater trust towards providers than they would be able to receive through other channels.

Third, related to the previous contribution, very little attention has been paid to understanding the effects of digital transaction platforms for complementors (e.g. Burch et al. 2018). Therefore, this dissertation contributes new insight to advance understanding of how complementors use and benefit from digital transaction platforms. This perspective is important as many complementors are now moving from traditional sales channels to digital transaction platforms to either partially or fully replace their existing sales channels. Yet, how complementors position their products and services on digital transaction platforms are largely unknown (e.g. Barlow et al. 2019). The main contribution that this dissertation, therefore, makes to literature is moving from only focusing on the proposed value to complementors to also capturing the observed value to complementors on digital transaction platforms by studying actual transaction data of a digital transaction platform, in both essays 4 and 5. By identifying a paradox for complementors from digital transaction platform use, Essay 4, for example, argues that digital transaction platforms, as a business model, bring together both the good and bad of both markets and hierarchies. This comes as in return for the flexibility for complementors to decide when and how they transact with customers, digital transaction platforms subject complementors to large within platform competition and through algorithmic control, such as review and rating systems, provide complementors only little independence and autonomy to platform use outside of the terms and conditions set by the platform owner. By limiting the ability of individual complementors to tailor their offering and prices on the platform, digital transaction platforms, therefore, create additional direct and indirect transaction costs, that may negate some of the transactional efficiency promised by such platforms to begin with (e.g. Langley & Leyshon, 2017). Complementors should, therefore, pay careful attention to how they engage with digital transaction platforms altogether.

Fourth, this dissertation contributes much needed conceptual and empirical research about digital transaction platforms. While many scholars are increasingly recognizing the importance and impact of digital transaction platforms across the marketing and retail domain (e.g. Ramaswamy & Ozcan, 2018), there is yet much ambiguity about the true nature and scope of digital transaction platforms. This is, for example, shown in essay 1 through a systematic literature review. The main contribution to marketing literature is, however, arguing that many of the marketing concepts inherited from a dyadic and industrial business environment are inadequate to explain the logic of value creation on a multi-actor digital transaction platform. For example, essay 3 shows that many classical marketing concepts, such as customer loyalty, no longer adequately explain customer behavior on digital platforms, as rather than building loyalty towards a specific service or offering, digital transaction platforms place effort at increasing loyalty and locking-in customers to a specific platform, for example, through transaction data, and the reliance on a large digital ecosystem to provide a host of ancillary services, such as on-demand media. Thus, customer loyalty may no longer be created through traditional price and promotion related tools, or even hold true anymore altogether. For example, essay 5 shows that as customers are constantly looking for better deals, rather than sticking to a preferred service

provider, customers are less loyal and now make their purchase decisions from a larger subset of complementors than before. While previously customers were extremely loyal to their preferred service providers, beauty salons in the empirical context of essays 4 and 5, and booked appointments well in advance, now in the age of the platform economy the majority of customers book appointments the night before and from a large subset of potential complementors. Therefore, this dissertation contributes to marketing research by arguing that marketers face increasing challenges as digital transaction platforms are redefining many of the classical marketing constructs, such as customer loyalty, which may no longer hold true in a market characterized by low transaction and search costs, as well as transparency in reviews, prices, and promotion.

Fifth, different conceptual and analytical frameworks are empirically analyzed in this dissertation to investigate digital transaction platforms. Many neo-classical economic theories, such as transaction cost economics and behavioral economics, can provide much needed theoretical perspectives to draw empirical generalizations of digital transaction platforms. This lens, therefore, enables this dissertation to move away from empirical generalizations to advancing theory on digital transaction platforms altogether. In addition, by adopting novel and advanced data and analysis methods, such as transaction data (essays 4 and 5) and particularly machine learning methods (essay 5), it is possible to study the actual transaction behavior of customers and complementors on a digital transaction platform and focus also on capturing the observed rather than only the proposed value to these groups of users. Therefore, the uniqueness of this dissertation comes largely from the ability to combine analysis of both proposed (Essay 3) and observed value (Essay 4 and Essay 5) on digital transaction platforms as well as a combination of systematic literature review (Essay 1), conceptual analysis (Essay 2), case study (Essay 3) and quantitative analysis (Essays 4 and 5) to conduct rigorous empirical and theoretical research on the forms, mechanisms and outcomes of digital transaction platforms.

Overall, as noted previously, the findings from this dissertation advance marketing, management, and strategy literature. For marketing literature, this dissertation shows that customer relationships, and particularly customer relationship management, is fundamentally changing in the platform economy, as digital platforms provide customers a more broad and transparent view of the market, that reduces many of the costs and friction that previously made many transactions inefficient and impossible via traditional sales and marketing channels. The research thus shows that through the transaction enabling effects of digital transaction platforms, customers are increasingly moving from long-term customer relationships, towards individual, infrequent, transactions with a large number of potential transaction partners, where the platform provides the means for customers to continuously search for the best possible bargains and deals from the large subset of complementors using the platform. This denies many of the previously held canonical assumptions of marketing theory and thought, as concepts such as relationship marketing (e.g. Grönroos, 2000), seem to no longer be as relevant in the platform economy, as on digital platforms the market, and it's broad offering, is directly at the customers fingertips in real-time and anywhere the customer goes. On the other hand, from the point of view of management and strategy literature, this dissertation points to the

need to critically evaluate digital platforms and understand their full implications, both good and bad, for traditional businesses. There is yet limited understanding of firm strategies in the digital age and therefore the research provides much-needed insight into both the short- and long-term potential, and risks, that digital transaction platforms may pose for businesses small and large. In the long-term and particularly for small businesses, engaging with digital transaction platforms may pose a strategic risk, particularly through the commoditizing effects of digital transaction platforms, and the increased competition in platform markets not only between the complementors using a particular platform but also between the different platforms themselves.

## 5.2 Managerial contributions

The findings from this dissertation have several managerial implications. First, the research shows that many industries and sectors are seeing large transformation as the digital transaction platform has become increasingly popular amongst both customers and complementors. This has significant implications for traditional businesses competing with digital transaction platforms. From services and retail, that were the focus of this dissertation, similar dynamics will likely be next seen in many other sectors of the economy, such as finance and education, that so far have largely escaped a digital transformation, albeit with many significant developments and innovations looming around the corner. Here, many industries that previously relied on long-term customer relationships and closed hierarchical value chains, will likely see a move towards increasingly infrequent transactions through open platform-based online marketplaces. The findings of this dissertation can, therefore, be used by managers to understand how both firm and customer behavior will change as a result of the platform economy, and help managers draft strategies that protect themselves from the possible changes that ensue.

Second, the research shows that firm capabilities and resources are changing through the increased dissemination of digital transaction platforms across the economy. From optimizing fixed resources and assets, such as stores and distribution centers, competing on open platform-based online marketplaces demands more rigorous data and analytics capabilities from managers, particularly as many of the capabilities and resources, that were central to traditional businesses, are no longer important or relevant for platforms, and sourced from the market altogether. For example, the research has shown that AI, and specifically machine learning methods, have the potential to deliver a more rich and nuanced analysis of customer behavior that can, for example, be used by managers to optimize and retarget marketing efforts. This shift towards more data-driven business also puts pressure on decision-makers, and particularly the existing education systems in many countries, that so far have not been geared towards increasing proficiency in emerging data-driven technologies such as AI. For example in Europe, that so far has not benefited from large digital transaction platforms, in the same way as China and the US, there is tremendous pressure to increase proficiency and education targeted to these areas in all phases

of the education system. This will likely help local businesses thrive in the digital age and catch-up to digitally native competitors.

Third, the research increases knowledge about how firms can engage with digital transaction platforms. Firms can either create their own platforms, join existing platforms, either fully or partially, or ignore the digital transaction platform altogether as a potential sales channel. Regardless of which strategy firms choose, each decision has its own opportunities and threats which managers must understand. Creating their own platform puts firms under large competitive pressure against native platform companies and requires huge investments, not only in attracting both customers and complementors to the platform but also as platforms require firms to rethink their earnings model, as well as the key resources and capabilities driving the business. On the other hand, competing on existing platforms puts complementors in large competition against other complementors in an open marketplace, but also large competition between platforms. In many markets, it is unclear which platform will ultimately win, and it is important that firms make the decision to join the right platform, at the right time, or alternative, multihome on many platforms – which in itself presents a risky, and often expensive, strategy. In addition, if firms only partially adopt digital transaction platforms as a marketing and sales channel, there is the risk that platform sales will cannibalize the core business of the firm. Finally, ignoring the digital transaction platform altogether, may at least in the short-term, prove risky if the platform is the de facto channel used by customers. In the long-term, the decision to ignore platform markets may enable firms to build competitive advantage from new technologies and successfully differentiate themselves. Therefore, it is important that firms understand the role of the digital platform as part of its larger multi and omnichannel strategy (e.g. Verhoef et al. 2015). Regardless of which strategy firms choose to engage with digital transaction platforms, they need to understand, not only the potential short-term benefits and drawbacks from their choice, but also define clearly what new they can bring to the existing offering on the platform, and how they can maximize their revenue and successfully differentiate from other businesses using the marketplace. The decision to enter a digital transaction platform is only one part of a larger digital, and multi-channel, strategy that firms need to define.

Finally, the research highlights the need for more stringent regulation of platforms in order to ensure a future fair play platform economy for all stakeholders involved. In the future, regulation of businesses can not be just industry or sector-specific, but rather, adapt to the increasingly cross-sectional and boundary-spanning nature of platform businesses, as digital transaction platforms are not confided to the barriers or distinctions that have defined and separated traditional businesses from one another. For example, Amazon is not a retailer *per se*, but a technology company, and as such, escapes much of the regulation and taxation that traditional companies in the retail sector, including how they are subject to VAT and property tax. It is, therefore, important to understand how regulation can ensure that traditional businesses can stay relevant in the competition against platforms by leveling the playing field and reducing loopholes in the legislative system. As digital transaction platforms are essentially global and have little fixed capital assets in the form of factories and production centers, these companies can easily globally optimize their taxation to the most fa-

vored nation, given them a huge advantage over traditional, more local, companies. Furthermore, digital transaction platforms put pressure on regulators regarding topics such as data protection and privacy. From the customer side, data protection is important as many platforms use transaction data to customize and personalize the customer experience by developing advanced algorithms that optimize marketing actions based on recent purchase behavior, while from the complementor side, platforms can use the data aggregated from across the platform to put pressure on complementors in many different ways. As digital transaction platforms from different legislative environments, such as Asia, increasingly enter international markets such as Europe, it is therefore important that regulators ensure that such platforms appreciate local legislation and adhere to the same standards that local companies face, for example, in Europe GDPR.

## 5.3   Limitations and Future Research

The limitations and future research areas of each essay are presented in Part II, that follows, and thus this section presents a mere summary and overview of the limitations and future research areas of the dissertation as a whole.

The empirical research focuses on the broad marketing and retail domain from a transactional and behavioral lens. Many of these concepts, such as TCE, are well-grounded in research particularly in the B2B marketing literature, but in this dissertation, they have been employed in a B2C setting, as well, as technological advances mean that many of the issues that have traditionally affected the relationships between buyers, such as the costs of contracting and finding potential transaction partners, are also relevant in a B2C context where, through open marketplaces, complementors can now more easily transact with individual customers. Furthermore, it is important to clarify, that this research takes a mere snapshot of the phenomena in a particular temporal and contextual environment and is not exhaustive or mutually exclusive by any means. It this thus important to recognize, that the research may not be directly generalizable to other sectors of the economy.

As digital transaction platforms are seeing large interest, and the platform logic is being applied by many types of businesses, there is much potential to expand the research in this dissertation to cover, for example, the sharing and circular economy. In addition, the research included in this dissertation focuses particularly on the perspective of customers and complementors, however, there is potential to also expand this focus to cover other stakeholders, and also the actions of the platform owner in coordinating the platform. Future research from the perspective of the platform owner, can therefore answer important questions, such as how platforms can survive the increasing competition between platforms, and continue to attract high-quality complementors to the platform. While so far, many platforms, such as Uber, have based much of their growth on simultaneous subsidies for both the customer and complementor side, in the future there is much pressure to understand how platform businesses can strive towards profitability and long-term sustainability.

Furthermore, as the focus of this dissertation is on digital transaction platforms, other types of platforms are ruled out of focus, for example, social media platforms where information is exchanged for free between users, or sharing economy platforms, where the product or service is often exchanged for free or at cost. Therefore, as technological change continues to alter the nature of business and customer-provider relationships, there is much potential for more in-depth studies of the effects of new digital intermediaries, such as digital transaction platforms across economies and value chains. For example, the research in this dissertation suggests that digital transaction platforms are challenging the traditional relationship marketing perspective, by shifting relationships between customers and complementors from long-term relationships towards individual transactions, future research could study such platforms from a relationship marketing perspective, particularly to better understand whether there are some mechanisms through which platforms can leverage more long-term customer relationships.

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