

Three Essays on New Challenges and Opportunities for Marketing in an Evolving Technological Environment

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Summary

Ongoing advancements in technology have significantly shaped the marketing landscape over the course of the last decades. Consequently, new technology-driven opportunities and challenges for marketing research and practice emerge. Those urge the need to redefine firm-based value propositions, to adapt business models, to place significant emphasis on topics such as innovation, design and strategy, but also to develop new knowledge and skill sets. In response to those changes, this dissertation addresses two major developments and related opportunities and challenges – namely, digitized retail environments and innovative, complex business models – in three different essays. Thereby, this dissertation contributes to a better understanding of the evolving relationship between marketing and technology.

Essay 1 and Essay 2 address the increasing digitization of physical retail environments. Retailers embrace a plethora of retail technologies to facilitate activities and processes for creating, communicating and delivering value to consumers and to consequently improving physical retail stores.

Essay 1 provides an integrated literature review on digital retail technologies' impact on consumer behavior at physical retail stores. Thereby, Essay 1 adopts a shopping cycle based framework structured around distinct phases of consumer behavior to delineate and summarize findings from existing literature on the behavioral effects of retail technologies embraced by retailers. With the applied shopping cycle based framework, Essay 1 identifies specific gaps in extant literature relative to currently embraced practices of retail technology, but furthermore on emerging trends, which have the potential to reshape the retailing environment. Subsequently, an extensive research agenda is proposed to advance the next generation of knowledge development. With its integrated literature review and research agenda, Essay 1

contributes to research in the retail area, such as research on customer experience, shopper marketing and specifically on the role of technology in retailing.

Essay 2 analyzes consumers' response to one particular innovative retail technology and thus replies to future questions of the research agenda developed in Essay 1. Essay 2 analyzes the perceptions and consequences of attribute-based personalized advertising in physical retail stores, where other people are present and can see the personalized content. Essay 2 shows when and how social presence of others impacts consumers' attitudes and behavioral intentions, as well as emotions, when exposed to personalized advertising. The findings of two experimental studies provide evidence, that the presence of others does not influence consumer response per se, but it interacts with personalization. Further, the results show that consumers' negative response to personalized ads in the social presence of others is mediated by embarrassment and moderated by consumers' congruity state (the extent to which the ad is consistent with the consumer's self-concept). These findings offer new theoretical insights into how consumers respond to personalized advertising in the social presence of others, and thus advance marketing research on personalized advertising, digital displays, shopper marketing as well as research on customer experience. Further, the results disclose meaningful managerial implications for the application of new consumer tracking technology.

Essay 3 addresses opportunities and challenges related to innovative, complex business models resulting from technological advancements. With customer orientation in free e-services, Essay 3 analyzes a strategically highly relevant phenomenon, which thus far has been neglected by prior research. Free e-services are characterized by the superiority of free costumers and interdependencies between free and paying customers. Essay 3 investigates how free e-service providers respond to

those particularities in their customer orientation activities. Results from one qualitative and one quantitative study uncover, that only free-born providers, that from the outset strategically committed themselves to the free business model, possess customer orientation capabilities that match the particularities of free e-services. They use customer orientation toward one customer group to increase the satisfaction of the other simultaneously and, thus, are reaching their financial goals. Contrastively, laggards, that started with a non-free business model before launching their free e-service, do not exploit the full potential of customer orientation, as they focus too much on the paying customer group. These findings offer new theoretical insights for research on customer orientation, research on two-sided markets as well as on stakeholder marketing. Moreover, Essay 3 provides valuable and actionable insights for managers of free e-services.

Taking a broader perspective, this dissertation advances marketing knowledge on technological innovation, new types of consumer data, strategy shifts, as well as new firm capabilities and managerial skill sets required in an age of disruption within the virtual, but also the physical world. By using a variety of methods including conceptual work, experiments, qualitative interviews as well as survey research, and furthermore by ensuring high practical relevance, this dissertation adds important perspectives to the evolving relationship between marketing and technology.

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List of Abbreviations

ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
AVE	Average Variance Extracted
B2C	Business-to-Consumer
CB-SEM	Covariance-Based Estimation Techniques
CI	Confidence Interval
CO	Customer Orientation
FC	Free Customers
HTMT	Heterotrait-Monotrait Ratio
M	Mean
N.S.	Non-Significant
PC	Paying Customers
PLS-SEM	Partial Least Squares-Structural Equation Modeling
RFID	Radio Frequency Identification
R&D	Research and Development
SD	Standard Deviation
SST	Self-Service Technology
VIF	Variance Inflation Factor

1 Introduction

1.1 Marketing in an Evolving Technological Environment: New Opportunities and Challenges

Over the course of the last decades, ongoing advancements in technology have transformed the marketing landscape (Hennig-Thurau et al., 2010; Lamberton & Stephen, 2016). Starting with the emergence of Internet marketing (e.g., Boyd & Ellison, 2007; Hoffman & Novak, 1996), other key change agents include the growing importance of e-commerce and e-tailing (e.g., Amazon) (e.g., Burt & Sparks, 2003; DeLone & McLean, 2004). In addition, the development of social media (e.g., Facebook, Twitter) and social commerce, i.e. sales via social media channels (e.g., Algesheimer, Borle, Dholakia, & Singh, 2010; Kumar, Bezawada, Rishika, Janakiraman, & Kannan, 2016), but also the rise of mobile marketing embracing trends such as location-based advertising (e.g., Fong, Fang, & Luo, 2015; Shankar & Balasubramanian, 2009), have had a profound effect on marketing. The evolving relationship between marketing and technology is further reflected in the digitization of physical retail environments, for example with a rising adoption in digital displays, self-service-technologies, mobile marketing technologies, augmented reality, and several other technologies (Grewal, Roggeveen, & Nordfält, 2017).

New, important opportunities and challenges emerge within the realm of the technology-driven revolution in marketing. For instance, the nature of competition between retailing channels has experienced a significant change (e.g., e-commerce vs. physical stores) (Neslin et al., 2016; Neslin & Shankar, 2009). Furthermore, the technological trends had a significant impact on how companies communicate and engage with consumers, but also on facilitating new ways of customer-to-customer

interaction (e.g. AirBnB) (Hennig-Thurau et al., 2010). New service systems, innovative business models and processes are on the rise (Huang & Rust, 2013), yielding accelerating complexity of markets and the need for new capacities and capabilities of firms and marketers to deal with it (Leeflang, Verhoef, Dahlström, & Freundt, 2014). The technological changes in marketing accompany a plethora of new types of data and consumer insights (e.g., Erevelles, Fukawa, & Swayne, 2016) that enable firms, for instance, to deliver more customized experiences, offers, and content (e.g., Bitner, Brown, & Meuter, 2000; Bleier & Eisenbeiss, 2015). Moreover, these technology-driven challenges and opportunities in marketing urge the need to redefine firm-based value propositions, to adapt business models, to place significant emphasis on topics such as innovation, design and strategy, but also to develop new knowledge and skill sets in response to the expanding relationship between marketing and technology (Day, 2011; Leeflang et al., 2014; Royle & Laing, 2014; Varadarajan & Yadav, 2009).

The outlined technological developments are shaping the marketing research agenda. This dissertation focuses on two major technology-driven developments as well as their related challenges and opportunities, which have been declared to be among the top priority research topics for marketing researchers by the Marketing Science Institute (2016) and prior research calls (e.g., Ostrom, Parasuraman, Bowen, Patrício, & Voss, 2015; Shankar, Inman, Mantrala, Kelley, & Rizley, 2011; Shugan, 2004). In the following, we delineate in more detail: (1) digitized physical retail environments, and (2) new business models in an evolving technological environment and the importance of free e-services. We outline the related evolving challenges and opportunities for academia and practice in depth.

1.1.1 Digitized Physical Retail Environments

The digital era with its technological evolvments has tremendously changed the game for physical retail stores. As with the rise of the internet, a great share of retail sales shifted to digital channels, reflected in the significant growth rates of online retailers, while physical retailers' growth rates dropped (Deloitte, 2017). This transformation in consumer behavior and changing competitive market structure faces physical retail stores with new challenges and requires them to adapt their business strategies (Kumar, Anand, & Song, 2017; Neslin et al., 2016). In response, retailers heavily invest in a digital transformation of physical retail stores. Global spending on retail technologies is projected a growth rate of 3.6% in 2017, thus reaching a total spending of \$207 billion (Beams & Narisawa, 2017). Retailers embrace a plethora of technological applications ranging from simple digital displays to highly advanced systems, such as audience-measurement tools, tracking tools or location based in-store mobile advertising (e.g., Fong et al., 2015). Such technologies aim to enable retailers with the opportunity to aid customers to make better informed decisions (Grewal et al., 2017), or to provide an engaging and exceptional shopping experience to customers (Shankar et al., 2011). Despite the embracing of retail technologies as a key managerial practice, marketing and retailing research in this area is still in its infancy. As such, there is an increasing and strong need for managerial guidance and understanding of how such new retail technologies impact consumer experience as well as consumer behavior along their in-store shopping path (Lemon & Verhoef, 2016; Shankar et al., 2011). Research is required on the new ways retail technologies may shape customers' interaction with retailers, brands, products, services, and other shoppers within a physical store (Marketing Science Institute, 2016).

Furthermore, the digitization of physical retail stores comes along with a variety and depth of new types of data and consumer insights (e.g., Erevelles et al., 2016; Grewal et al., 2017) collected, for instance, via consumer tracking technologies. These enable retailers to deliver more customized experiences, offers, and content. Some retail technologies provide new opportunities for personalization and enable retailers to target customers individually (e.g., Fong et al., 2015). Marketing actions based on customer data have been shown to exert a significant positive impact on firm performance, but also hold benefits for consumers. For instance, prior research on personalized online marketing has demonstrated how customized communication and recommendations can lead to higher profits (Iyer, Soberman, & Villas-Boas, 2005) or help to reduce consumers' information overload (Adomavicius & Tuzhilin, 2005). However, past findings in the field of online marketing may not necessarily generalize to personalization strategies for physical retail stores, as here contextual factors, such as presence of other shoppers, or sales staff and related social influence (e.g., Latané, 1981) may impact the effectiveness of personalization strategies. In order to leverage the opportunities and benefits consumer data-based technologies offer, the creation of new knowledge and capabilities among retailers and marketing managers is required. Day (2011) and also Leeflang et al. (2014) have emphasized on a widening gap with regard to the accelerating complexity and variety of consumer data and the capabilities of firms and marketers to cope with this data richness. As such, the Marketing Science Institute (2016) has highlighted the need for integration of new methods as well as new skill sets in light of the variety of new types of data and declared this topic as one of the top research priorities.

1.1.2 New Business Models in an Evolving Technological Environment and the Importance of Free E-Services

Advances in technology lead to a proliferation of new service systems as well as innovative business models and processes (Huang & Rust, 2013), which reshape entire industries and their business paradigms (Rust & Kannan, 2003). Providing services via electronic networks has had a profound effect on how companies engage with consumers, but also on how consumers connect with each other (Hennig-Thurau et al., 2010). These developments fostered the growth of online platform firms (Eisenmann, Parker, & van Alstyne, 2006; Sriram et al., 2015), which act as intermediaries and generate revenues by bringing together multiple market sides (Eisenmann et al., 2006; Rochet & Tirole, 2006). Exemplary services provided via online platform firms encompass offerings such as communication (e.g., Whatsapp), social networking (e.g., Facebook, LinkedIn), information search (e.g., Google) or entertainment (e.g., Netflix) (Anderl, März, & Schumann, 2016). Most of the online platform firms thereby include highly valuable companies and start-ups such as Alphabet, Facebook or Pinterest (Forbes Media LLC, 2016; Fortune.com, 2016), which rely on a business model offering online services for free to one market side, free customers. The other market side, paying customers, cross-subsidize this free offer by advertising their own products and services on the firms' platform. Such free e-services are spreading at a rapid pace (Bryce, Dyer, & Hatch, 2011; Casadesus-Masanell & Zhu, 2013), but are facing firms and marketers with important challenges in adopting the free business model, and leveraging and optimizing its potential benefits to build sustainable advantage in the marketplace (Leeflang et al., 2014; Sorescu, Frambach, Singh, Rangaswamy, & Bridges, 2011). As such, firstly, online platform firms providing services for free need to fully understand the value of their

free customers, who are not providing any monetary value to the platform (Anderl et al., 2016). Secondly, online platform firms, thus, have to simultaneously fulfill the needs of two or more entirely different distinct market sides, which greatly increases the complexity of their business model (Leeflang et al., 2014; Yadav & Pavlou, 2014). These particularities carry organizational challenges in relation to a platform's capacities and capabilities to coordinate resources between varieties of stakeholders. Moreover, firm-based value propositions need to be adapted to the free business model and new knowledge and skill sets must be developed in response to the complexity of multiparty interactions of platform firms (Day, 2011; Leeflang et al., 2014; Royle & Laing, 2014; Varadarajan & Yadav, 2009).

Given the relevance of the free business model, it is therefore important for both practitioners and academic research to go beyond the classic consumer-firm dyad and consider the particularities and challenges of the complex multiparty interactions of platform firms (Yadav & Pavlou, 2014). In consequence, Ostrom et al. (2015) have highlighted the importance of more research on technology-driven new service networks and systems as a tier one priority in service research. Moreover, the Marketing Science Institute (2016) has declared research on the facilitation of managerial understanding on disruption and changes in marketing and in markets among the top priorities for academic research. Additionally, research on how to effectively design complex service offerings, are highlighted to be among the top priorities for marketing researchers (Marketing Science Institute, 2016).

1.2 Research Scope

In three independent essays, this dissertation addresses two major developments, as well as related challenges and opportunities emerging in a technology-driven marketing environment, which we have outlined above. In the following subsections, we provide a brief overview of these essays together with our research scope.

1.2.1 Essay 1: The Impact of Retail Technologies on Consumer Behavior at Physical Retail Stores: A Review and Research Agenda

Essay 1 relates to major challenges and opportunities within digitized retail environments. The past decade has witnessed an important transition for traditional retailers in the way they are carrying out their business. To improve physical stores, retailers increasingly embrace an array of innovative retail technologies (Shankar et al., 2011; Varadarajan et al., 2010). Despite this accelerating managerial practice, marketing research in this area is yet at a nascent stage (Lemon & Verhoef, 2016; Shankar et al., 2011; Verhoef et al., 2009). To address the fragmentation and scarcity of research in marketing on retail technologies' impact on consumer behavior within physical stores, Essay 1 aims to provide an integrated literature review and adapts a shopping cycle based organizing framework, structuring and summarizing current findings. Further, Essay 1 aims to advance the next generation of knowledge development on retail technologies' behavioral outcomes and proposes an extensive research agenda. As such, it identifies specific gaps in extant literature relative to currently applied practices of retail technology, but furthermore on emerging trends,

which have the potential to reshape the retailing environment. In sum, Essay 1 thus aims to delineate:

- (1) How do retail technologies influence consumer behavior throughout distinct stages of the shopping cycle at physical retail stores?
- (2) What are important directions for future research on retail technologies' behavioral impact at physical retail stores?

1.2.2 Essay 2: Personalized Advertising in Public Environments - Perceptions and Consequences

By analyzing the influence, personalized advertising via in-store consumer tracking technology can have on consumers' emotions and downstream purchasing behavior, Essay 2 addresses advancements and challenges in the realm of digitized physical retail environments. Specifically Essay 2 addresses new types of data collection and consumer insights at physical stores. Personalized advertising has emerged as a major marketing trend. A steady growth of the collection and usage of personalized information not only characterizes the online world and the private lives of consumers, but increasingly expands into areas of public life, such as retail stores or shopping malls, which presents new research questions. Extensive research has examined e-mail marketing, personalized online marketing and personalized postal and telephone marketing (e.g., Bleier & Eisenbeiss, 2015; Schumann, Wangenheim, & Groene, 2014; Speck & Elliott, 1997), but the results cannot be directly applied to the public context due to specific challenges faced in this field of study: in public, other shoppers are present. Unlike online advertisements where the consumer is the only one who sees the advertisement, personalized content shown in public can also be seen by other shoppers. Grounded in theory on impression management and self-concept

congruity, this research examines how consumers respond to such personalized advertising in public environments. Specifically, we address the following research questions:

- (3) Does social presence (i.e. the presence of other shoppers) differentially influence consumers' responses to personalized (vs. non-personalized) advertisements?
- (4) If yes, what is the underlying emotional mechanism driving this response?

1.2.3 Essay 3: The Importance of Being Born Free as Online Platform – How Prior Strategic Commitments Influence the Conception of Customer Orientation and Its Outcomes in Free E-Services

With the digital economy online platform firms with new and more complex business models have become increasingly prevalent (Huang & Rust, 2013), reshaping entire industries and their business paradigms (Rust & Kannan, 2003). Online platform firms generate revenue by bringing together multiple distinct customer groups who interact with one another. In Essay 3, we focus on free e-services, which are the most successful manifestations of online platform firms. Those offer free e-services to one customer group (free B2C customers), while paying customers (B2B or B2C) cross-subsidize this free offer (e.g., through advertising their goods or listing them in an online market place). However, despite the increasing prevalence of such free e-services, the management of the underlying business model remains challenging for platform firms. Publishing houses, in particular, have difficulties with the free business model, and are constantly searching for ways to convert free customers into paying ones (The Economist, 2015). Obviously, the free business model and its particularities

challenge firms leveraging and optimizing its potential benefits to build sustainable advantage in the marketplace. One reason for this obvious heterogeneity can be poorly developed customer orientation capabilities that fail to match such business models. Customer orientation is an important capability, which provides firms with substantial competitive advantage (Day, 1994; Jaworski & Kohli, 1993; Narver & Slater, 1990). However, there is only one study investigating possibly appropriate customer orientation capabilities in settings with more than one customer group, leaving a gap in research on how customer orientation unfolds within the highly complex business model of free e-services. Responding to this gap in research, with Essay 3 we aim to expand current knowledge on customer orientation. Hence, by addressing the evolving challenges related to new complex business models, this essay answers the following questions:

- (5) How do managers of free e-services respond to the particularities of the free business model (i.e., free customers' superiority and interdependencies between customer groups) in conceptualizing customer orientation?
- (6) What are the outcomes of the firms' customer orientation toward the two customer groups (i.e., free customers and paying customers)?
- (7) Due to the interdependencies that govern free e-services, how does customer orientation toward one group affect the other group, and vice versa? What are the effects of customer orientation on the respective customer groups' satisfaction?
- (8) How do the different customer orientations directly contribute to the free e-service providers' financial goal attainment?

1.3 Structure of the Dissertation

This dissertation proceeds as follows: After giving an overview of the opportunities and challenges for marketing in an evolving technological environment, and discussing our research scope, we continue with Essay 1 on the impact of retail technologies on consumer behavior. We present this essay in Chapter 2. Next, we present Essay 2, which investigates the perceptions and consequences of personalized advertising in public environments such as retail stores, in Chapter 3. Chapter 4 comprises Essay 3 on customer orientation in free e-services. This chapter is followed by an overall discussion of the results of all three essays in chapter 5, providing implications for research and management, as well as an outlook on future research. Figure 1 outlines the overall structure of this dissertation.

Figure 1. Structure of the Dissertation

Introduction			
Challenges and Opportunities for Marketing in an Evolving Technological Environment Research Scope Structure of the Dissertation			
	Essay I	Essay II	Essay III
Title	The Impact of Retail Technologies on Consumer Behavior at Physical Retail Stores: A Review and Research Agenda	Personalized Advertising in Public – Perceptions and Consequences	The Importance of Being Born Free as Online Platform – How Prior Strategic Commitments Influence the Conception of Customer Orientation and Its Outcomes in Free E-Services
Data	Academic Research Papers	2 Experimental Studies	In- Depth Interviews, Survey Data (Key Informants)
Analytical Method	Literature Review	ANOVA, ANCOVA, Moderated Mediation Models, Spotlight Analysis	Open Coding (MAXQDA), PLS-SEM
Approach	Conceptual Research	Experimental Research	Qualitative Research, Survey Research
Conclusion			
Overall Discussion Outlook			

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2 The Impact of Retail Technologies on Consumer Behavior at Physical Retail Stores: A Review and Research Agenda

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Although the application of retail technologies in physical stores shows significant growth rates, academic literature on behavioral effects of retail technologies remains fragmented and scarce. An overarching research framework to provide structure and guidance to the evolving research stream on retail technologies is indispensable for further knowledge development in this area. To address this issue, this article adopts a shopping cycle based framework structured around distinct phases of consumer behavior, to delineate and summarize findings from existing literature on the behavioral effects of retail technologies applied at physical stores. Thereby, four categories of retail technologies implemented at physical retail stores are highlighted: (1) digital signage, (2) self-service technologies, (3) mobile technologies, and (4) advanced technologies. With the applied shopping cycle based framework, this article identifies specific gaps in extant literature relative to currently applied practices of retail technology, but furthermore on emerging trends, which have the potential to reshape the retailing environment. Subsequently, an extensive research agenda is proposed to advance the next generation of knowledge development.

Keywords: *Retail Technology, Shopper Behavior, Digital Signage, Self-Service Technology, Mobile Technology, Advanced Technology*

2.1 Introduction

The retailing landscape has been significantly reshaped by key developments such as the changing nature of competition between retailing channels (e.g., the web vs. the physical store) (Neslin et al., 2006; Neslin & Shankar, 2009), increasing interest on customer experience (Lemon & Verhoef, 2016; Verhoef et al., 2009), accompanied with rapid and highly innovative technological developments (Shankar, Inman, Mantrala, Kelley, & Rizley, 2011). Driven by these key developments, the past decade has witnessed an increasing interest in the application of technology in retailing to improve physical stores (Shankar et al., 2011; Varadarajan et al., 2010). The variety of technological applications ranges from simple digital displays to highly advanced technologies, for instance in-store facial recognition systems which record a significant growth rate in retailing (Transparency Market Research, 2015). As the embracing of retail technologies emerges as a key managerial practice, it is vital to understand how these retail technologies affect consumer behavior within physical stores (Lemon & Verhoef, 2016; Shankar et al., 2011). However, marketing and retailing research in this area has been limited (Lemon & Verhoef, 2016; Shankar et al., 2011; Verhoef et al., 2009). Moreover, academic inquiry of a predominately technical nature has hitherto dominated the research focus on highly advanced retail technologies and thus publications in this field are mainly found published in computer science oriented journals (Liao & Humphreys, 2014). The fragmentation and scarcity of research in marketing on retail technologies' behavioral outcomes calls for a comprehensive literature review and an organizing framework structuring and summarizing current findings, which can then be used as a stimulus and agenda for such research. In response to this issue, this paper thereby makes several conceptual contributions (MacInnis, 2011) to research in marketing and retailing, such as research

on customer experience (e.g., Lemon & Verhoef, 2016; Verhoef et al., 2009), shopper marketing (Shankar et al., 2011) and specifically on the evolving role of technologies in retailing (e.g., Grewal, Roggeveen, & Nordfält, 2017): First, we propose an organizing framework adapted from Shankar et al. (2011) to organize, delineate and summarize findings from existing literature on the impact of retail technologies on consumer behavior throughout distinct phases of the shopping cycle. Second, with the shopping cycle based framework, we identify specific gaps in extant literature relative to currently applied practices of retail technologies, but furthermore on emerging trends, which have the potential to reshape the retailing environment (Shugan, 2004). Following this, an extensive research agenda is proposed, which summarizes issues worthy of further research and accordingly serves as a catalyst for future work. Consequently, our conceptual contributions and the development of an impactful research program advance the generation of knowledge development on retail technologies' behavioral impact, which is an area of increasing significance for retailing and marketing research, but also for practice. Finally, the results give guidance to managers on how retail technologies affect consumer behavior, while further promoting managers' awareness of different contingency factors, which may alter consumer response and thus need to be taken into consideration when implementing retail technologies.

The remainder of this paper is organized as follows: First, we frame our research by outlining the retail technology context as well as highlighting and defining technologies relevant for our research. A review of current applications of retail technologies in physical stores is presented and features practical examples. Second, we present a shopping cycle based framework to structure, delineate and summarize findings from extant research on retail technologies' impact on distinct phases of

consumer behavior (see Figure 2). Finally, this paper identifies research gaps and several questions for future research, which are then integrated to set an agenda for research.

2.2 Overview of Retail Technology Applications in Physical Stores

The use of retail technology applications has increased rapidly over the last few years (Shankar et al., 2011). The term ‘technology’ denotes “[...] tools or devices that mediate (i.e., facilitate) communication, including Internet-enabled technologies that convert inputs (e.g., information about consumers’ preferences) into outputs (e.g., information about product offerings)” (Varadarajan et al., 2010, p. 97). Further, retail technologies facilitate activities and processes for creating, communicating and delivering value for consumers (Kannan & Li, 2017). The scope of retail technologies which are presented in this work pertains to technologies which are located at physical stores, i.e. the entrance (e.g. storefront window), the sales-floor or the exit (e.g., checkout), thus excluding other retail channels such as online retailing. We also include certain mobile applications (e.g., location-based mobile promotions, mobile payment systems). Even though mobile media marketing is mainly defined as an out-of-store activity (Shankar, 2011), we include some forms of mobile marketing applications, if they bear a link to the in-store shopping experience and consumer behavior relevant to physical stores (Bues, Steiner, Stafflage, & Krafft, 2017). Moreover, in this work we focus on technologies which are consumer-oriented, i.e., technologies with which the consumer directly interacts. Therefore, this research excludes retail technologies with a rather operational focus and which are used as a supply chain management tool, such as smart shelve systems that function as an aid to better inventory tracking (Inman & Nikolova, 2017).

Continuing innovations enable a wide array of retail technology applications at physical stores ranging from simple video screens to highly advanced interactive technologies like smart mirrors or augmented reality (Inman & Nikolova, 2017). In this work, we describe salient forms of such retail technologies, which are already broadly introduced or are beginning to be introduced by retailers (Inman & Nikolova, 2017). We do not claim to capture every retail technology; rather, we draw upon the focus and findings from previous scholarly work in marketing. Our literature review identifies four major categories of retail technologies, which have hitherto been in the focus of academic inquiry in marketing: digital signage, self-service technologies, mobile technologies and advanced technologies. In the following subsections, an overview of each of these types of retail technologies is carried out together with featuring examples from existing retail practices.

Digital signage. Digital signage refers to a screen network in public spaces, for instance department stores and shopping malls, showing a variety of content such as advertisements, information or entertainment content with the aim to engage with consumers when they are captive and in the mood to buy (Dennis, Newman, Michon, Joško Brakus, & Tiu Wright, 2010; Dennis, Michon, Brakus, Newman, & Alamanos, 2012). Digital signage networks, characterized by their ability to display dynamic multimedia content and advertising, offer improvements in cost and effectiveness to retailers as opposed to traditional signage (Harrison & Andrusiewicz, 2003). Thus, digital signage is increasingly used as a retail technology, which is reflected in the considerable market growth for digital displays. The global market for digital displays is predicted to be worth more than \$ 27 billion by 2022 (MarketsandMarkets, 2016). Digital signage is applied by shopping malls such as Harrods or Macy's, and also finds broad application in retail stores such as Victoria's Secret, Hollister and Abercrombie

& Fitch, or Apple (e.g., Dennis, Joško Brakus, & Alamanos, 2013; Milligan, 2012). For instance, in 2012, Victoria's Secret launched a flagship store featuring a video wall made up of 30 digital screens. On the screens, live feeds of Victoria's Secret catwalk shows were displayed with the aim to inspire consumers while shopping (Milligan, 2012).

Self-service technologies. Self-service technologies (SST) are “technological interfaces that enable customers to produce a service independent of direct service employee involvement” (Meuter, Ostrom, Roundtree, & Bitner, 2000, p. 50). Retailers employ SSTs due to lower labor costs, enhanced efficiency, improvements in productivity and increased corporate performance as a result of customer involvement in service co-production (Bitner, Zeithaml, & Gremler, 2010). Examples in retail stores include self-checkout terminals, which allow consumers to scan and pay for items without a cashier (van Ittersum, Wansink, Pennings, & Sheehan, 2013); self-scanning technologies such as smart shopping carts, which keep track of the total price of the shopping basket while shopping (Inman & Nikolova, 2017); or information kiosks, which for instance provide information about the product range of a store or information on specific products (Meuter et al., 2000). The global SST market is expected to be worth \$31.75 billion by 2020 (Allied Market Research, 2015), while the global retail market for self-checkout terminals alone is predicted with a steady and considerable growth of 18% from 2017 to 2021 (Technavio, 2016).

Technological innovations in the SST market are steadily being pushed forward to design faster and more efficient services to shoppers. For instance, Walmart experiments with smart shopping carts which are not only capable of scanning items and thus keeping track of a shoppers' bill, but also are capable of navigating the shopper within the store through aisles, thereby helping them to find items on a

shopping list. With this technology, Walmart aims to compete with the convenience online stores offer to shoppers (Soper & Pettypiece, 2016).

Mobile technologies. Today, due to the proliferation of mobile phone usage, the mobile channel represents a highly important touchpoint for retailers to interact with consumers (Andrews, Goehring, Hui, Pancras, & Thornswood, 2016). Even though mobile media marketing previously has mainly been defined as an out-of-store marketing activity (Shankar, 2011), technological advancements allow retailers to use mobile in-store advertising as a new way of communicating with consumers within physical stores (Bues et al., 2017). Retailers' mobile in-store advertising strategies encompass for instance retailer-specific apps, or supplying free Wi-Fi and thus gathering location-based data about consumers that enables retailers to send push notifications while the consumer is in shopping mode (Andrews et al., 2016; Forrester, 2015). Location-based targeting allows the tracking of the exact position of a customer within a store and forwarding contextually relevant promotional content, such as information about products within close proximity to the customer. Information for example include price information or information regarding complementary products (Andrews et al., 2016; Shankar et al., 2016) or they may be offering a specific exchange of value, e.g. a price discount or a free sample (Shankar & Balasubramanian, 2009; Danaher, Smith, Ranasinghe, & Danaher, 2015; Andrews et al., 2016; Danaher et al., 2015). Retailers however, not only make use of location-based consumer data within physical stores, but also engage in sending push-notification to consumers in either close proximity to their own location ('geo-fencing') or close to a competitor's store ('geo-conquesting') (Fong, Fang, & Luo, 2015). These mobile marketing actions are leveraged to motivate consumers to enter a focal physical store. One example of location-based mobile marketing in retail practice is Shopkick, which emerged as one

of the top apps in the commerce and shopping category, that records a strong increase in user numbers (BusinessWire, 2015). The app serves as a reward program for shoppers, in which they are rewarded with location-based coupons for instance by walking inside a participating store. Shopkick partnered with major retailers, such as Best Buy, J.C. Penney, Macy's Target (BusinessWire, 2015).

Another option to integrate mobile technology into the in-store experience is retailers' acceptance of mobile wallets as a payment option and the supply of required supporting terminals at the check-out (Shaw, 2014). Mobile wallets allow digital, non-cash payments via a mobile device, which needs to be tapped to a retail terminal at the check-out (JPMorgan Chase, 2017). Retailers as well as consumers increasingly accept mobile wallets as a form of payment at physical stores, as reflected in the significant growth rate of the global mobile payments market, which is estimated to reach nearly \$3.4 trillion by 2022 (Allied Market Research, 2017).

Advanced retail technologies. Retailers increasingly experiment with highly advanced retail technologies and the technological boundaries are continuously being pushed forward. Advanced retail technologies include for example augmented reality, smart mirrors, or audience-measurement tools like facial recognition (Bodhani, 2012; Pantano, 2010). Those technologies aim to influence consumer in-store behavior, consumer satisfaction, while also modifying the retailer-consumer interaction (Pantano, 2010). Moreover, advanced retail technologies introduce new elements like enhanced interactivity or the capability of creating a more customized service. While customized in-store messages delivered to shoppers based on a scan of their eyes seemed futuristic in the film "Minority Report" a decade ago (Bodhani, 2012), advanced technologies like facial recognition applications now represent a particular growth area in the retail segment (Transparency Market Research, 2015). With the

help of audience-measurement systems integrated within in-store digital displays, retailers now are enabled to conduct a demographic analysis of consumers, thereby offering them personalized content based on the recorded metrics (Buckley & Hunter, 2011). For instance, Tesco petrol stations use facial recognition technology to personalize advertisements to individual customers. The technology enables Tesco to identify a customer's gender and approximate age and concurrently shows an advertisement that is tailored to this demographic data (Cockerton, 2013). Going even a step further, more advanced facial recognition technologies allow tracking and analyzing consumers' emotional states (McStay, 2015).

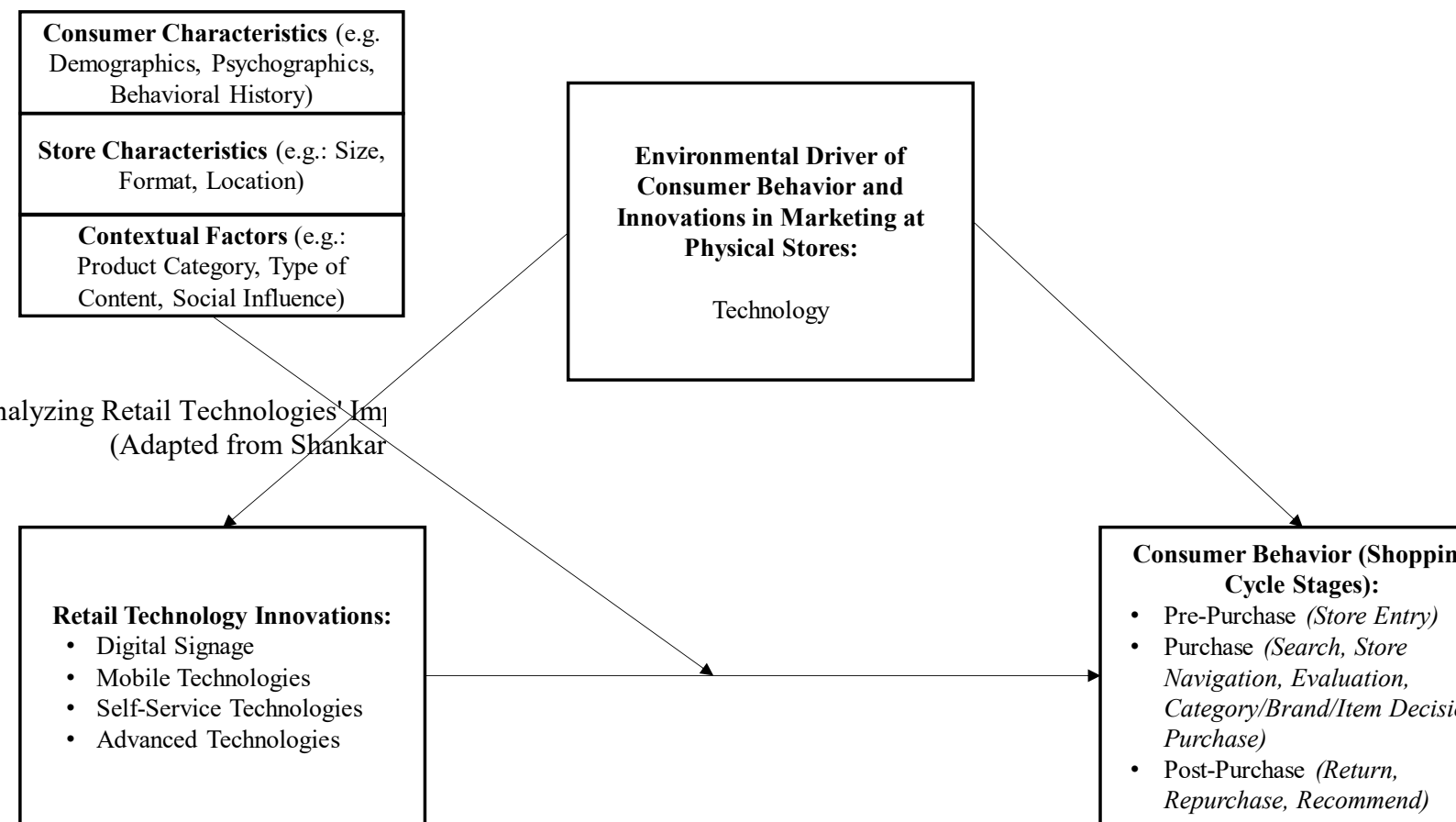
Other advanced retail technologies, like augmented reality also report significant growth rates and are applied by retailers as a promising element of the marketing environment. The market for augmented reality alone is forecasted to be worth \$61.39 billion by 2023 (MarketsandMarkets, 2017). Applications connecting the virtual and the physical world within store environments are promising new concepts for retailers to integrate their web and store channels (Bodhani, 2012). For instance, Cisco StyleMe is a life-sized smart mirror. The mirror is capable of overlaying shoppers' images with images of clothing items they select via gesture- and touch-based interfaces. This provides shoppers with opportunities to create different outfits by mixing and matching a range of clothing items. Moreover, the mirror is capable of connecting to social network sites, enabling shoppers to receive feedback about their outfits from social media (Fretwell, 2011).

2.3 Shopping Cycle Based Research Framework

By implementing different forms of retail technologies within physical stores, retailers' key goal is to enhance consumers' shopping experience and impact their shopping behavior throughout the shopping cycle (Lemon & Verhoef, 2016; Shankar et al., 2011). In order to review findings from prior research on this topic, we use the framework shown in Figure 2, which adapts the organizing framework of shopper marketing activities proposed by Shankar et al. (2011). As outlined in the introduction section of this paper, several environmental key developments have driven the increasing interest of retailers to embrace retail technologies at physical stores. In the following, we put a lens on technology and its advancements as key drivers of applications of digital signage, self-service technologies, mobile technologies as well as advanced technologies within physical stores. Further, the organizing framework delineates the shopping cycle stages of consumers at physical stores, which represent key behavioral touchpoints the aforementioned retail technologies may affect.

Building on prior research, the shopping cycle of consumers and its particular stages can be conceptualized in three overall stages: pre-purchase, purchase, and post-purchase (e.g., Lemon & Verhoef, 2016; Puccinelli et al., 2009). The three overall stages are applied as organizing categories to reflect and summarize findings from prior research on how retail technologies drive consumer behavior:

(1) *Pre-purchase*: The first stage encompasses consumer behavior before purchase, i.e. behaviors such as “[...] need/goal/impulse recognition to consideration of satisfying that need/goal/impulse with a purchase” (Shankar, 2011, p. 76). In this regard, we summarize findings on how retailers can influence the need/goal/impulse recognition in a way such that consumers consider satisfying this recognition by choosing to enter a focal physical store.



(2) *Purchase*: The second stage comprises all behavior and consumer interactions with a retailer during the purchase itself. Consistent with prior research (e.g., Lemon & Verhoef, 2016; Shankar et al., 2011), for this stage, we summarize findings from extant research on behaviors such as in-store navigation, evaluation, category/brand/item choice, and purchase.

(3) *Post-purchase*: The third stage encompasses customer interactions with a retailer following the actual purchase (Lemon & Verhoef, 2016). Thus, at this stage, we review findings on potential spillover effects retail technologies applied at physical stores may have on consumer post-purchase behavior, namely return, repurchase or recommendation behavior (e.g. Lemon & Verhoef, 2016; Shankar et al., 2011).

While consumers pass those three overall shopping cycle stages, they are further influenced by own characteristics, such as demographics, psychographics or behavioral history, which potentially moderate the behavioral effects of retail technologies (Shankar et al., 2011). Further, we extend the framework by including store characteristics as additional potential moderators in our model, for instance store type, store size, or other factors like location as those have been proven by prior research to be potential moderators of consumer behavior (Gauri, Trivedi, & Grewal, 2008; Roggeveen, Nordfält, & Grewal, 2016; Talukdar, Gauri, & Grewal, 2010). Besides consumer and store characteristics, we furthermore extend the framework by contextual factors which have been shown to alter consumer behavior, for instance product type (e.g., Danaher et al., 2015), type of content (e.g., Dennis, Joško Brakus, Gupta, & Alamanos, 2014) or social influence (e.g., Dahl, Manchanda, & Argo, 2001). Where applicable, those potential moderators will be discussed. Finally, we additionally elaborate on potential interaction effects among retail technologies and their joint impact on consumer behavior. Table 1 visualizes the findings from each

article comprised in the literature review structured according to type of retail technology and stage of the shopping cycle. Moreover, Table 1 highlights current gaps in research, i.e. it shows which shopping cycle stage, moderators and related consumer behavior hitherto have not been addressed by extant research.

In the following subsequent sections, each of the four retail technologies is discussed together with its impact on the three overall shopping cycle stages, while summarizing the current research findings. Subsequently, we identify resultant opportunities for future research (see Table 2).

Study	Consumer Behavior Across Shopping Cycle Stages			Moderators		
	Pre-Purchase	Purchase	Post-Purchase	Consumer Characteristics	Store Characteristics	Contextual Factors
Signage						
et al. (2013)		X		X		X
et al. (2014)		X	X	X		X
et al. (2012)		X	X	X		
et al. (2010)		X				
et al. (2011)	The Impact of Retail Technologies on Consumer Behavior Across Distinct Stages of the Shopping Cycle					X
an et al. (2006)		X				
reen et al. (2016)		X			X	X
Service Technologies						
d Yang (2013)			X	X		
al. (2009)			X			
rs et al. (2008)			X			X
r et al. (2015)			X			X

Study	Consumer Behavior Across Shopping Cycle Stages			Moderators		
	Pre-purchase	Purchase	Post-Purchase	Consumer Characteristics	Store Characteristics	Contextual Factors
Self-Service Technologies (Continued)						
Selnes and Hansen (2001)			X			
van Ittersum et al. (2013)		X	X	X		
Technologies Impact on Consumer Behavior Across Distinct Stages of the Shopping Cycle (Continued)						
White et al. (2012)			X	X		
Mobile Technologies						
Bues et al. (2017)		X				X
Danaher et al. (2015)	X			X		X
Fong et al. (2015)	X					
Hui et al. (2013)		X				X
Luo et al. (2014)	X					X

Study	Consumer Behavior Across Shopping Cycle Stages			Moderators		
	Pre-Purchase	Purchase	Post-Purchase	Consumer Characteristics	Store Characteristics	Contextual Factors
<i>Technologies</i>						
(6)						X
Naccarato		X				

Figure 1: Impact on Consumer Behavior Across Distinct Stages of the Shopping Cycle
(Continued)

Table 2. Summary of Future Research Issues

Important Research Questions	
<i>Digital Signage</i>	
<i>Pre-Purchase</i>	<ul style="list-style-type: none"> – How can digital signage content be designed to influence consumers' store entry decision most effectively? – How do situational factors impact the effectiveness of digital signage to influence consumers' store entry decision and how does digital signage content need to be designed to address such factors?
<i>Purchase</i>	<ul style="list-style-type: none"> – How do distinct consumer characteristics drive the effects of different digital signage content on consumer behavior? – What digital signage content assists consumers most effectively to make better informed shopping choices? – Depending on retailer characteristics, such as store format or retailer / brand image, what type of content is most effective in driving consumer behavior? – What impact does advertising via digital signage have on sales of focal brands or items advertised? Are there varying effects across product categories? – Can optimized strategic positioning of digital signage be leveraged to impact consumers' in-store travel paths?
<i>Post-Purchase</i>	<ul style="list-style-type: none"> – What is the impact of digital signage as a retail atmospheric tool on wait time perceptions, customer satisfaction and hence on possible downstream effects on post-purchase behavior?
<i>Self-Service Technologies</i>	
<i>Pre-Purchase</i>	<ul style="list-style-type: none"> – How can SST applications such as information kiosks be used to effectively provide potential customers with product-related information at the storefront and can this information via SST be leveraged in terms of store entry decision?
<i>Purchase</i>	<ul style="list-style-type: none"> – Does the usage of SST impact consumers' product, category and brand choice behavior during the purchase phase? E.g., can SST usage consequently reduce perceived social friction and impact shopping choices? – How can SSTs be acted upon by consumers for the purpose of upholding and improving their well-being? E.g., can SSTs provide consumers with additional information to assist them in finding products which best match their needs?
<i>Post-Purchase</i>	<ul style="list-style-type: none"> – What are potential contingency factors of SST's impact on consumers' post-purchase behavior? – Can SSTs like self-checkout terminals be more imagined for use in certain store formats (e.g. convenience stores vs. fashion stores) or for certain retail brands (e.g., like low-budget brands vs. luxury brands) than for others? – How does the implementation of SSTs impact consumers' shopping experience across different store formats and what is the consequence on post-purchase behavior? – How does consumer-driven SST failure influence shopping experience and downstream variables (e.g. re-patronage intentions, word-of-mouth intentions)?

Summary of Future Research Issues (Continued)

<i>Mobile Technologies</i>	
<i>Pre-Purchase</i>	<ul style="list-style-type: none"> – What distinct moderators might influence the effectiveness of mobile targeting on consumers' store entry choice (e.g., certain consumer characteristics, consumers' behavioral history)? – What other information rather than price promotions could retailers send via mobile technologies to positively influence consumers' store entry decision?
<i>Purchase</i>	<ul style="list-style-type: none"> – Which consumer or store characteristics might be moderators that drive the impact of location-based mobile in-store advertising on consumers' decision making during the purchase phase? – Which contextual factors (e.g., presence of other shoppers or companions) may boost or diminish the effectiveness of mobile promotions during the purchase phase?
<i>Post-Purchase</i>	<ul style="list-style-type: none"> – What are the consequences and the boundaries of personalized and frictionless shopping experiences via mobile technologies? – For instance, what are the privacy-related consequences of mobile technology applications on consumer behavior? When does the usage of mobile retail technologies go too far and for instance decrease trust in the retailer employing these technologies. What are the related spillover effects on consumers' post-purchase behavior, such as loyalty or referral intentions?
<i>Advanced Technologies</i>	
<i>Pre-Purchase</i>	<ul style="list-style-type: none"> – Which advanced retail technologies lead to highest customer attention at the storefront? – Which features enable to elicit feelings of surprise as an important prerequisite in gaining consumers' attention? Will this positively influence intentions to enter a focal store?
<i>Purchase</i>	<ul style="list-style-type: none"> – How do distinct advanced technologies impact consumer behavior in terms of the course of searching for, choosing, comparing and interacting with products? How can advanced technologies assist consumers in their decision making (e.g. by integrating social media within physical stores)? – How do potential moderating factors such as consumer characteristics, store characteristics or contextual factors (e.g., social presence of other shoppers) drive purchase related behavioral effects of advanced technologies?
<i>Post-Purchase</i>	<ul style="list-style-type: none"> – Do advanced technologies (e.g., payment via fingerprint identification) applied at the exit level of a physical store influence post-purchase behavior of consumers? – What are possible contingency factors (e.g., privacy concerns or trust in the retailer) of advanced technologies' behavioral effects and how will those alter consumers' post-purchase response?
<i>Integrated Perspective</i>	
	<ul style="list-style-type: none"> – What is the optimum blend of the application of distinct forms of retail technologies and what are the contingencies that influence this optimum blend? How can retailers most efficiently and effectively balance their efforts to influence consumer behavior with a variety of retail technologies? – Which retail technology is most efficient at which stage of the shopping cycle?

2.4 Results

2.4.1 Digital Signage

2.4.1.1 Current Findings

Purchase. Despite the accelerating pace at which digital signage is penetrating the retailing landscape, scholarly research in marketing on the behavioral effects of digital signage is still at a nascent stage. Thus far, academic research has mainly considered the effects of digital signage on retail atmosphere, with limited findings on spillover effects of enhanced atmospheric perceptions on consumer behavior (Dennis et al., 2010; Dennis et al., 2012; Dennis et al., 2013; Dennis et al., 2014; Newman, Dennis, Wright, & King, 2010; Newman, Dennis, & Zaman, 2006). The general conclusion of prior work is that digital signage improves the image of the shopping environment by creating a favorable atmosphere and eliciting positive affect, which in turn translates into positive approach behavior such as self-reported spending (Dennis et al., 2010; Dennis et al., 2012; Dennis et al., 2013; Dennis et al., 2014; Newman et al., 2010). Dennis et al. (2012) further find higher effectiveness of digital signage on approach behavior among income earning consumers compared to non-working consumers. Besides the reported atmospheric aspects, Newman et al. (2010) find that information provided via digital signage may assist consumers in making better informed shopping choices.

Elaborating more deeply on effective content design of digital signage, research findings are rather mixed. While Newman et al. (2010) find consumers are most responsive to digital signage messages which address the task at hand and focus on featuring information (e.g., information on new products, promotions, local and time specific information), Dennis et al. (2013) and Dennis et al. (2014) find affective (i.e., content featuring high sensory cues) digital signage content to be superior over

cognitive content (i.e., information based content). Considering consumer characteristics, Dennis et al. (2013) and Dennis et al. (2014) show, that specifically for first-time shoppers there is a stronger effect of affective content on approach behavior.

Recent research on digital signage content draws on the role of price promotions and sheds light on the impact of digital signage on retail sales. Roggeveen et al. (2016) find that a price-promotional message induces a lift in sales, number of items purchased, and time spent in a store, whereas non-price content does not. Further, stressing on specific store characteristics, the authors emphasize that the enhancing effect of digital signage on sales depends on store format. Whereas sales in hypermarkets are enhanced by digital signage, sales in supercenters and supermarkets are less impacted by this retail technology. For smaller stores, like convenience stores, digital signage may even have a negative impact on retail sales (Roggeveen et al., 2016).

Post-purchase. The positive impact of digital signage as a retail atmospheric tool on consumer behavior at the sales-floor level (e.g., time spent in store, spending), also translates into positive post-purchase behavior. Findings from prior research reveal, that digital signage has a significant, positive, total effect on approach behaviors such as intentions to revisit a retailer, mediated by positive affect and perception of shopping environment (Dennis et al., 2010; Dennis et al., 2012; Dennis et al., 2014), with stronger effects among income-earning consumers compared to non-income earning consumers (Dennis et al., 2012). Intention to revisit a store is further enhanced by an affective experience evoked by digital signage that features high sensory cues rather than by content that features mainly information based advertising cues (Dennis et al., 2014). As for in-store behavior, this effect on post-purchase behavior is stronger for first-time shoppers (Dennis et al., 2014).

2.4.1.2 Avenues for Future Research

Pre-purchase. Thus far, the placement of digital signage at the store entrance, e.g. integrated within storefront windows, and its potential effects on consumers' pre-purchase behavior, has been neglected in prior research. However, gaining new insights into digital signage's potential impact on capturing consumers' attention at the store entrance and influencing their entry decision might be of interest for future research. The design of storefront windows is an integral part of retail strategy and plays an important role in influencing consumers' store entry decision (Cornelius, Natter, & Faure, 2010; Oh & Petrie, 2012; Sen, Block, & Chandran, 2002). Furthermore, consumers' perceptions of storefront windows and thus their store entry decisions interact with elements displayed in a window as well as with consumer characteristics and situational factors, such as shopping motivation or cognitive load of consumers (Oh & Petrie, 2012). Consequently, the question of how can digital signage content be designed to influence consumers' store entry decision most effectively arises. What is furthermore not understood yet, is how moderating factors, for instance, consumer characteristics alter the effectiveness of digital signage to influence consumers' store entry decision and how digital signage content needs to be designed to address such factors.

Purchase. Thus far, academic inquiry on digital signage mainly focused on its overall effects to enhance in-store atmosphere, but gives relatively little guidance on effective content design. Prior research has witnessed mixed findings on the effectiveness of different digital signage content (e.g., Dennis et al., 2014; Newman et al., 2010) and had a very narrow focus on possible moderating factors on the link between digital signage content and consumer behavior. This suggests an area that is ripe for future research, - namely, deepening the understanding of digital signage

content design and analyzing contingency factors that might alter its effectiveness. Building on prolific research, which demonstrated the interrelationship between a retailer's marketing strategy and varying moderators (e.g., brand, product category, customer segment), which drive its impact on consumer behavior (e.g., Bolton & Shankar, 2003; Shankar & Bolton, 2004; Voss & Seiders, 2003), several possible research questions arise: How do distinct customer characteristics (Shankar et al., 2011; Steenkamp & Wedel, 1991; Westbrook & Black, 1985) drive the effects of different digital signage content on consumer behavior? How should digital signage content be designed with different targeted customer segments in mind (e.g. teens / young adults / middle aged to the elderly)? Considering certain customer characteristics, how does digital signage content need to be designed to assist consumers to make better informed shopping choices? Depending on retailer characteristics, such as store format or retailer / brand image (e.g., Gauri et al., 2008; Talukdar et al., 2010), what type of content is most effective in driving consumer behavior? How can content be properly leveraged, so that digital signage can serve as a dynamic brand or retailer image extension and impact consumers' purchase behavior?

In addition, another fruitful avenue for research is the impact on sales for specifically promoted items via digital signage, but also potential halo-effects. Prior research thus far mainly focused on self-reported spending and spending intentions (e.g., Dennis et al., 2012; Dennis et al., 2014). Some initial and recent findings reveal, that digital signage has the potential to increase overall purchases (Roggeveen et al., 2016). However, besides the effect of digital signage on overall purchases, is there also an increase in sales of the focal brands or items advertised? Are there varying effects across product categories? Can advertisements for a particular product induce halo-

effects (i.e. a potential lift in sales of other items of the same product category) or potential substitution patterns (Chevalier, 1975a, 1975b)?

Yet another promising area for future research is the impact of digital signage on shoppers' in-store travel paths and in-store navigation. Decent research on in-store shopping behavior provides evidence that on their path from store entrance to exiting a store, consumers rarely go through the entire store (Larson, Bradlow, & Fader, 2005) and thus only visit approximately one third of all store areas (Hui & Bradlow, 2012). Consequently, as consumers bypass much of shop areas, marketing strategies motivating customers to walk through a larger proportion of store areas are highly relevant to retailers. Following these findings, future research should seek to understand how to optimize strategic positioning of digital signage at the sales floor to affect consumers' in-store navigation. Can optimized strategic positioning of digital signage attract consumers' attention and motivate them to move along as many in-store areas as possible and thus spur unplanned purchases (Hui, Inman, Huang, & Suher, 2013)? For instance, can optimized positioning of digital signage attract more shoppers to the less vivid parts of a sales floor?

Post-purchase. Findings of prior research on behavioral effects of digital signage at the post-purchase phase are rather limited (e.g., Dennis et al., 2012; Dennis et al., 2014), thus, leaving room for fruitful future research. The checkout forms the last possible touchpoint with a shopper at a physical store. Therefore, investigating the effects of digital signage applied at the checkout might yield interesting insights into consumers' post-purchase behavior. Findings from prior research suggest that specific service environment elements (e.g., lighting, color, temperature) influence affect and wait time perceptions of shoppers (e.g., Baker & Cameron, 1996; Gorn, Chattopadhyay, Sengupta, & Tripathi, 2004). Results further supported the

relationship between wait time perceptions and customer satisfaction, such that with decreasing waiting time, customer satisfaction tends to increase (e.g., Katz, Larson, & Larson, 1991), which positively relates to post-purchase behavior (Mittal & Kamakura, 2001). Building on these findings, future research could examine the impact of digital signage as a retail atmospheric tool on wait time perceptions, customer satisfaction and hence on possible downstream effects on post-purchase behavior. For example, is digital signage positioned at the check-out capable of influencing perceived quickness of the service transaction, e.g. by eliciting feelings of relaxation or entertainment (e.g., Gorn et al., 2004). If so, what is then the effect on shoppers' post-purchase behavior, such as re-patronage, repurchase or recommendation intentions?

2.4.2 Self-Service Technologies

2.4.2.1 Current Findings

Purchase. Thus far, research in the field of self-service technologies has centered around identifying different factors of acceptance and usage of SST (e.g. Blut, Wang, & Schoefer, 2016; Collier & Kimes, 2013; Collier, Moore, Horky, & Moore, 2015; Dabholkar & Bagozzi, 2002; Meuter et al., 2000), but relatively little research has investigated the impact of different downstream effects of SSTs on consumer behavior during the purchase phase. To the best of our knowledge, only one recent study by van Ittersum et al. (2013) examines how SST usage in the form of smart shopping carts impacts consumers' decision making at the purchase phase. Self-scanners integrated in smart shopping carts provide customers with real-time feedback about their shopping bill while moving along the sales floor. This feedback significantly influences shoppers' spending behavior, but with varying effects. The

real-time feedback thereby increases spending of budget shoppers (those with constrained budget), but has an opposite effect on spending of non-budget shoppers (van Ittersum et al., 2013).

Post-purchase. Research on the effects of SST usage on consumer behavior after exiting a physical store is sparse; however, some findings give insights on how the usage of self-scanning devices has spillover effects on post-purchase behavior. SSTs like self-scanning devices or smart-shopping carts are, on the one hand, capable of giving consumers' constantly real time feedback on their spending (van Ittersum et al., 2013), and on the other hand, they reduce perceived waiting time at the cash register and thus increase consumers' satisfaction (Weijters, Rangarajan, Falk, & Schillewaert, 2007). This has positive spillover effects on consumers' post-purchase behavior, for example by enhancing re-patronage intentions (van Ittersum et al., 2013; Weijters et al., 2007). However, two important contingencies of these effects are apparent. First, the demonstrated positive effects on perceived time savings and related post-purchase behavior are only evident when many items are bought (Weijters et al., 2007). Second, real-time feedback on spending via SSTs increases the intentions of budget shoppers (those with a constrained shopping budget) to return to a store, but not the re-patronage intentions of non-budget shoppers (van Ittersum et al., 2013).

Besides wait time savings and real-time feedback on spending via SST, perceived usage quality (e.g. delivered through information kiosks or self-checkout terminals) positively affects post-purchase behavior, such as re-patronage intentions (Lee, Fairhurst, & Lee, 2009; Lee & Yang, 2013). However, this positive link between SST usage quality perceptions and consumer post-purchase behavior is attenuated for consumers having a high need for interaction and is also attenuated for older consumers (Lee & Yang, 2013).

Many retailers start to implement policies that aim to encourage and push customers to adopt SST offerings, such as reducing full-service options or even penalties for using full-service options (Scherer, Wunderlich, & von Wangenheim, 2015; White, Breazeale, & Collier, 2012). However, shifting service options from personal service to SST fuels the risk of weakened social bonds, which in turn results in lowered customer loyalty (Selnes & Hansen, 2001). Further, fairness perceptions of such retail policies significantly influence the relationship between antecedents of SST adoption such as individual characteristics (e.g. technology readiness, need for human interaction), situational characteristics (e.g. order size, speed of transaction) and their impact on consumer response to SST (e.g. future patronage, future spending, word of mouth) (White et al., 2012). Specifically, consumers who perceive SST push policies as unfair are less likely to increase future spending and have lower intentions of engaging in positive word of mouth behavior. Thereby, important antecedents of perceived fairness are customers' technological readiness, perceived length of the time required to complete a transaction, need for human interaction and inertia (White et al., 2012). Furthermore, research reveals consumers are most likely to exit a service relationship or engage in negative word of mouth, when merely one channel for service delivery is provided, thus intermediate levels of both SSTs and personal service are associated with the lowest likelihood of consumer defection (Reinders, Dabholkar, & Frambach, 2008; Scherer et al., 2015).

2.4.2.2 Avenues for Future Research

Pre-purchase. Investigating how SST applications' impact on consumer behavior can be leveraged to engage consumers at the storefront and influence their store entry decision has thus far been neglected in research. This gap provides fruitful

avenues for future research. Insights from prior studies suggest that potential customers infer store-related information, but also product-related information from storefront windows, whereby the latter have higher impact on store entry decision (Sen et al., 2002). As such, how can SST applications such as information kiosks be used to effectively provide potential customers with product-related information at the storefront. Can this information via SST be leveraged in terms of store entry decision?

Purchase. Surprisingly, besides the increasing application of SSTs at physical stores, research on behavioral effects of SSTs during the purchase phase is still at a nascent stage. Thus, there is a strong need to look at broader implications of self-service encounters than only the frequently researched SST goals of faster transactions and higher convenience (e.g., Collier & Kimes, 2013; Meuter et al., 2000). Yet a fruitful avenue for research is the impact SST usage could have on reducing social friction or the fear of being judged by others and the related impact on consumer behavior (Latané, 1981). Consumers often need to choose between high-price/high-quality and low-price/low-quality options or other options categorized according to a good/bad dichotomy, for example, in terms of food options: vice food options (e.g. healthy foods as vegetables or fruits) versus indulgent food options (e.g., unhealthy foods as chocolate or pizza) (Chernev & Gal, 2010; Rozin, Ashmore, & Markwith, 1996). SSTs, such as smart shopping carts or self-checkout terminals allow purchase transactions without interacting with a cashier at the check-out, who might be judging what a consumer buys. As such, how can SST usage reduce perceived social friction, and does it influence consumers' product, category and brand choice behavior during the purchase phase? For instance, in the absence of social judgment, do consumers choose more "indulgent" products than "vice" products? Furthermore, what is the effect on purchase behavior for certain embarrassing product categories (e.g., anti-

dandruff shampoo, feminine napkins) (Dahl et al., 2001; Morales & Fitzsimons, 2007)?

Another important area of research is the potential impact of SSTs on consumer well-being. The growing field of transformative consumer research has examined a variety of facets of consumer well-being, for example environmental issues (e.g., Goldstein, Cialdini, & Griskevicius, 2008) or discrimination (e.g., Bone, Christensen, & Williams, 2014). However, there is a dearth of scholarly research that strives to develop insights on how retail technologies, especially SST, can be acted upon by consumers for the purpose of upholding and improving their well-being. For example, “nutrition and obesity” represents one of the most pressing research topics in the area of transformative consumer research (Mick, 2006). As such, future research could investigate how SST technologies such as smart shopping carts or information kiosks can support consumers in their category, brand and item choice. Can SSTs increase food literacy among consumers (i.e. the knowledge about food and nutrition, but also the motivation to apply nutrition information to food choice, Block et al., 2011)? For instance, could SST effectively provide consumers with special nutrition needs with additional information and thus, assist them in finding products which best match their needs (e.g. calorie indications, allergies relevant information)?

Post-purchase. In general, the impact of SSTs on consumers’ post-purchase behavior is a barely researched field in academia. Most scholarly research thus far has centered around exploring determinants of customers’ intentions to adopt SSTs (e.g., Collier et al., 2015; Dabholkar & Bagozzi, 2002) and some outcome variables such as perceived waiting time (Weijters et al., 2007) or customer satisfaction (e.g., Collier & Kimes, 2013; Weijters et al., 2007). Therefore, there is still a requirement for a more holistic perspective on experience with SST, related downstream consequences in

terms of consumers' post-purchase behavior and potential contingency factors. For instance, in addition to the potential direct effects SST usage can have on consumer behavior after exiting the store (e.g. re-patronage, recommendation, repurchase), future research could examine contingencies in terms of store characteristics that might influence these effects. While SSTs like self-checkout terminals have become common retail technology applications within convenience stores, self-checkouts now are also being introduced to other retail sectors such as fashion stores. For example, Rebecca Minkoff, a label providing casual luxury handbags, accessories, as well as apparel, recently introduced a self-checkout system in one of its flagship stores (Arthur, 2017). Several questions worthy for future investigation arise: Can SSTs like self-checkout terminals be more imagined for use in certain store formats (e.g. convenience stores vs. fashion stores) or for certain retail brands (e.g., like low-budget brands vs. luxury brands) than for others? Thus, is store format or retail brand image a contingency factor of SST on consumer behavior? For example, customers of luxury brands highly value quality of experience and feelings of being taken care of personally (e.g., Atwal & Williams, 2009) – how do SST applications impact their retail experience in comparison to other customer segments? What are the implications regarding post-purchase behavior?

There is much yet to learn about the influence of SST failure on shopping experience and consumer post-purchase behavior. While preliminary research addressed consumer reactions to and attributions for SST technology failures (e.g., Meuter et al., 2000), understanding how consumer-driven failure influences shopping experience and downstream variables (e.g. re-patronage intentions, word-of-mouth intentions) represents a promising research avenue. For instance, consumer-driven failure may occur at self-checkout desks, by improperly using the scanners and thus

triggering an irritating voice warning of the system or a call for assistance by the sales staff. Even consumers are willing to take part of the responsibility when such dissatisfying encounters with SSTs occur (Meuter et al., 2000), consumer-driven failure may publicly shame consumers, as others are around (e.g., other consumers, sales staff) and notice the failure (Latané, 1981). Hence, for consumer-driven SST failure, several possible research questions arise. For example, how does the use of SST affect social interaction of individuals in public spaces such as physical stores? Do consumers encounter feelings of pressure, anxiety or embarrassment if they are observed by other consumers during a customer-driven SST failure (Argo, Dahl, & Manchanda, 2005; Dahl et al., 2001)? What might be related potential downstream effects on consumers' shopping experience and consequently on post-purchase behavior (e.g. repatronage, word-of-mouth)?

2.4.3 Mobile Technologies

2.4.3.1 Current Findings

Pre-purchase. To influence consumers' pre-purchase behavior, and specifically the decision to enter a store, retailers either can send mobile coupons to consumers who are in close proximity to their own store (geo-fencing) or close to a competitor's store (geo-conquesting) (Fong et al., 2015). Recent research on geo-fencing finds, that effectiveness in terms of redemption of mobile promotions depends on when and where promotions are received by a targeted consumer (Danaher et al., 2015; Luo, Andrews, Fang, & Phang, 2014). Redemption rates are highest for mobile coupons sent to consumers in close proximity of a focal retailer and with a short expiration length (Danaher et al., 2015; Luo et al., 2014). Probability of redeeming a coupon is further influenced by day-of-the-week effects, and by previous consumer

behavior, such that consumers who have previously redeemed a coupon show higher redemption rates (Danaher et al., 2015). Moreover, redemption rates are driven by product type, such that coupons for a non-durable consumer product (i.e. snack food) are found to be superior over coupons for other product types, such as clothes or electronics (Danaher et al., 2015).

Purchase. Only few recent studies have examined the influence of mobile technology on consumer behavior specifically within physical retail stores. Hui et al. (2013) show how mobile coupons can influence consumers' in-store navigation and consequently influence purchase decisions. Their findings reveal that targeted in-store mobile promotions, which aim at increasing in-store path length, lead consumers to encounter more products. This strategic influence on shoppers' in-store navigation translates into an increase in unplanned spending. Further, results also reveal superior effectiveness of mobile promotion strategies in increasing unplanned purchases compared to classic strategies such as managing product locations within a store.

While increasing travel distance leads to an uplift in unplanned purchases (Hui et al., 2013), mobile promotions need to be sent in close proximity, if they aim to enhance purchase decisions for a focal promoted product (Bues et al., 2017). Bues et al. (2017) find, that effectiveness of mobile in-store advertising depends on certain value drivers, which are price promotion (advertising with or without a rebate), location (ad received close to the product or farther away), and personalization (ad sent to all customers or specific customers). Bues et al. (2017) find that all three value drivers are exerting a significant effect on consumers' purchase intentions of the focal promoted product, but with a varying degree. The location where consumers receive a mobile promotion within a store is the strongest driver of consumer response, whereas personalization is the second most important and price promotion the least important value driver. More

specifically, messages received close to a focal product lead to higher purchase intentions than messages received farther away from the product. Personalized messages are superior over non-personalized mobile messages. Importantly however, the authors also find that personalization and location interact with each other, such that personalization close to a specific product was found to have little impact on consumers' purchase intention (Bues et al., 2017).

2.4.3.2 Avenues for Future Research

Pre-purchase. Building on the as yet very limited findings from prior research, on geo-fencing versus geo-conquesting (Danaher et al., 2015; Fong et al., 2015), more research is required on how to determine an optimum choice of when to use which promotional tool to enhance consumers' store entry decision. Distinct potential moderators might influence the effectiveness of mobile targeting on consumers store entry choice such as certain consumer characteristics and consumers' behavioral history (Shankar, 2011). For instance, brand loyalty or brand identification (Chaudhuri & Holbrook, 2001) with a focal retailer may be important drivers of behavioral reactions toward geo-conquesting vs. geo-fencing. Presumably, highly brand-loyal consumers receiving a mobile promotion may be willing to pay more for a competitors' brand even though receiving a discount for another brand, and hence be less likely influenced by geo-conquesting. Additionally, further research could investigate how involvement, i.e. consumers' motivation to process the information they have received (Celsi & Olson, 1988), might alter the effectiveness of geo-conquesting and geo-fencing. Moreover, prior research demonstrated that store-related information inferred at the entrance of a store (e.g. from window displays) may positively influence store entry decision (Sen et al., 2002). Likewise, what other

information than price promotions could retailers send to positively influence consumers store entry decision? For instance, what impact could information on new product arrivals or the product range via mobile messages sent to consumers in close proximity to a store have on their entry decision?

Purchase. As only few recent studies investigated the influence of mobile technology on consumer behavior during the purchase phase (Bues et al., 2017; Hui et al., 2013), gaining a more holistic perspective on behavioral effects and potential moderators yield avenues for future research. Thus, identifying additional value drivers of mobile in-store advertising as well as finding further explanations for how and when location-based mobile in-store advertising influences consumers' decision making might be of interest for future research. For instance, several possible consumer characteristics and store characteristics, which may alter the effects of mobile promotions on consumer behavior, require additional research. While prior research has identified location-based mobile promotions to be effective in influencing customers' in-store navigation and their purchase behavior (Hui et al., 2013), future research may analyze if these findings generalize to different stores with varying characteristics. For instance, do effects of mobile promotions on in-store navigation vary across different store sizes (e.g., small convenience stores, larger retail stores or shopping malls)? How do mobile promotions affect unplanned purchases particularly in smaller stores, where increasing in-store travel distance is limited? Moreover, future research could explore to what extent individual characteristics such as demographics, psychographics and behavioral history drive the effects of mobile promotions on consumer behavior. Prior research suggests different types of consumer segments based on shopping motivation and focus during their shopping trip (e.g., McCabe, Rosenbaum, & Yurchisin, 2007; Westbrook & Black, 1985). Thus, consumer

segments may alter the effectiveness of varying content sent via mobile promotions (e.g., price promotions vs. information). While price promotions have been found to be the least important value driver of mobile promotions (Bues et al., 2017), these findings might not be generalized across different consumer segments. For instance, economic shoppers are highly price sensitive (Westbrook & Black, 1985) and thus might be more prone to price promotions. Moreover, how are unplanned purchases induced via mobile promotions affected by consumer type and shopping motivation? For example, unplanned purchases may be more likely for customers with a hedonic shopping motivation versus those who have a rather utilitarian driven shopping motivation (Shankar, 2011). Is the amount of unplanned purchases induced via mobile promotions higher if the goal of the shopping trip is less concrete (e.g., weekly grocery shopping trip) than when it is concrete (e.g., searching for a specific item) (Bell, Corsten, & Knox, 2010)?

Moreover, there is a dearth of research, which aims to gain deeper understanding on additional contextual factors of receiving mobile promotions at the sales floor, which might boost or diminish the effectiveness of mobile promotions. For instance, consumers are often accompanied by peers or family during their shopping trip. The presence of others has been shown to exert influence on consumers' decision making in a purchase situation and may influence spending for unplanned purchases (Luo, 2005). Hence, future research could examine to what extent the presence of others influences the likelihood of redemption of mobile coupons received within a store. Does the presence of companions boost the effectiveness of mobile promotions and lead to an increase in unplanned purchase?

Post-purchase. Thus far, there is a gap in research investigating potential spillover effects of mobile technologies on consumers' post-purchase behavior. The

ongoing advancement of mobile technologies allows retailers to offer customers more personalized and frictionless shopping experiences, which likewise provide several avenues for future research. While location-based mobile promotions may provide a more personalized shopping experience (e.g., Andrews et al., 2016), supplying check-out terminals, which enable mobile wallets as a cash-less and card-less form of payment, make shopping experiences more frictionless (Shaw, 2014). In this regard, gaining new insights into the consequences and the boundaries of such personalized and frictionless shopping experiences might be subjects of interest for future research. Consumers may recognize how much data and information retailers collect about them for enhancing their shopping experience via mobile technologies (Aguirre, Mahr, Grewal, Ruyter, & Wetzels, 2015). Thus, consumers may have high privacy risk perceptions regarding mobile technologies applied in retailing, as they perceive their mobile devices as personal. It therefore follows that geo-targeting and mobile wallets enable retailers to enter this private environment of consumers (Shankar, Venkatesh, Hofacker, & Naik, 2010). As such, what are the privacy-related consequences on consumer behavior? When does the usage of mobile retail technologies go too far and for instance decrease trust in the retailer employing these technologies. What are the related spillover effects on consumers' post-purchase behavior, such as loyalty or referral intentions?

2.4.4 Advanced Technologies

2.4.4.1 Current Findings

Pre-purchase. Prior research highlights the function of storefront displays to create attention for a store and to influence consumers' entry decisions (Cornelius et al., 2010; Oh & Petrie, 2012; Sen et al., 2002). Extending these findings, Pantano

(2016) analyzes how the integration of advanced technologies such as interactive storefront displays engages consumers at the store entrance. From an exploratory, qualitative research approach, hedonic and functional aspects emerge as the most influencing factors for consumers considering interactive technologies at the storefront (Pantano, 2016). Specifically, integrating entertaining elements enable advanced technologies to grab consumers' attention and deliver hedonic value. Moreover, advanced technologies, which enable consumers to visualize store offers directly at the storefront, provide functional value. While for traditional storefront windows, emotional aspects are among the strongest impact factors to engage customers, for advanced technologies both emotional as well as functional factors are the most important factors in influencing consumers at the storefront (Pantano, 2016).

Purchase. Research on the implementation of advanced technologies at the sales floor is at a nascent stage, lacking empirical evidence on the technologies' behavioral effects. Some first conceptual research analyzed the introduction of advanced technologies to the retail sector. Pantano and Naccarato (2010) examine how the introduction of advanced technologies modifies the retailing context and consumers' shopping experience and perceptions of the retailing environment. The authors introduce different forms of advanced technologies (e.g. smart mirrors) and derive potential influences of these technologies on consumer behavior from a theoretical point of view. In particular, Pantano and Naccarato (2010) propose that the introduction of advanced technologies to the retailing context may modify store appearance in terms of style, layout and atmosphere which in turn might influence purchase behavior. Furthermore, advanced technologies might influence consumer behavior, for instance, in terms of the course of searching for, choosing, comparing and interacting with products (Pantano & Naccarato, 2010).

Post-purchase. Yet, only one recent empirical study by Poncin and Ben Mimoun (2014) examines how advanced technologies (i.e. magic mirrors with augmented reality, interactive game terminals) shape consumers' in-store experience and related post-purchase behavior. Results of a field study disclose positive effects of advanced technologies on store atmosphere perceptions, shopping experience and on positive affective reactions. The authors further show that advanced retail technologies offer benefits to retailers in terms of satisfaction, which positively links to downstream post-purchase behavioral consequences such as re-patronage and recommendation intentions.

2.4.4.2 Avenues for Future Research

Pre-purchase. Yet, as research in this area is limited to the findings of one empirical study conducted by Pantano (2016), a promising avenue for research is further investigating the potential impact advanced technologies may have on store entry decisions. Insights from extant research provide evidence that information overload and elicited feelings of psychological reactance lead consumers to avoid being exposed to and be influenced by marketing actions (e.g., Balasubramanian, Karrh, & Patwardhan, 2006; Darke & Ritchie, 2007; Edwards, Li, & Lee, 2002). Advanced technologies, such as interactive storefront windows, represent promising tools for retailers to overcome this attention dilemma, especially at the store entrance to attract consumers' attention (Pantano, 2016). Adding to preliminary, explorative research findings (Pantano, 2016), more empirical research is required to provide guidance on how to most effectively leverage the potential of advanced technologies to engage customers at the storefront. Future empirical research could investigate the features that make the integration of advanced technologies at the storefront most

effective and elicit positive affective reaction by consumers. For example, what is the most effective form of technology integration at the storefront? Which advanced retail technologies lead to highest consumer attention? Which features enable to elicit feelings of surprise as an important prerequisite in gaining consumers' attention (Hutter & Hoffmann, 2014)? Will this lead to increased intentions to enter a focal store?

Purchase. Academic inquiry of a predominately technical nature has yet dominated the research focus on advanced technologies. Hence, advanced technologies have been largely investigated in the areas of computer science and human-computer interaction (e.g. Carmigniani et al., 2011; Reitmayr & Drummond, 2006; van Krevelen & Poelman, 2010). This in turn leaves room for manifold research questions related to the impact advanced technologies exert on consumer behavior at the sales floor. In marketing literature, hitherto, only preliminary conceptual insights into the positive effects advanced technologies have on perceptions of store appearance and store atmospherics exist (Pantano & Naccarato, 2010). Consequently, empirical guidance is needed on how different technologies alter consumer perceptions. Thus far, the preliminary research findings are limited to particular technologies. However, given the broad scope (e.g., augmented reality, smart mirrors, facial recognition) and ongoing advancement of retail technologies, there is a strong need to determine if and how these diverse retail tools differently influence customers' perceptions of the retail environment and distinct facets of the shopping experience. Moreover, how may those experiences in turn influence in-store shopping behavior? How do distinct advanced technologies impact consumer behavior in terms of the course of searching for, choosing, comparing and interacting with products? Further, there is a need to better understand customer-related factors, which could moderate

these effects, e.g. customers' technology readiness (Parasuraman, 2000), which might certainly influence the use and quality of the experience with advanced technologies at the sales floor. Likewise, further potential moderating effects of other customer characteristics, such as demographics and psychographics (Shankar et al., 2011), require future research.

Another promising area for future research is the understanding of the potential consequences and boundaries of retail technology-enabled actions, which aim at providing customers a highly personalized shopping experience. For instance, with the help of audience measurement systems, personalized marketing content can be shown on in-store digital displays based on a demographic analysis of consumers (Buckley & Hunter, 2011). Even more advanced emerging technologies also enable retailers to analyze facial expressions and related emotions of consumers (McStay, 2015). Several potential research questions arise: Do different forms of data collection and personalization have different impact on consumers' experience and hence on their purchase behavior? Which form of data collection is seen most (un-)favorably in physical stores? When is personalized content more effective in influencing consumers' purchase behavior than "one size fits all"? What are the related consequences in terms of consumers' purchase behavior?

Furthermore, there is much yet to learn about the usage situation and contextual factors of advanced technologies. Some retailers like the Japanese beauty brand Shiseido apply advanced technologies such as smart mirrors, which allow consumers to virtually try on different make-up styles (Coleman, 2011). Other retailers embrace audience measurement systems to show personalized content (Buckley & Hunter, 2011). The usage of such technologies at the sales floor has in common that their outcome (e.g., result of the make-up style, personalized content) is visible to others

(e.g., other shoppers in a store, sales staff). Thus, social presence (Latané, 1981) and aspects related to impression management (Leary & Kowalski, 1990) may play a critical role in the usage situation of advanced technologies. As such, how does the usage of advanced technologies affect the social interactions among individuals at the sales floor? How do feelings of being observed or impression management concerns affect consumers' usage and purchase related behavioral outcomes of advanced technologies? Might new forms of privacy issues arise, (e.g., in terms of concerns of personal information being shown to others) and represent a boundary of retail technology-enabled personalization?

Future research is necessary to understand how retailers may use advanced technologies to effectively integrate social media to consumers' shopping experience within physical stores. Social media is on the rise and has become an important platform, which connects consumers and enables them to express and exchange opinions with each other, but also to engage with a company (Malthouse, Haenlein, Skiera, Wege, & Zhang, 2013). Some retailers experiment to integrate social media into the shopping experience within physical stores. Diesel for instance tests interactive monitors, which are placed in front of fitting rooms. Those enable customers to take pictures of themselves and post them on Facebook (Digitalbuzz, 2010). During their shopping experience, many consumers tend to have a strong desire for social interaction, such as consumer-consumer communications exchanging enquiries, concerns or feedback (Swaminathan, Lepkowska-White, & Rao, 1999). Subsequent research could examine what the role of social media integration will be within physical stores and how it influences consumer behavior. Is social media integration and the enabling of exchanging feedback an efficient tool for aiding consumers in their decision making? Are customers who instantly post their product

choices on social media within a physical store influenced in their item or brand choice?

Post-purchase. A promising area for future research is how advanced technologies applied at the exit level of a physical store might influence post-purchase behavior of consumers, as prior empirical findings in this area are rather limited. At the point-of-sale, advanced technologies are being tested for the purpose of transactions such as the payment via fingerprint identification (Clodfelter, 2010). Those payment systems can be used instead of credit or check card where consumers have to memorize their passwords and pin numbers (Kumar & Ryu, 2008). Payment via fingerprint identification promises benefits such as improved transaction speed (Clodfelter, 2010). How does this translate into impacting consumer experience and thus post-purchase behavior? What are possible contingency factors (e.g., privacy concerns or trust in the retailer) and how will those alter effects on consumer post-purchase behavior?

2.4.5 Integrated Perspective on Digital Signage, Self-Service Technologies, Mobile Technologies and Advanced Technologies

2.4.5.1 Current Findings

Presumably, retailers rarely only apply one specific technology, but embrace a mixture of retail technologies at the physical store. For instance, the luxury brand Rebecca Minkoff uses a mixture of digital signage, smart mirrors, but also advanced self-checkout systems in its flagship stores (Alvarez, 2016). Lemon and Verhoef (2016) highlight that customer experience is influenced by the totality of touchpoints throughout the shopping cycle, which supports the need for a holistic and integrated

perspective on distinct technologies' impact on consumer behavior. However, our literature review revealed that previous academic studies thus far place their focus on only one particular retail technology, therefore neglecting potential interaction effects among retail technologies and their joint impact on consumer behavior. Moreover, prior research lacks a comprehensive comparison of distinct forms of retail technologies in terms of effectiveness and their varying impact on consumer behavior.

2.4.5.2 Avenues for Future Research

Future research is necessary to provide guidance on how to determine an optimum blend of the application of distinct forms of retail technologies and to understand the contingencies that influence that optimum blend. For instance, if consumers feel overexposed to marketing attempts of persuasion, perceived information overload (e.g., Balasubramanian et al., 2006; Darke & Ritchie, 2007) and psychological reactance (e.g. Edwards et al., 2002) might limit the effectiveness of applying too many varying forms of retail technology. How can retailers balance their efforts to influence consumer behavior with a variety of retail technologies and consumers' potential feelings of information overload as well as psychological reactance? Besides potential negative effects, can the application of a multitude of retail technologies enhance positive effects on consumer behavior?

Another important area for further research is the potential varying effectiveness across retail technologies. Retail technologies have been shown to be capable of influencing decision processes, while also influencing consumers at distinct stages of the shopping cycle (see Table 1). However, future research is required to provide an integrative perspective and comparison of the distinct forms of retail technologies and their varying effects at different stages of the shopping cycle. Which

retail technology is most efficient at which stage of the shopping cycle? For instance, which technology is most effective in driving consumers' store entry decision? Which technological application is most effective in influencing purchase decisions? Are there varying effects across retail technologies in terms of the degree they affect post-purchase behavior?

2.5 Concluding Remarks

Although the implementation of retail technologies at physical stores has gained tremendous growth, the literature on retail technologies' behavioral impact remains fragmented and numerous gaps need to be addressed. In this article, we aim to organize and synthesize the evidence from the extant body of research in marketing that focuses on retail technology and its impact on consumer behavior at physical stores. In line with the conceptual advancements in marketing proposed by MacInnis (2011), we contribute to scholarly work on evolving retail technologies (e.g., Hui et al., 2013; Poncin & Ben Mimoun, 2014; Roggeveen et al., 2016), shopper marketing (e.g., Shankar et al., 2011) and customer experience (e.g., Lemon & Verhoef, 2016). First, we propose a framework adapted from Shankar et al. (2011) to organize, delineate, and summarize findings from existing literature, which is structured around four major retail technologies and their impact on distinct stages of consumers' shopping cycle. Second, we demonstrate the usefulness of the adapted shopping cycle based framework in identifying specific gaps in the literature relative to currently applied practices, but also emerging trends in the usage of retail technologies at physical stores. We follow the call by Shugan (2004) for research on emerging technologies rather than focusing merely on well-established topics. As such, we discuss research opportunities that pertain to these evolving trends and hence aim to

spur future research that not only builds on prior research topics or well-established industry practices, but focusing on new insights on emerging technologies which have the potential to heavily reshape existing retail practices. We believe the research agenda and proposed research efforts are essential for advancing knowledge on retail technologies' impact on consumer behavior, which is of increasing significance for retailing and marketing. Moreover, research-based answers to the questions proposed within our research agenda will significantly extend knowledge that can be used for developing effective strategies to implement retail technologies at physical stores. The results of our review give managers insights on what kind of retail technologies exist and how they affect consumer response along different shopping cycle stages. Appropriate leverage of retail technologies may significantly affect important downstream effects, including factors such as (future) spending, customer loyalty or referral. Moreover, our results promote managers' awareness of different contingency factors, which may alter consumer behavior and thus need to be taken into consideration when implementing retail technologies.

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3 Personalized Advertising in Public Environments - Perceptions and Consequences

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Personalized advertising is a major marketing trend. Using new facial recognition technologies, personalized advertising now expands into public areas, such as retail stores or shopping malls. Although the concept of personalized advertising has been widely discussed among marketing academics, existing research does not account for personalized advertising via digital displays in public environments. Grounded in theory on impression management and self-concept congruity, this research analyzes the perceptions and consequences of attribute-based personalized advertising in public environments, where other people are present and can see the personalized content. Two experiments show when and how social presence of others impacts consumers' attitudes and behavioral intentions, as well as emotions, when exposed to personalized advertising. Specifically, the results suggest that the presence of others does not influence consumer response per se, but it interacts with personalization. Further, the results show that consumers' negative response to personalized ads in the social presence of others is mediated by embarrassment and moderated by their congruity state (the extent to which the ad is consistent with the consumer's self-concept). These findings offer new theoretical insights into how consumers respond to personalized advertising in the social presence of others and provide managerial implications for the usage of new consumer tracking technology.

Keywords: *Personalized Advertising, Digital Displays, Self-Concept (In-)Congruity, Public Environment, Social Presence*

3.1 Introduction

Personalized advertising has emerged as a major marketing trend. A steady growth of the collection and usage of personalized information not only characterizes consumers' experiences when they are online and in private, but now increasingly expands into consumers' public life, such as when they are shopping at retail stores. Audience-measurement systems that are integrated in monitors and in-store digital displays enable retailers to conduct a demographic analysis of consumers and offer them personalized (advertising) content (Buckley & Hunter, 2011). Even more advanced facial recognition technologies allow for the analysis of consumers' emotional states (McStay, 2015). In general, the market for digital displays is growing considerably; the global market is predicted to be worth more than \$17 billion by 2017 (Intel, 2014) and facial recognition technologies represent a particular growth area in the retail segment (Transparency Market Research, 2015). Technology-enabled marketing actions like these are becoming increasingly common and the technological boundaries are continuously expanding. Even though there is an increasing and strong need in understanding how such new technologies change the ways customers interact with companies, brands, products, services, and other customers (Marketing Science Institute, 2016), marketing and retailing research still lacks insights into the effects of personalized advertising in public spaces. That is, prior research has examined personalized e-mail marketing, personalized online marketing, and personalized postal and phone marketing (e.g., Bleier & Eisenbeiss, 2015; Schumann, Wangenheim, & Groene, 2014; Speck & Elliott, 1997); importantly however, these types of communications are typically *not received in public*. Past findings may not necessarily generalize to personalized advertising that consumers receive *in public* (e.g., via digital in-store displays) due to, at least, two distinct aspects: First, personalized content

shown in public is visible to others (e.g., other shoppers in a store), in sharp contrast to traditional online advertisements, which typically only the targeted consumer can see. Second, consumers have no influence on the content that is shown to them on public digital screens; thus, they cannot control the impression they make on other shoppers as a consequence of the content shown to them. This aspect related to impression management should be particularly relevant for ads that address visible consumer attributes that are also closely related to a person's self-concept; for example, when a consumer—based on the software analyzing physical attributes such as age, gender, and body-mass-index—is presented with in-store advertising for fitness gear or weight loss programs. Subsequently, we will refer to this kind of advertisement as *attribute-based personalized advertisements*.

Grounded in theory on impression management and self-concept congruity, this research examines how consumers respond to such personalized advertising in public environments. Specifically, we address the following research questions: (1) Does social presence (i.e. the presence of other shoppers) differentially influence consumers' responses to personalized (vs. non-personalized) advertisements? (2) If yes, what is the underlying emotional mechanism driving this response?

Two experiments examine the above questions. In both experiments, we use attribute-based advertisements, which are directly linked to a consumer's physical appearance.¹ Study 1 investigates the interplay between social presence and personalization of the ad. The results demonstrate that when the ad is personalized, consumers exhibit *less favorable attitudes and behavioral intentions (e.g., purchase intentions) when others are present* than when consumers are alone; this effect is attenuated when the ad is *not* personalized.

¹ Notably, except for the actual brand name, our stimuli were adapted from advertisements of an actual retailer.

Study 2 further explores when and how social presence impacts consumers' responses to personalized advertising. The study finds that consumers' negative response to personalized ads in the presence of others is moderated by their ad-self-congruity state (i.e., the extent to which the ad is consistent with the consumer's self-concept). Moreover, we find that consumer embarrassment is the underlying mechanism, as it mediates the negative effect of social presence on consumer attitudes and behavioral intentions.

Our work expands marketing knowledge in four ways: First, this research adds to literature on personalized advertising, digital displays, shopper marketing as well as research on customer experience. Although prior research has extensively researched consumers' responses toward personalized advertising in different settings (e.g., Bleier & Eisenbeiss, 2015; Schumann et al., 2014; Speck & Elliott, 1997), the emerging trend toward personalization in public environments is under-researched. We show that consumers respond negatively to personalized ads in a store, especially when other shoppers are present; this is a new finding, expanding current marketing knowledge on how personalization alters effects of advertisements in public vs. private environments. While research in the area of digital displays mostly focuses on the potential benefits of this technology, it neglects possibly negative downstream effects (e.g., Dennis, Joško Brakus, Gupta, & Alamanos, 2014; Dennis, Michon, Brakus, Newman, & Alamanos, 2012; Roggeveen, Nordfält, & Grewal, 2016).

Our findings further add to research on shopper marketing (e.g., Shankar, Inman, Mantrala, Kelley, & Rizley, 2011) and customer experience (e.g., Lemon & Verhoef, 2016; Verhoef et al., 2009), which emphasizes a growing need to better understand how new in-store technologies and social environments influence the shopper at the point of sale. Against this background, we provide new insights into the role of social

presence, the role of ad personalization, and moderating effects of shopper characteristics in terms of self-concept and embarrassment.

Second, we expand research on congruity between self-concept and image appeals. Prior empirical research on self-concept congruity has not distinguished between different incongruity states (e.g., Hong & Zinkhan, 1995; Hosany & Martin, 2012; Kressmann et al., 2006; Sirgy et al., 1997). Our findings demonstrate the distinct relevance of two sub-types of incongruity (threatening ad-self-incongruity vs. bolstering ad-self-incongruity), showing that it is important to examine the *direction (i.e., valence) of ad-self-incongruity*.

Third, research on identity appeals in advertising highlights the benefits of identity marketing and idealized appeals in advertising (e.g., Bolton & Reed, 2004; Forehand, Deshpandé, & Reed, 2002; Reed, Forehand, Puntoni, & Warlop, 2012). Our work adds to this literature by documenting potential risks and limitations of identity appeals in advertising, especially in public settings. Finally, we add to research on consumer well-being in service settings (Anderson & Ostrom, 2015), by highlighting consumers' vulnerability when they are being publicly targeted with personalized content via new in-store technologies.

3.2 Theoretical Background and Hypotheses Development

3.2.1 Research on Personalized Advertising

Personalized advertising involves tailoring an advertisement to consumers' individual needs and preferences based on, for example, demographic data, users' past online browsing behavior, or their past purchases, or preference information (Baek & Morimoto, 2012; Evans, 2009; Schumann et al., 2014). Personalization efforts and the corresponding use of personal consumer data, are associated with both benefits and

drawbacks for consumers and businesses (Baek & Morimoto, 2012; Culnan & Armstrong, 1999). On the one hand, companies are able to increase the accuracy of the advertisement, thereby enhancing their relationship marketing (Culnan & Armstrong, 1999; Evans, 2009). Consumers may benefit from personalized offers as they are tailored to their specific needs, serve as a useful decision aid, and lead to a reduction in search costs, information overload, and transaction time (Baek & Morimoto, 2012; Hui, Teo, & Lee, 2007; Tam & Ho, 2006).

On the other hand, these benefits might be mitigated by consumers' privacy concerns (Culnan & Armstrong, 1999). Since advertisers use detailed personal information to create personalized ads, consumers do not always respond favorably, due to concerns about how their information is obtained and how it is used (Baek & Morimoto, 2012; Phelps, Nowak, & Ferrell, 2000; Son & Kim, 2008). Multiple studies have examined consumer responses with regard to personalized advertising, including specific privacy-protective responses and their underlying determinants (e.g., Lwin, Wirtz, & Williams, 2007; Sheehan & Hoy, 1999), the phenomenon of advertising avoidance (e.g., Cho & Cheon, 2004; Edwards, Li, & Lee, 2002) and the reasons why consumers are unwilling to disclose their personal information (e.g., Malhotra, Kim, & Agarwal, 2004; Mothersbaugh, Foxx, Beatty, & Wang, 2012). Notably, these studies focus on consumers' responses toward personalized advertising in private settings, where the focal advertisements are typically not visible to others, namely personalized e-mail marketing, personalized online marketing and personalized postal and phone marketing (e.g., Bleier & Eisenbeiss, 2015; Schumann et al., 2014; Speck & Elliott, 1997).

However, this stream of research offers little insights into how consumers respond to personalized advertising in public settings, such as retail stores or shopping

malls. To the best of our knowledge, no study has identified and addressed the specific contextual factors of personalized advertisements in public; therefore, it is unclear how consumers assess personalized ads in the presence of others and what consequences for consumers and retailers may emerge.

3.2.2 Hypotheses Development

The influence of other shopper's presence and impression management attempts. Consumers are highly sensitive to the presence of others and are influenced by others in the consumption process (e.g., McFerran, Dahl, Fitzsimons, & Morales, 2010; Ramanathan & McGill, 2007). According to social impact theory (Latané, 1981), people are impacted by the real, implied, or imagined presence of another person or group. As a result, this so called social presence can change an individual's feelings, motives, and behavior (Latané, 1981). The majority of research in the field of social influence has focused on the effects of *interactive social influence*, such as interactions with salespeople (e.g., Zhang, Li, Burke, & Leykin, 2014), or interactions with group members (e.g., friends or family members) during the consumption process (e.g., Kurt, Inman, & Argo, 2011).

However, consumers are also influenced by the mere presence of others (i.e., strangers), even if no direct interaction with them occurs, i.e. *non-interactive social influence* (e.g., Argo, Dahl, & Manchanda, 2005; Dahl, Manchanda, & Argo, 2001; Hui, Bradlow, & Fader, 2009). The mere presence of others affects consumers' emotions and self-presentation behaviors depending on size and proximity of the social presence (Argo et al., 2005). In line with these findings, research in psychology demonstrates that mere social presence can affect a person's cognition (e.g., Huguet, Galvaing, Monteil, & Dumas, 1999; Levine, Resnick, & Higgins, 1993), increase the

awareness of oneself as a social object (Buss, 1980) and consequently activate impression management goals (Puntoni, Hooge, & Verbeke, 2015). Individuals try to leave the best possible impression when in public and they therefore attempt to control the way they are perceived by others; this leads to engagement in impression management techniques to influence others' views (e.g., Latané, 1981; Leary & Kowalski, 1990). While assessing advertisements, consumers consider the impressions they make on others, and the focal ads may serve as a type of self-presentation tool if they address certain identity appeals (Puntoni et al., 2015; Thomas, Trump, & Price, 2015).

Building on the above, we expect the following effects of personalized advertisements: when consumers are exposed to personalized content in the social presence of other shoppers, and others are aware that the content is targeted (i.e., customized) to a certain individual, this will elicit negative effects on the targeted consumers' response, due to their impression management concerns. This effect should emerge because customers cannot control the content on a digital screen in public and therefore are limited in terms of their impression management. Hence, they cannot control the impressions others might form based on the content being shown. We do not expect the effect of social presence for non-personalized advertisements, because then the content is not related to a specific person and impression management concerns should not emerge. The effect of social presence on response toward personalized advertising should be particularly relevant for advertisements that are directly linked to their physical appearance; that is, ads that refer to physical aspects that are visible to others and that address attributes that are highly relevant to the consumer and personal in nature. Personalized advertisements via facial recognition technology shown on digital screens are able to address such identity appeals as they

are based on measuring demographic data and certain body metrics. Finally, people make attributions for causes of situations they observe (Kelley & Michela, 1980; Weiner, 1985). Because the retail store is using the (facial recognition) technology, we expect that targeted consumers will attribute their experience to the store. Hence, we expect that experiencing personalized advertising will affect customers' attitudes and their behavioral intentions *toward the store*. In contrast, impression concerns will be mitigated if the content is not personalized; therefore, the effect of social presence on customers' favorability will be diminished for non-personalized content. We hypothesize:

H1: Social presence will interact with personalization and influence a) attitude toward the store and b) behavioral intentions toward the store, such that under personalization consumers will be less favorable toward the store with social presence, but the effect will be attenuated when the ad is not personalized.

The moderating role of threatening and bolstering ad-self-congruity. The impressions individuals try to construct in public depend on their self-concept (Latané, 1981; Leary & Kowalski, 1990). Self-concept refers to the "totality of the individual's thoughts and feelings, having reference to himself as an object" (Rosenberg, 1979). Self-concept congruity is defined by the match between a consumer's self-concept and the user image of the target consumers of a particular product, brand, or store (Kressmann et al., 2006). Prior research examined the effects of self-concept congruity on different facets of consumer behavior (e.g., product use, brand attitude, purchase intention, brand choice, store loyalty; Hosany & Martin, 2012; Kressmann et al., 2006; Sirgy et al., 1997; Sirgy & Samli, 1985). Consumer self-concept can also influence

advertising effectiveness, whereby advertisements that are congruent (vs. incongruent) with a target's self-concept are more effective in influencing consumers (Hong & Zinkhan, 1995). Contrary to those findings, Thomas et al. (2015) found that identity-congruent advertising appeals can also trigger negative consumer responses toward an advertisement, if the advertisement is portraying information about consumers they would rather others not see.

The extant research on self-concept congruity not only offers rich insights into consumer behavior, but it also accounts for distinct types of self-concepts, such as the effects of actual or ideal self-concept (e.g., Hosany & Martin, 2012; Kressmann et al., 2006). Importantly however, none of this prior research has looked beyond mere congruity-versus-incongruity effects; that is, the *valence of the incongruity* has been widely overlooked in prior work.

Therefore, we propose a more nuanced account for advertising-self-concept (in-) congruity, which goes beyond prior findings on self-concept mis-/matching image appeals (e.g., Hong & Zinkhan, 1995; Hosany & Martin, 2012; Kressmann et al., 2006). Specifically, we propose the following conceptualization of three ad-self-congruity states (derived from Sirgy, 1982): (1) *congruity* refers to a match between a perceived advertising-image and the consumer's self-image; (2) we refer to *threatening ad-self-incongruity* as the comparison between a positive advertising-image perception and a relatively more negative self-image; and (3) *bolstering ad-self-incongruity* refers to the comparison between a negative advertising-image perception and a relatively more positive self-image. For example, if a model wearing sports apparel depicted in an advertisement is perceived by a consumer as being more athletic than herself, this is threatening ad-self-incongruity. Vice versa, if the consumer

perceives herself as being more athletic than the model depicted in the advertisement, this is bolstering ad-self-incongruity.

We theorize that, when consumers are exposed to personalized content, the valence of incongruity (threatening ad-self-incongruity vs. bolstering ad-self-incongruity) will alter their responses, especially as a function of social presence. (Negative) Self-discrepancies arouse negative affect and may threaten self-esteem (Higgins, 1987). Specifically, if targeted individuals compare negatively to the image of an advertising appeal (i.e. the advertising image is perceived to be better in certain important domains and therefore ‘outperforms’ the targeted consumer), this upward comparison can be highly threatening (Argo, White, & Dahl, 2006) (i.e., threatening ad-self-incongruity).

Accordingly, we expect that, with social presence, threatening ad-self-incongruity will undermine the targeted consumer’s public impression and thus trigger negative reactions. Because individuals make attributions for the causes of certain situations (Weiner, 1985), we expect that consumers report a less favorable attitude and less favorable behavioral intentions *toward the store that employs the advertising technology*. This negative effect of the presence of others should be mitigated when the image of the advertising appeal is congruent with or when it supports the consumer’s self-concept (bolstering ad-self-incongruity).

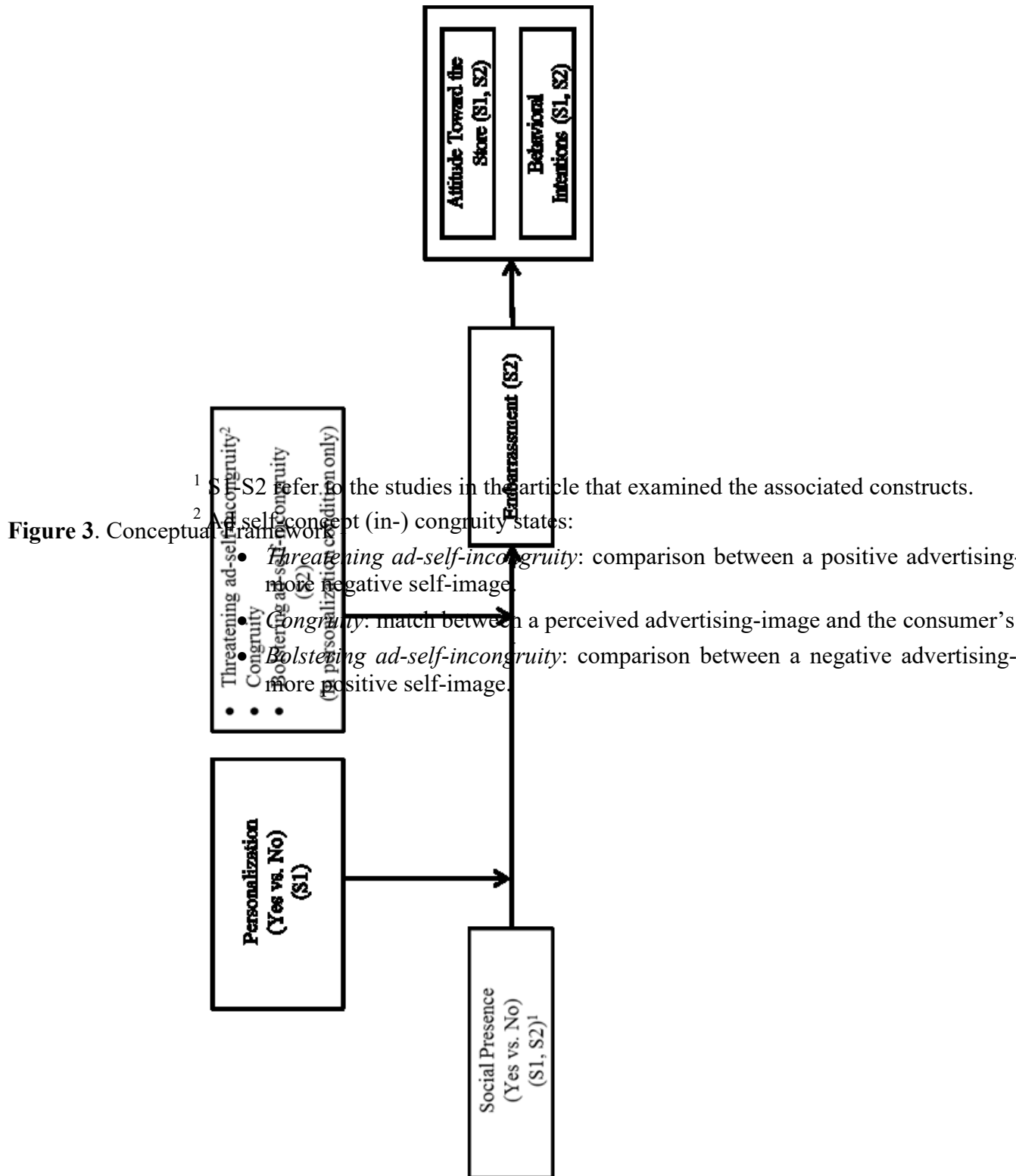
Consistent with theory on impression management, we expect *embarrassment* to be the underlying mechanism driving the above negative effect. Social presence theory postulates that the mere presence of others can elicit embarrassment for shoppers, for example, when buying an embarrassing product (Dahl et al., 2001). Furthermore, being targeted by an advertisement that speaks to the social identity of a

particular individual in front of an audience can evoke embarrassment (Puntoni et al., 2015). We therefore hypothesize:

H2: Social presence interacts with the valence of ad-self-concept in-/congruity and influences a) attitude toward the store, b) behavioral intentions and c) level of embarrassment such that under threatening ad-self-incongruity presence of others negatively influences attitudes, behavioral intentions and emotional reactions, but not under bolstering ad-self-incongruity nor under congruity.

H3: There is moderated mediation such that (a) the effect of social presence on attitude and behavioral intentions is moderated by the valence of the ad-self-concept congruity, and (b) this is mediated by embarrassment.

Two studies examine the proposed effects on when and how social presence affects consumers' attitudes and behavioral intentions when they encounter personalized ad content. Study 1 investigates the interplay between personalization and social presence (hypothesis 1). Study 2 further explores the indirect effect of social presence of others on consumers' attitudes as well as behavioral intentions, the moderating influence of ad-self-concept congruity state (hypothesis 2) and the mediating role of embarrassment (hypothesis 3). Figure 3 shows the conceptual framework of this research.



3.3 Study 1

Study 1 tests hypotheses H1a and H1b, which predict that social presence will interact with personalization and influence attitude and behavioral intentions toward the store. We hypothesize that under personalization consumers will have a less favorable attitude when others are present, but the effect will be attenuated when the ad is not personalized.

3.3.1 Methodology

Design, participants and procedure. Study 1 employed a 2 (social presence: no/yes) \times 2 (personalized advertisement: no/yes) between subjects experimental design. One hundred seventy-six undergraduates (84 females) participated for credit. We conducted the study in a computer lab. Each computer station was provided with partition walls to ensure anonymity of participants' answers.

The study involved two parts. In the first part, we manipulated the personalization of the advertisement. To do that, we asked all participants to enter their age, gender, and body measurements in an online survey. Participants in the personalization condition were then told we would use these metrics to provide them with a personalized advertisement later in the study. Participants in the non-personalization condition were not provided with this information.

In the second part of the study, we manipulated social presence, i.e. whether or not other shoppers were present. Participants read a scenario about shopping in a store (either with other shoppers or alone) that uses new consumer tracking technology. Participants were then shown a picture that featured a focal ad on a large television monitor prominently displayed in the store; the ad was either personalized to the participants' personal physical metrics (age, gender and body metrics) or not. We

manipulated social presence both in the scenario language and in the visual depiction of the scene (see Appendix A). As a visual stimulus, we used cartoon drawings (produced with a professional software) that allow a depiction of the store and other shoppers without any recognizable details, such as clothing style or appearance of other shoppers, which could evoke compatibility bias (Uhrich & Tombs, 2014). Participants were told that they find themselves in front of the TV screen; in the “social presence” condition, they were told that other people are also present, and in the “no social presence” condition, they were told that they are alone with no other customers around them. No further information on other shoppers was provided (e.g., age, gender, and appearance) to reduce compatibility bias. We held all information constant except the manipulation of social presence in the retail store and the manipulation of personalization.

The ad that we used in our stimuli as featured on the monitor depicted exercise clothing; we adapted this ad from an actual department store’s clothing advertisement (see Appendix A). We used a clothing advertisement because the advertisement addresses aspects of a person’s physical appearance that can be seen by others. Furthermore, the advertisement did not show any brand names, which eliminated any brand-related bias. By excluding any brand names in the advertisement, any consumer attribution of responsibility for showing the advertisement would likely be directed toward the store, not toward any brand. Participants in the personalization condition were told that *this is their personalized advertisement, based on their recorded metrics they had provided in the first phase of the survey*. Despite this statement, all female participants were in fact shown the same advertisement and, all male participants were shown the same advertisement. Finally, participants indicated their attitude and behavioral intentions toward the store; they were then debriefed and thanked.

Measures. Attitude toward the store ($\alpha = .97$) was measured with three bi-polar items on a seven-point scale (bad/good, unfavorable/favorable, negative/positive; Spangenberg, Crowley, & Henderson, 1996). To measure behavioral intentions ($\alpha = .91$) we used a three-item scale adapted from Kaltcheva and Weitz (2006). Items included “I would enjoy shopping in this store”, “I would be willing to buy things at this store”, “I would be willing to recommend this store to my friends”. See Appendix C for measurement items of all studies.

3.3.2 Pretest

We conducted a pretest to test our manipulations. Participants ($N = 81$, $M_{\text{age}} = 34.26$) were randomly assigned to one of the four conditions, and saw the stimuli from the main study corresponding to their assigned condition. After viewing the stimuli, they indicated the extent to which the advertisement seemed personalized to them. Perceived personalization ($\alpha = .96$) was measured using six items adapted from prior research (Baek & Morimoto, 2012; Srinivasan, Anderson, & Ponnnavolu, 2002). Participants also indicated the extent to which they would feel a social presence in this situation. To measure perceived social presence ($\alpha = .97$), we adapted a six-item scale from Argo et al. (2005) and Grewal, Baker, Levy, and Voss (2003).

A personalization \times social presence ANOVA on the personalization index revealed a significant main effect of personalization ($M_{\text{Personalized}} = 4.43$ vs. $M_{\text{NotPersonalized}} = 2.83$, $F(1, 80) = 19.71$, $p < .001$); the social presence main effect and the interaction were non-significant ($ps > .17$). A personalization \times social presence ANOVA on the social presence index revealed a significant main effect of social presence ($M_{\text{SocialPresence}} = 6.22$ vs. $M_{\text{Alone}} = 1.58$, $F(1, 80) = 649.69$, $p < .001$); the

personalization main effect and the interaction were non-significant ($ps > .27$). Thus, our manipulations performed as intended.

3.3.3 Results and Discussion

Results. ANCOVA was conducted as a function of other customers, personalization, and their higher order interactions. Gender was included as a covariate in the models, but did not have any significant effects in this study.

Attitude toward the store. An ANCOVA on attitude toward the store revealed the predicted other customers \times personalization interaction ($F(1, 175) = 4.54, p = .03$). The analysis revealed a main effect of personalization ($F(1,175) = 16.64, p = .001$); the social presence main effect was non-significant ($F(1,175) = 1.97, p = .16$).

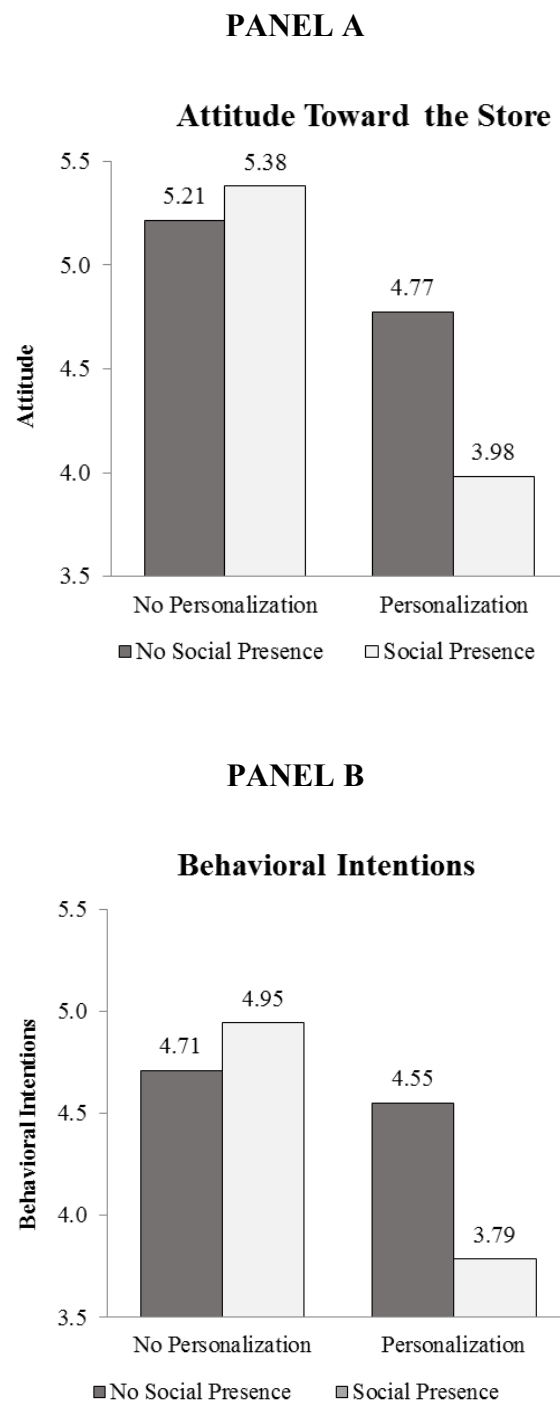
We conducted contrasts to explain the significant two-way interaction. Under personalization, consumers are less favorable toward the store with social presence ($M_{\text{SocialPresence}} = 3.98$ vs. $M_{\text{NoSocialPresence}} = 4.77$; $F(1, 175) = 6.12, p = .01$, see Figure 4A); this effect is attenuated when the ad is *not personalized* ($M_{\text{SocialPresence}} = 5.38$ vs. $M_{\text{NoSocialPresence}} = 5.21$; $F < 1$). These findings support hypothesis H1a.

Behavioral intentions. An ANCOVA on behavioral intentions revealed similar results. We found the predicted other customers \times personalization interaction effect ($F(1, 175) = 6.12, p = .01$). There was also a significant main effect of personalization ($F(1, 175) = 10.69, p = .001$), whereas the main effect of social presence was non-significant ($F(1,175) = 1.75, p = .19$).

Supporting hypothesis H1b contrasts revealed that under personalization, consumers report less favorable behavioral intentions toward the store when others are present ($M_{\text{SocialPresence}} = 3.79$ vs. $M_{\text{NoSocialPresence}} = 4.55$; $F(1, 175) = 7.15, p = .008$, see

Figure 4B); this effect is attenuated when the ad is not personalized ($M_{\text{SocialPresence}} = 4.95$ vs. $M_{\text{NoSocialPresence}} = 4.71$; $F < 1$).

Figure 4. Study 1- The Interaction Effect of Social Presence and Personalization on Attitudes and Behavioral Intentions



Discussion. In support of H1a and H1b, study 1 uncovers the important effect of social presence on attitudes and behavioral intentions toward a retail store when consumers face personalized ad content. Notably, our findings reveal that the effect of social presence is attenuated when advertising was not personalized. Next, we will further examine when and how the presence of others affects consumers' response toward personalized advertising.

3.4 Study 2

Thus far, we find that social presence influences consumer responses when they encounter personalized advertising. The present study builds on this finding and, hence, focuses exclusively on situations in which consumers are presented with personalized ads. The objective of study 2 is two-fold: First, examining boundary conditions, it tests the moderating role of congruity between the ad and the customer's self-concept (hereafter, ad-self-congruity) on attitudes and behavioral intentions. Second, investigating the underlying psychological mechanism, it tests the mediating role of embarrassment.

3.4.1 Methodology

Design, participants and procedure. Two hundred ninety-one undergraduate students (173 females) participated for partial credit. The study employed a 2 (social presence: no / yes) \times (measured: ad-self-congruity) design. Social presence was a between subjects factor, and ad-self-in/congruity was a continuous measured factor (as explained below). Study 2 involved two parts. In the first part, we asked all participants to indicate their demographic data as well as their body measures in an online survey.

Contrary to study 1, this time we informed *all* participants that we would use these metrics to provide them with a personalized advertisement later in the study.

The second part of study 2 mirrored the procedure of study 1, and manipulated whether or not other shoppers were present. We again used a shopping scenario in a store (either with other shoppers or alone). We explained to participants that the store uses new consumer tracking technology and told them that they would see an ad on a monitor in the store, which was personalized to consumers' personal physical metrics. As before, we manipulated social presence both in the scenario language (see Appendix B) and the visual depiction of the scene, using the same visual and ad as in study 1. All information was held constant, except the manipulation of social presence. All participants were told that this would be their personalized advertisement based on the metrics they provided at the beginning of the study (all female participants saw the same ad, all male participants saw the same ad).

At the end of the study, participants were asked to indicate their attitude and behavioral intentions toward the store, using the same items as in study 1. Additionally, we asked participants to indicate their emotional state (in terms of embarrassment) and to evaluate the image of the person depicted in the advertisement as well as their self-image rating.

Measures. To assess *ad-self-in/congruity*, we used difference scores between each personality image rating of a person depicted in the advertisement for exercise clothing and its corresponding self-image ratings. The image ratings used five bi-polar, seven-point scales using items including active, health oriented, style oriented, young, and athletic. We then averaged the respective item-level differences across all image ratings for each respondent (Sirgy, 1982, as we will illustrate in an example below).

Following the approach proposed by (Sirgy, 1982), we used simple differences (rather than absolute differences), for the purpose of being able to identify the direction of ad-self-incongruity (threatening ad-self incongruity vs. bolstering ad-self-incongruity). With this method, we derived an ad-self-in/congruity index ($\alpha = .79$) with values of -6 to $+6$. Negative values represented a more favorable self-image (bolstering ad-self-incongruity), whereas positive values represented a more favorable ad-image (threatening ad-self-incongruity) and values around zero represented congruity. For example, if a consumer rated the person portrayed in the ad on the item “active” as a “4” and then rated themselves on the item “active” as a 7, then the ad-self incongruity score for the item “active” would be -3 (i.e. bolstering ad-self-incongruity). After this an item-level score was calculated for each item, these scores were averaged to create the ad-self-in/congruity score. Equation (1) specifies the computation, as follows:

$$D_k = \sum_{i=1}^n (P_{ik} - S_{ik}) \quad (1)$$

D_k Self-congruity score

n Number of image attributes ($n = 5$)

I Image rating i ($i = 1 \dots n$)

P_{ik} Image rating of the person depicted in the advertisement
along image attribute i for respondent k

S_{ik} Self-image rating along personality attribute i for
respondent k

Dependent variables. We measured embarrassment with a four item scale adapted from Blair and Roesse (2013) ($\alpha = .92$), and used the same measures for attitude and behavioral intentions toward the store as in study 1. See Appendix C for all measurement items.

3.4.2 Results and Discussion

We conducted ANOVAs as a function of other customers, ad-self-in/congruity, and their higher order interactions. Gender was included as a covariate in the models. The covariate is discussed only when it was significant.

Attitude toward the store. An ANCOVA on attitude toward the store revealed an other customers \times congruity state interaction ($F(1, 290) = 4.59, p = .03$); the main effects were non-significant ($ps > .27$). To understand the nature of the significant two-way interaction, we conducted spotlight analyses at ± 1 standard deviation (SD) from the mean of ad-self-congruity (Aiken, West, & Reno, 2010). Spotlight analyses reveal that under *threatening ad-self-incongruity (+1 SD)*, attitude levels were lower with social presence (vs. no social presence) ($M_{\text{SocialPresence}} = 4.65$ vs. $M_{\text{NoSocialPresence}} = 5.28$; $B = -.63, t = -2.33, p = .02$, see Figure 5A). Under *congruity* ($M_{\text{SocialPresence}} = 4.73$ vs. $M_{\text{NoSocialPresence}} = 4.97$; $B = -.24, t = -1.28, p = .20$) and under *bolstering ad-self-incongruity (-1 SD)* ($M_{\text{SocialPresence}} = 4.81$ vs. $M_{\text{NoSocialPresence}} = 4.66$; $B = .16, t = .57, p = .57$), the effect was attenuated. These findings support hypothesis H2a.

Behavioral intentions toward the store. An ANCOVA on behavioral intentions toward the store revealed an other customers \times congruity state interaction ($F(1, 290) = 6.16, p = .01$); the main effects were non-significant ($ps > .41$). Spotlight analyses showed that under *threatening ad-self-incongruity (+1 SD)*, behavioral

intentions were less favorable with social presence (vs. no social presence) ($M_{\text{SocialPresence}} = 4.34$ vs. $M_{\text{NoSocialPresence}} = 4.98$; $B = -.64$, $t = -2.80$, $p = .005$, see Figure 5B). Under *congruity* ($M_{\text{SocialPresence}} = 4.58$ vs. $M_{\text{NoSocialPresence}} = 4.75$; $B = -.17$, $t = -1.09$, $p = .27$) and under *bolstering ad-self-incongruity* (-1 SD) ($M_{\text{SocialPresence}} = 4.82$ vs. $M_{\text{NoSocialPresence}} = 4.52$; $B = .30$, $t = 1.27$, $p = .21$), the effect was attenuated. These results support hypothesis H2b.

Embarrassment. An ANCOVA on embarrassment revealed an other customers \times congruity state interaction ($F(1, 290) = 11.33$, $p = .001$); the main effects were non-significant ($ps > .37$). Gender was a significant covariate in the model ($F(1, 290) = 11.73$, $p = .001$).

Supporting hypothesis H2c, spotlight analyses showed that under *threatening ad-self-incongruity* ($+1$ SD), embarrassment levels were higher with social presence (vs. no social presence) ($M_{\text{SocialPresence}} = 3.54$ vs. $M_{\text{NoSocialPresence}} = 2.62$; $B = .92$, $t = 3.06$, $p = .002$, see Figure 5C). Under *congruity* ($M_{\text{SocialPresence}} = 3.15$ vs. $M_{\text{NoSocialPresence}} = 2.86$; $B = .29$, $t = 1.53$, $p = .13$) and under *bolstering ad-self-incongruity* (-1 SD) ($M_{\text{SocialPresence}} = 2.76$ vs. $M_{\text{NoSocialPresence}} = 3.10$; $B = -.34$, $t = -1.25$, $p = .21$), the effect was attenuated.

Mediation analysis. A test of moderated mediation using the PROCESS macro (Hayes, 2013; model 8) with 5,000 bootstrapped samples examined whether feelings of embarrassment mediated the effects of the social presence \times ad-self-congruity interaction on attitude toward the store. The independent variable was social presence, the moderator was ad-self-congruity, and the dependent variable was attitude toward the store. Gender was included as a covariate in the model. Under *threatening ad-self-incongruity*, the bootstrapping analysis revealed that embarrassment mediated a negative indirect effect of social presence on attitude toward the store ($\beta = -.46$; 95% CI: $[-.81, -.17]$). The mediation pattern did not appear for *congruity* ($\beta = -.14$; 95% CI:

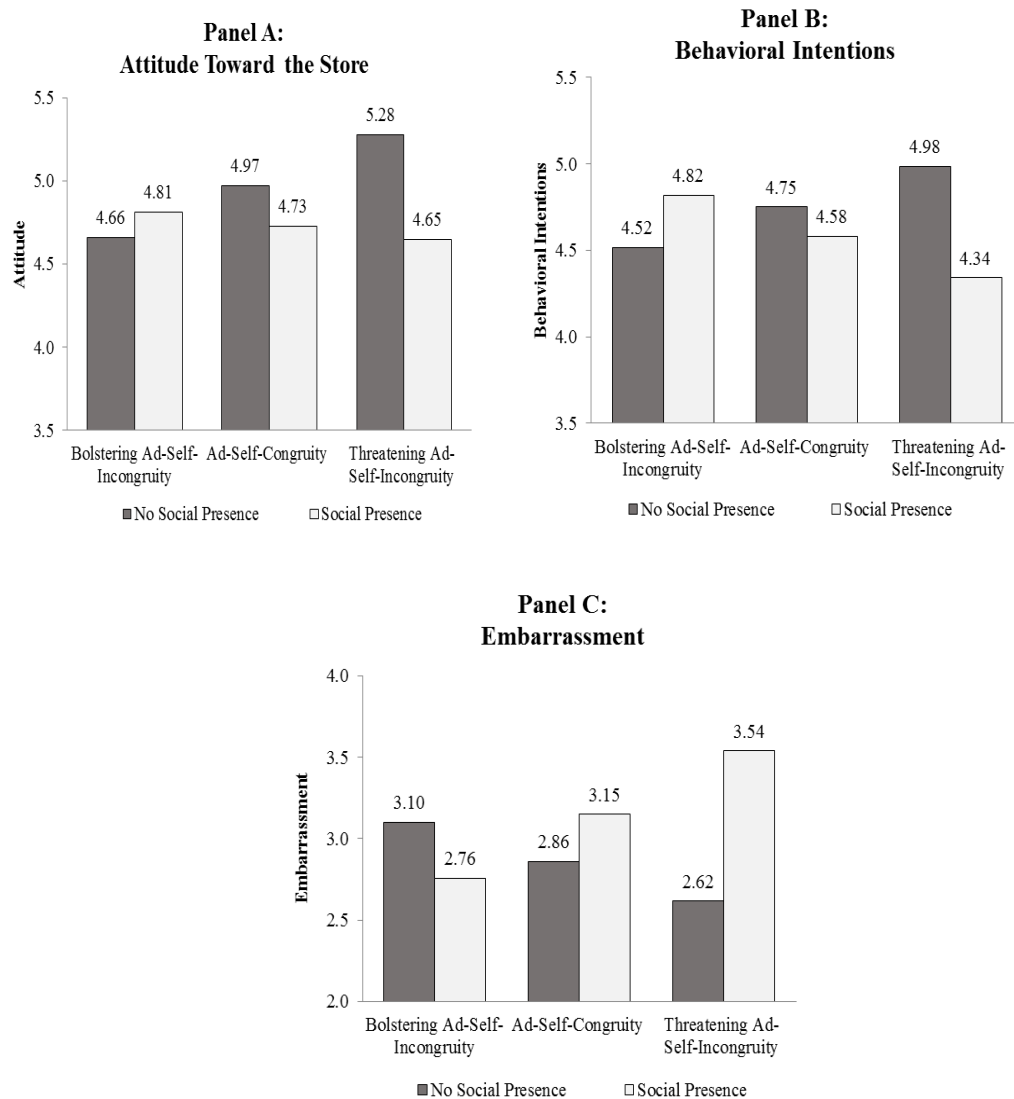
[-.36, .03]) or for *bolstering ad-self-incongruity* ($\beta = .17$; 95% *CI*: [-.09, .44]). The findings of the mediation analysis support hypothesis H3a.

Next, we conducted the same moderated mediation model, but used behavioral intentions toward the store as the dependent variable. The bootstrapping analysis showed that embarrassment mediated the effects of the interaction between social presence and ad-self-congruity on behavioral intentions. The negative indirect effect on behavioral intentions excluded zero for embarrassment under *threatening ad-self-incongruity* ($\beta = -.41$; 95 % *CI*: [-.72, -.16]). The mediation pattern was not evident for *congruity* ($\beta = -.13$; 95% *CI*: [-.31, .03]) or for *bolstering ad-self-incongruity* ($\beta = .15$; 95% *CI*: [-.08, .40]). The findings of this second mediation analysis support the prediction of hypothesis H3b.

Discussion. Study 2 provides several key findings. First, study 2 revealed that there is a difference in the impact of presence of others on shoppers across varying ad-self-congruity states. Presence of others had an impact on consumers' attitudes and behavioral intentions if the advertising image is perceived as better in certain domains (threatening ad-self-incongruity), but not if congruity or bolstering ad-self-incongruity was prevalent. These findings support H2 and provide evidence for the need of a more nuanced account for the effects of ad-self-in/congruity and further offer insights into *when* social presence matters.

Second, study 2 shows *how* social presence influences consumers; namely, embarrassment is the underlying emotional mechanism that drives the effects on consumer attitudes and behavioral intentions (H3).

Figure 5. The Interaction Effect of Social Presence and Ad-Self-In/Congruity on Attitudes, Behavioral Intentions and Emotions



3.5 General Discussion

3.5.1 Theoretical Contributions and Implications

Although digital displays gain increasing importance in retailing, research on this new in-store technology and its downstream effects is scant (Dennis et al., 2012; Dennis et al., 2014; Roggeveen et al., 2016). Prior research has focused on the potential benefits of digital displays in retailing, like enhanced store atmosphere or positive

effects on shopping behavior. In contrast, we find novel and potentially negative downstream effects (i.e., less favorable attitude and behavioral intentions toward the store), which expand marketing knowledge on how personalized ads alter the consumer experience. Our results provide insights for research on evolving in-store technologies (e.g., Dennis et al., 2014; Roggeveen et al., 2016), shopper marketing (e.g., Shankar et al., 2011), and customer experience (e.g., Verhoef et al., 2009).

Social presence and personalized advertising research. Although research in marketing has examined dis-/advantages of personalized advertising (e.g., Bleier & Eisenbeiss, 2015; Schumann et al., 2014), the effects of personalized content *in public environments* remain under-researched. This is ironic, because marketing scholars in the field of customer experience and shopper marketing (e.g., Lemon & Verhoef, 2016; Shankar et al., 2011; Verhoef et al., 2009) have pointed to a need to examine how marketing activities influence shoppers along their consumption journey. For example, Shankar et al. (2011) call for more research on how new in-store technologies can be used to better influence shoppers at the point of sale. By studying the interactive effects of technology, social presence, and consumers' self-concept, we answer this call. We reveal that personalization, especially with social presence, can lead to unintended unfavorable consumer responses (i.e., decreased attitude and behavioral intentions toward a store); customer-perceived embarrassment drives this effect of social presence on consumer responses toward personalized advertising.

A novel view of self-concept congruity. By adopting a more nuanced perspective on different states of advertising-self-congruity (threatening/bolstering) and their distinct effects, we expand prior research on the congruity between self-concept and image appeals. While earlier empirical work on self-concept congruity

(e.g., Hosany & Martin, 2012; Kressmann et al., 2006; Sirgy et al., 1997) did not differentiate between distinct incongruities, we demonstrate the importance of the valence of ad-self-incongruity: *threatening ad-self-incongruity* has important negative downstream effects; in contrast, *bolstering ad-self-incongruity* does *not* trigger those downside effects. Thus, studying advertising incongruity without taking its valence into account might limit an accurate assessment of how consumers respond to image appeals that are mis-matched with their self-concept.

Idealized identity appeals in advertising. Prior research has documented the effectiveness of identity marketing and idealized appeals in advertising (e.g., Bolton & Reed, 2004; Reed et al., 2012). However, more recent research shows possible undermining effects of identity marketing strategies (e.g., Bhattacharjee, Berger, & Menon, 2014; Puntoni et al., 2015) and identity-congruent advertising appeals (Thomas et al., 2015). Contributing to these recent findings, our results unearth two additional risks of identity appeals in marketing: First, advertising appeals that ‘outperform’ the focal consumers (i.e., threatening ad-self-incongruity) elicit feelings of embarrassment with social presence. Second, idealized appeals in advertising might not only hurt the attitude toward the focal ad (Thomas et al., 2015), but—as our findings document—can also have negative downstream effects for retailers (i.e., less favorable attitude and behavioral intentions toward the store).

Effects of new in-store technologies on consumer well-being. We find that data collection and usage of personalized information in public retail environments via in-store technologies can be threatening to consumers and make them feel embarrassed in the presence of others. Feelings of embarrassment undermine consumer well-being. Focusing on consumer well-being in the marketplace (Anderson & Ostrom, 2015), the emerging field of transformative consumer research has examined various aspects of

well-being, for example food consumption (e.g., Scott, Nowlis, Mandel, & Morales, 2008), environmental issues (e.g., Goldstein, Cialdini, & Griskevicius, 2008), and discrimination (e.g., Bone, Christensen, & Williams, 2014). However, there is little work on potential positive and negative effects that monitoring-technology and personalized ads may have on consumer well-being. Emerging technologies (e.g., facial recognition and tracking technologies in retailing) point to a continued need for research on the relationship between technology and consumer well-being in retailing.

3.5.2 Managerial Implications

In-store communication and advertising is fundamental to an effective retailer-customer experience at the point of sale (Ailawadi, Beauchamp, Donthu, Gauri, & Shankar, 2009). Due to the growing importance and usage of facial recognition technologies as in-store communication and advertising tools in retailing (Transparency Market Research, 2015), our findings identify important managerial challenges and offer implications for retailers in managing the new in-store technologies.

Retail managers need to be aware that personalization in public context is different from personalization in a private setting, such as online marketing. Managers thus cannot transfer their experiences with the effectiveness of personalization online to an offline context. Our findings show that the effectiveness of attribute-based personalized advertising is considerably lower when consumers see it in the social presence of others. Managers therefore need to make a critical cost-benefit analysis of public personalized advertising. Given that installing such a technique is costly, retail managers need to carefully test, whether this investment actually pays off in terms of increase in sales. In doing so, they should test this technology with different forms of

personalization techniques. In our study, we show negative effects of attribute-based personalized advertising. Other personalization techniques, such as targeting people's emotional states, might even increase such negative effects.

Managers should also test the effectiveness of personalization for different product types. In this research, we focus on products that are closely related to a person's self-concept. Our findings furthermore show that the negative effects of public personalization for consumers' self-concept are even amplified if consumers perceive the image of the person depicted in an advertisement is more favorable than the consumers' self-image. When using public personalization, retailers should hence better avoid advertisements that are closely related to a person's self-concept.

A further and more conservative approach to avoid potential negative effects of personalized in-store advertising is to carefully assess where to place new in-store technologies. By placing the new in-store technologies in areas which are less or not visible to other customers such as dressing rooms, retailers can avoid or at least mitigate the negative effects of social presence of other shoppers. The usage of small displays (e.g., tablets) might be another possible strategy for creating more privacy when targeting consumers with personalized content at the point of sale.

3.5.3 Limitations and Further Research

Our work is subject to limitations that provide several avenues for further research. First, we are focusing on the general effect of social presence and did not differentiate between different audience compositions. For instance, different types of others (e.g., strangers vs. friends) or the number of other customers present may alter the effects. We speculate that facing personalized advertising in front of more (vs. less)

relevant others and in front of a large (vs. a small) number of others might further intensify our effects.

Second, we focused on personalized ads based on demographics and body measures. Further research could examine which form of data collection is seen most (un-)favorably in public. For example, emerging technologies can analyze facial expressions and related emotions of consumers. Does this form of data collection for personalized ads alter our effects? For example, collecting data on emotions might be perceived as more personal and intrusive than the collection of body metrics, because then the psychological condition of a targeted individual is put into public view. More research is needed on these and other emerging data collection methods for personalized public advertisements, to better understand possible risks and negative consequences for consumers and firms. For instance, are there different privacy concerns prevalent for data collection in private and public environments and might new forms of privacy issues arise, e.g., in terms of concerns of personal information being shown to others?

Third, our model focused on the mediating role of embarrassment. Subsequent research could examine whether other forms of emotional responses might be triggered when the customer feels that personalized adverts (do not) match their self-perception (e.g., vanity, or potentially positive emotional reactions such as pride related to bolstering ad-self-incongruity).

Fourth, related to the prior point, marketing scholars should examine how personalized advertisements affect observing / by-standing consumers. For example, prior research investigated how observers react when they see others being flattered (e.g., by a salesperson) in a retail context (Chan & Sengupta 2013). Future research

could examine observer reactions to personalized advertising induced embarrassment (e.g., might Schadenfreude be relevant?).

Fifth, we studied attribute-based personalized advertising that featured ego-relevant products. More work is needed to better understand the boundary conditions of the effects of personalized advertising in public, for example, by examining different product categories. Furthermore, our stimuli (deliberately) did not display any brand names. When showing personalized advertising of certain brands, do consumers attribute the situation to the brand or might there still be spillover effects toward the store?

Sixth, we demonstrate the importance of the valence of ad-self-incongruity. While *threatening ad-self-incongruity* has important negative downstream effects, we did not find positive effects for *bolstering ad-self-incongruity*. Being exposed to flattering personalized advertising (bolstering ad-self-incongruity) however could potentially have positive effects on attitude toward the advertisement and hence on further downstream effects. Additional research is needed on how bolstering ad-self-incongruent advertisements could trigger positive effects and favorable consumer response.

Finally, in our studies we used student samples. Future research could explore if the response effects toward personalized advertisements in public differ across different age groups. However, studying the effect of using the new in-store tracking technology with the help of student samples is a conservative test, because young consumers should be more open to technological innovation. Hence, we expect our negative response effects will still hold across different age groups and might be even stronger for older consumer groups.

3.6 References

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3.7 Appendices

Appendix A. Study 1 Scenario and Stimuli

“Please imagine the following scene: you are browsing a retail store offering a variety of products, e.g., women’s and men’s clothing (casual wear, business wear, active-/sportswear), accessories, jewelry, and beauty products (store is comparable e.g., to Macy’s) ...

No personalization: In the store you come across a TV screen which shows advertising content.

Personalization: In the store you come across a TV screen which shows advertising content. The screen has an integrated camera which can determine your age, gender and body size. The system automatically adjusts personalized content based on your recorded metrics. In this case, the height, weight, age and gender information you provided at the beginning of this survey were used to select the ad.

No Social Presence: [Personalization / No personalization]:

... You stand alone in front of the screen. There are no other people in your immediate vicinity so you alone are viewing the screen. There are no other customers present to notice that you are looking at the screen. [You know that the shown content has been customized to you / omit].

Social Presence: [Personalization / No personalization]:

... You do not stand alone in front of the screen. There are other people in your immediate vicinity that are also viewing the screen. Other customers in the store [know that the shown content has been customized to you / notice that you are looking at the screen].”

Participants were also shown a visual of the shopping scene:

No social presence

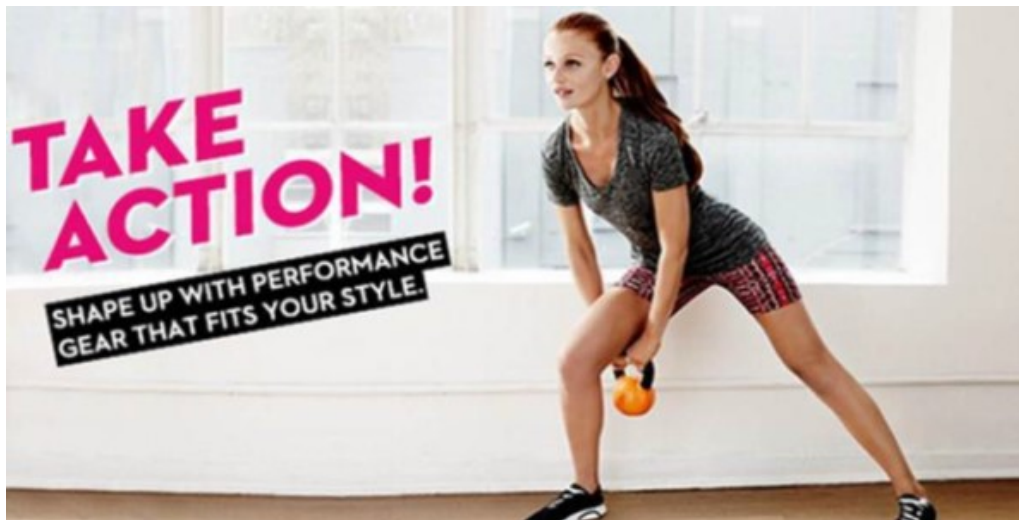


Social presence



Participants were shown a visual corresponding to their gender.

Advertisement shown to female participants



Advertisement shown to male participants



Appendix B. Study 2 Scenario and Stimuli

“Please imagine the following scene: you are browsing a retail store offering a variety of products, e.g., women’s and men’s clothing (casual wear, business wear, active-/sportswear), accessories, jewelry, and beauty products (store is comparable e.g., to Macys).

Within the store you come across a TV screen which shows advertising content. The screen has an integrated camera which can determine your age, gender and body size. The system automatically adjusts personalized content based on your recorded metrics. ...

No Social Presence:

... You stand alone in front of the screen. There are no other people in your immediate vicinity. You are not being observed by any of the other customers in the store.”

Social Presence:

... You do not stand alone in front of the screen. There are other people in your immediate vicinity that are also viewing the screen. You are being observed by those other customers. They know that the shown content has been adjusted to appeal to you.”

The same visuals (picture of the shopping scene and advertisement) as in study 1 have been used.

Construct	Study & Statistics	Measurement Items ¹
Perceived Personalization Adapted from Srinivasan et al. (2002); Baek and Morimoto (2012)	Pretest $\alpha = .96$	This material in the ad seems ... <ul style="list-style-type: none"> • ... designed around my specific measurement. • ... personalized for me. • ... customized based on me. • ... to be directed to me personally. • ... to take into account who I am. • ... to take into account my personal situation.
Perceived Social Presence Adapted from Argo et al. (2005); Grewal et al. (2003)	Manipulation Check, Study 1 $\alpha = .97$	In this scenario, ... <ul style="list-style-type: none"> • ... there are no other people around. • ... I am somewhat isolated. • ... there are no other people near me. • ... the retail store is not crowded. • ... no other people can observe me. • ... no other people are next to me.
Appendix C. Measures of Study 1 and Study 2		
Attitude Toward the Store Spangenberg et al. (1996)	Study 1: $\alpha = .97$ Study 2: $\alpha = .97$	<ul style="list-style-type: none"> • bad/good • unfavorable/favorable • negative/positive
Behavioral Intentions Adapted from Kaltcheva and Veitz (2006)	Study 1: $\alpha = .91$ Study 2: $\alpha = .92$	<ul style="list-style-type: none"> • I would enjoy shopping in this store. • I would be willing to buy things at this store. • I would be willing to recommend this store to my friends.

Construct		Study & Statistics	Measurement Items ¹
Embarrassment Adapted from Eyal and Roese (2013)		Study 2 $\alpha = .92$	<ul style="list-style-type: none"> • I feel embarrassed. • I feel uncomfortable. • I feel awkward. • I feel ashamed.
Self-congruity Adapted from Samli and Samli (1985)	Self-congruity index	Study 2 $\alpha = .79$	<p>To measure self-congruity, the difference scores between product user image and self-image were used.</p> <ul style="list-style-type: none"> • Not active / active • Not health oriented / health oriented • Not style oriented / style oriented • Not athletic / athletic • Old / young

Measures of Study 1 and Study 2 (Continued)

¹ For all items, participants indicated their responses to the items on seven-point Likert scales (1 = “strongly disagree” and 7 = “strongly agree” or 7-point polar scales).

4 The Importance of Being Born Free as Online Platform – How Prior Strategic Commitments Influence the Conception of Customer Orientation and Its Outcomes in Free E-Services

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Under Review at the *Journal of Marketing*, 1st Round (VHB Ranking: A+)

Research on customer orientation has predominantly focused on dyadic customer-firm-relationships. Yet, the increasing prevalence of free e-services requires further research that extends this dyadic perspective and analyses customer orientation in business models that entail one free and one paying customer group. In one qualitative and one quantitative study, the authors demonstrate that free e-service providers vary greatly in their conceptions of customer orientation and its outcomes. Free-born providers, that from the outset, strategically committed themselves to the free business model, possess customer orientation capabilities that match the particularities of free e-services (i.e., interdependencies between both groups, superiority of free customers). They use customer orientation toward one customer group to increase the satisfaction of this group and the other simultaneously and, thus, are reaching their financial goals. Laggards, that started with a non-free business model before launching their free e-service, however, cannot exploit the full potential of customer orientation, as they focus too much on the paying customer group. The findings offer new theoretical insights for research and provide managers with actionable implications.

Keywords: *Customer Orientation, Free E-Service, Dynamic Capabilities, Strategic Commitment, Two-Sided Markets*

4.1 Introduction

Extant marketing research has shown that with customer orientation, i.e., a company's capability to serve the needs of its customers, firms can increase customer satisfaction and achieve a substantial competitive advantage (Day, 1994; Jaworski & Kohli, 1993; Narver & Slater, 1990). Customer orientation research thus far has focused mainly on customer orientation capabilities in dyadic customer-firm-relationships, where firms serve the needs of one customer group only. Such research has investigated drivers of customer orientation, its outcomes, and contingency factors (Jaworski & Kohli, 1993; Kirca, Jayachandran, & Bearden, 2005; Narver & Slater, 1990). Yet, in the new economy, online platform firms with new and more complex business models have emerged that generate revenue by bringing together multiple distinct customer groups who interact with one another. One of the most successful manifestations are free e-services. As such, the most valuable companies and start-ups in today's economy, such as Alphabet, Facebook or Pinterest (Alphabet Inc., 2016; Facebook Inc., 2016; Forbes Media LLC, 2016; Fortune.com, 2016), offer free e-services to one customer group (free B2C customers), while paying customers (B2B or B2C) cross-subsidize this free offer (e.g., through advertising their goods or listing them in an online market place). However, not all providers of free e-services are as successful as Alphabet, Facebook or Pinterest. Especially publishing houses have difficulties with the free business model, and are constantly searching for ways to convert free customers into paying ones (The Economist, 2015).

One reason for this obvious heterogeneity can be poorly developed customer orientation capabilities that fail to match such business models. So far, there is only one study investigating possibly appropriate customer orientation capabilities in settings with more than one customer group. Chakravarty, Kumar, and Grewal (2014)

investigated B2B-platforms with two paying customer groups and confirmed that firms in two-sided market settings are customer oriented toward each group separately. Through customer orientation toward one customer group, platforms can either increase the platform's total customer orientation, or prioritize one customer group over the other. Whereas the authors extend customer orientation research by emphasizing that in more complex business models, firms need to be customer oriented to more than just one customer group to be successful, their study does not address the challenges free e-services entail. In this respect, research has shown that free e-service providers must acknowledge the importance of free customers for the business model's success, even if they do not bring monetary proceeds. They are even more important than paying customers (Gupta & Mela, 2008; Kraemer, Hinz, & Skiera, 2010). Further, free and paying customers are not independent of each other, in that marketing actions directed at one customer group also affect the other, and vice versa.

Addressing this research gap, the present study aims to expand current knowledge on customer orientation. We investigate how managers of free e-services respond to the particularities of the free business model (i.e., free customers' superiority and interdependencies) in conceptualizing customer orientation. Based on their conception of customer orientation, we assess the outcomes of the firms' customer orientations toward the two customer groups. Due to the interdependencies that govern free e-services, our specific interest is how customer orientation toward one group affects the other group, and vice versa. In line with prior research, we assess the effects of customer orientation on the respective customer groups' satisfaction (Brady & Cronin, 2001). Besides investigating the effects on customer satisfaction, we

further investigate how the different customer orientations directly contribute to the free e-service providers' financial goal attainment.

We undertook a qualitative (Study 1) and a quantitative study (Study 2) to address our research goals. Taking an exploratory approach in Study 1, we assessed how free e-service providers conceive customer orientation in the face of the superiority of free customers and the interdependencies between the customer groups they serve. Based on this conception, Study 2 investigated the outcomes of customer orientation by taking a survey-based approach. Both studies reveal that free e-service providers differ considerably in their conception of customer orientation, depending on the nature of their strategic commitment to the free business model. Free e-service providers that committed themselves to the free business model from the outset (i.e., free-borns), are aware of free customers' superiority and the interdependency of free and paying customers. For this reason, such free e-service providers anticipate the effect of customer orientation behavior toward one customer group on the other group's satisfaction, and vice versa. Thus, they can increase the satisfaction of both customer groups simultaneously, even while they are customer oriented to one group only. Contrastively, free e-service providers that did not commit to the free business model from the beginning (i.e., laggards), limitedly acknowledge how critical free customers are for the free business model, and overestimate the importance of paying customers. Such free e-service providers do not anticipate the impact their customer orientation behavior toward paying customers has on free customers' satisfaction, and thus, are not able to increase the satisfaction of both paying and free customers. In addition, our results reveal that laggards' customer orientation behavior toward free and paying customers is less efficient and effective than that of free-borns. Our study

makes several theoretical contributions, specifically to the three important marketing fields discussed below:

Contribution to research on customer orientation. Our contributions to research on customer orientation are three-fold: First, our findings expand existing knowledge of customer orientation in two-sided markets by disaggregating a platform's customer orientation into its individual parts. In contrast to Chakravarty et al. (2014), who investigated the effects of two aggregated measures of customer orientation, namely total customer orientation and asymmetric customer orientation, we look at customer orientation toward each customer group separately, and assess their individual outcome effects on the customer groups' satisfaction and the free e-service provider's financial performance. Second, we show customer orientation to be a necessary firm capability, even toward customer groups that do not provide any monetary value, as long as they interact with paying instances. This finding extends prior research on bi- and multilateral value exchanges between customers and firms, which hitherto neglected free customers (Chakravarty et al., 2014; Jaworski & Kohli, 1993; Narver & Slater, 1990). Third, we disclose that a firm's prior strategic decisions are important contingency factors in customer orientation. A firm's strategic commitment influences managers' conception of customer orientation and its outcomes. Our findings highlight that only firms that strategically committed themselves to the free business model from the beginning, leverage the full potential of customer orientation, thus serving the needs of both customer groups efficiently and effectively. In contrast to existing research on customer orientation, which focusses on firm-external factors influencing the outcomes of customer orientation (Jaworski & Kohli, 1993; Kirca et al., 2005), we thus show that firm-internal factors, such as

strategic commitment, can also be important contingency factors in customer orientation.

Contribution to research on two-sided markets. First, we add meaningful insight to research on two-sided markets by identifying customer orientation as an appropriate coordination strategy to meet the expectations of multiple market sides and, hence, gaining their commitment to the platform. In this regard, previous research has highlighted the importance of pricing mechanisms (Armstrong, 2006; Caillaud & Jullien, 2003; Rochet & Tirole, 2006), as well as a platform's content (Anderson & Gabszewicz, 2006; Hagiu & Spulber, 2013; Wilbur, 2008). We demonstrate that customer orientation is of similar importance, but only if platform firms factor in the other customer group's satisfaction in their customer orientation activities toward the focal customer group. Second, we show that the level of customer orientation behavior toward free customers is higher than toward paying customers, even if free customers do not provide any monetary value. This is an important contribution to knowledge on two-sided markets that include a free customer population. Thus far, research in this area has proposed that managers should assign more importance to free than to paying customers, due to their higher value to a platform. However, whether they really do so has not been investigated (Gupta & Mela, 2008; Kraemer et al., 2010). Third, we unearth new strategies for laggards to accommodate free business. Whereas previous research primarily suggested strategies to turn the free business model into a freemium business model (Pauwels & Weiss, 2008), our results suggest that accurately understanding how to respond to the particularities of free e-services in customer orientation behavior, could help laggards to manage the free business model successfully.

Contribution to research on stakeholder marketing. Our study directly responds to prior research calls from stakeholder marketing (Hillebrand, Driessen, & Koll, 2015). First, we take a systemic perspective on studying the complex value-exchange relationships in free e-services. Simultaneously, we investigate how customer orientation behavior toward one customer group (e.g., free customers) affects the same and the other group's satisfaction (e.g., paying customers). Second, we show that free-borns anticipate the influence customer orientation behavior toward free customers has on paying customers' satisfaction, and vice versa. As such, our results show that systems thinking, i.e., the capability of understanding a firm's whole stakeholder system, is not only what firms should do in complex value-exchange relationships, but what they actually do, at least if they are free-born.

Our results also provide valuable and actionable insights for managers of free e-services. Both studies demonstrate that customer orientation is as important in the multi-sided context of free e-services, as it is in dyadic markets with only one customer group. Yet, it is more challenging. Providers of free e-services need to be customer oriented toward both free and paying customer groups, even if the former provide no monetary value in exchange for the service offer. Apart from just fulfilling the needs of each customer group, free e-service managers should leverage the interdependency of free and paying customers by anticipating how customer orientation toward one of the two groups affects the other. Further, by acknowledging the superiority of free customers, customer orientation behavior toward free and paying customers can yield additional financial benefits. Those results are especially important for laggards that espoused a non-free business model prior to launching a free e-service.

The remainder of this article is organized as follows: After a brief overview of prior research on customer orientation and free e-services, we report on the qualitative

study (Study 1) and its results. The findings of Study 1, together with evidences from prior research, provide the conceptual foundation for our quantitative, survey-based study (Study 2) among managers of free e-services. Finally, we discuss the results and the implications for research and practice.

4.2 Literature Review

Research in the field of customer orientation thus far mainly focusses on so called pipeline firms (van Alstyne, Parker, & Choudary, 2016), which have to serve the needs of one customer group only. In this context, Narver and Slater (1990) show that customer orientation positively impacts firm performance. Numerous follow-up studies confirm this positive relationship between customer orientation and firm performance (Jaworski & Kohli, 1993; Kirca et al., 2005). Thus, customer orientation represents a distinct firm capability to achieve competitive advantage (Day, 1994), even though the competitive advantage decreases with a growing number of competitors also leveraging customer orientation for better firm performance (Kumar, Jones, Venkatesan, & Leone, 2011). One explanation for customer orientation positively impacting firm performance is rooted in customer satisfaction, which is achieved by fulfillment, but also overfulfillment of customer expectations and needs. Customer satisfaction, in turn, positively translates into firm success (Anderson & Sullivan, 1993; Brady & Cronin, 2001; Slater & Narver, 1994).

Customer orientation in a setting with multi-sided markets is an area that is ripe for additional research, as studies in this area are still rather limited. One recent study by Chakravarty et al. (2014) provides evidence that customer orientation is a valuable tool for the success of platform firms. By means of commercial B2B-platforms the authors have confirmed that these online platforms hold separate customer orientations

toward the distinct customer groups. According to Chakravarty et al. (2014), the sum of the separate customer orientations represents the total customer orientation of a platform, which in turn, positively impacts competitive advantage. Customer orientation asymmetry, in contrast, represents the difference between the separate customer orientations and reflects the prioritization of one customer group over the other. Customer orientation asymmetry enables counterbalancing dependency on one customer group and, thus, increases a platform's performance.

Whereas Chakravarty et al. (2014) extend customer orientation research by the important aspect that in more complex business models firms need to be customer oriented to more than just one customer group, their study does not address the challenges raised by free business models. First, free customers are profoundly important even without bringing in monetary returns. Previous research on customer value has demonstrated that free customers are more critical to the platform than paying customers are, because they attract paying customers who do pay for the platform-based interaction (Gupta & Mela, 2008; Kraemer et al., 2010). Second, such interaction between free and paying customers challenges free e-service providers in the development of their customer orientation capabilities. The interaction between free and paying customers takes several forms: Paying B2B customers can advertise their products and services via the platform, as is common practice for online newspapers. Moreover, they can list their products and services on online market places such as TripAdvisor, so that their offers are part of the value proposition to free customers.² Paying B2C customers can interact with free customers in online games or communities, or they can sell personal items in online market places, such as eBay. Given these features of free e-services, in the following, we investigate how free e-

² Further types of interaction encompass the selling of customer data to third party firms by the platform, or conducting marketing research by the free e-service provider for third party firms.

service managers respond to free customers' superiority and the interdependencies between free and paying customers in their conception of customer orientation and in developing appropriate customer orientation capabilities. Further, we assess how this conception influences customer orientation outcomes.

4.3 Study 1: Qualitative Study – Conception of Customer Orientation In Free E-Services

Study 1 was a qualitative investigation in which we interviewed managers of free e-services. The research objective was to gain improved knowledge on how managers of free e-services conceive customer orientation with respect to the presence of free customers and the interdependencies between free and paying customers.

4.3.1 Method

We chose a qualitative exploratory research approach to investigate industry experts in the free e-services sector, which entailed interviewing 20 executives of German free e-service providers (Appendix D). This is consistent with sample sizes recommended for exploratory research (Guest, Bunce, & Johnson, 2016). Our sample was diverse, including firms with different revenue streams (e.g., ad-financed communities, market places with transaction-based fees) and in different company stages (e.g., established publishing houses, as well as start-ups). Our sampling procedure followed the approach of Strauss and Corbin (1990), thus we stopped sampling at the point of saturation. The interviews of between 40 and 75 minutes each were recorded and transcribed verbatim. They were conducted in a semi-structured format, using an initial set of prepared questions to guide the interviews, with specific follow-up questions based on each informant's individual response. This approach has

been used in numerous former marketing studies (Dahl & Moreau, 2007; Flint, Woodruff, & Gardial, 2002; Fournier & Mick, 1999). For analysis, we open-coded the transcripts according to methods Boyatzis (1998) and Braun and Clarke (2006) used with the MAXQDA software. To identify topics relevant to our research goals, two researchers independently open-coded the transcripts. The results were compared, jointly discussed and matched with existing literature.

4.3.2 Results

Customer orientation and free customers. In accordance with our theoretical assumptions, our expert interviews provided evidence that managers are aware of the high importance of free customers to the free business model. Thus, managers aim to provide free customers with superior value by means of customer orientation. Even though managers perceive both customer groups – free as well as paying customers – as vital to their business (E10, J45, R8), they acknowledge free customers as indispensable. The business model of free e-services is not workable without them (A2, E18, I22, K24, R8). Based on the central role of free customers, which one publishing house platform manager calls “the key component of the business model” (T23), managers of free e-services recognize the need to serve them with highly attractive service offers for delivering high value. As one respondent, a manager of a price comparison website, states: “It is of high importance, if we do not serve them [free customers] with high value, they will not return to our business” (P10). Similarly, a manager of a mobile couponing-platform notes, that the highest risk to the success of the free business model is limitedly attractive coupon offerings. Thus, the strong need for action toward free customers is emphasized (B182-B186). Free e-service providers make use of customer orientation to create value for free customers.

Respondents report their offerings to be heavily based on free customers' needs (F51, I78, S20). Relatedly, some service providers go a step further by bringing unfinished products to the market: "From the beginning, our purpose was not to have a fully developed platform to bring to the market, but rather to go online with a raw product, which we would refine based on customers' priorities" (K30). As a source of identifying consumer needs, managers make use of free customers' explicitly communicated feedback (A48, A134, G40, H85). Moreover, service providers implicitly infer customer needs from behavioral online data (D102, F53, K34). Additionally, some service providers continuously assess free customers' satisfaction, for instance by surveys (E86) or by using the Net Promoter Score (G40). Our interviews make it apparent that managers align the extent of customer orientation behavior toward free customers with the value this customer group brings to the service providers. Therefore, managers prioritize the needs and expectations of highly valued³ free customers over the needs of free customers with lower value. Even though they are critical to the business model's success, providers are not driven solely by free customers' articulated needs and interests in their customer orientation behavior. In this respect, a manager of an online community describes its customer orientation behavior toward free customers as follows: "Well yes, regarding stability, that means we do not chase every issue, this would just be impossible and lead to contorted maneuvers, because we have a huge community. Some people want things that other people don't. But we take it seriously and manage it. However, we still need to remain true to ourselves and stick to our platform" (N174).

³ Free e-service providers assess the value of free customers based on a ratio between revenues and the number of free customers (e.g., A26, H16) or based on non-monetary values free customers provide such as their online activity (A14, J57, N14).

Customer orientation and interdependencies. Our interview data reveals important findings in terms of customer orientation and interdependencies between customer groups in a platform setting. Our findings provide evidence for managers' awareness of the interdependencies of both customer groups they have to serve; that is, managers anticipate the impact customer orientation activities toward a focal customer group has on the other group. Relatedly, one interviewee, a manager of an online marketplace which brings together so-called listers (paying customers) and searchers (free customers) states: "If it comes to pricing issues, you obviously focus on the listers. However, we always bear in mind, that our business model relies on the searchers" (R8). Similarly, a manager of a career marketplace, which connects highly qualified students to paying customers, is aware of potentially negative effects of being overfocused on the interests of paying customers. For example, a major strategic focus on paying customers' interest in recruiting highly attractive students, carries the risk of lowering satisfaction among other students that are less attractive to the paying customers (E70). In line with these findings, managers of advertising-based platforms are also aware that an overfocus on advertisers (i.e., paying customers), for instance in terms of type and content of advertising provided on the platform, can lower free customers' satisfaction (C75, H52, H90, S102). Vice versa, managers are aware that dedicated focus on free customers, could diminish paying customers' satisfaction (D114). The same is true in marketplaces, where, for instance, a manager of a pricing and service comparison platform, which arranges contracts between free and paying customers, noted that free customers who repeatedly switch between energy suppliers, displease the suppliers: "You cannot tell a paying customer: 'I have 100 new customers for you, but you know, next year 110 customers will leave you', as is likely if another paying customer comes up with a more attractive offer" (M22).

Heterogeneity in customer orientation among free e-service providers. Our interviews reveal first evidence on heterogeneity among managers in terms of their perception of free customers' role, capabilities in customer orientation toward free customers, as well as awareness of the interdependencies between customer groups (B25). This became evident in two interviews with managers of news platforms launched by publishing houses who are apparently dissatisfied with the free business model (B25). The managers are aware of free customers' importance to the business model, and thus of the importance of creating value for them (B77, D21, D147). Simultaneously, however, those managers substantially focused on paying customers' interests, even trying sometimes to establish freemium business models, in which some free customers are willing to pay for the hitherto free service. A manager of a news portal stated, for example, that the strategic focus of his platform is on attracting as many free customers as possible, who are willing to react to advertisements of paying customers by clicking on the ads or by buying something (D115). Another manager of a news platform goes a step further, stating that the offers of the platform are worthless if free customers are not willing to pay for them (B59). Consequently, the strong mental orientation toward monetizing the service provider's offerings inhibits the alignment of their offerings to the needs of free customers. Even though such service providers have the required sense of how to shape offers that would better fulfill their free customers' needs, they do not act accordingly (B79, B83). Further, this strong focus on monetizing perpetuates limited knowledge of free customers (B51), and of how to efficiently and effectively fulfill their needs. For instance, one manager reports that the news platform assumes free customers to be homogeneous and similar to readers of the printed news, while in fact, they cannot be certain about it while lacking sufficient knowledge of their free customers (D51; D60). This means that such service

providers are unable to recognize different segments of free customers, and accordingly cannot align customer orientation behavior to free customers' value (D32-D33). Regarding the interdependencies that reign in free e-services, the two interviews give further evidence about additional heterogeneity among free e-service providers. For instance, they indicate that online service providers make use of advertising formats, even if they know this will prompt negative reactions among free customers (B126-B132).

4.3.3 Discussion

The purpose of Study 1 was to gain insight into how free e-service providers' customer orientation unfolds with respect to the two major particularities of the focal business model, namely the high relevance of free customers, and the interdependencies between customer groups. The results show that managers not only should attach importance to free customers (Gupta & Mela, 2008; Kraemer et al., 2010), but that they indeed do so by being customer oriented towards them. In this respect, our findings reveal that the traditional concept of customer orientation (Jaworski & Kohli, 1993; Narver & Slater, 1990) can be transferred to customer groups that do not provide monetary value to a firm. Moreover, by showing that the providers of free e-services are customer oriented toward both free and paying customers, we support the findings of Chakravarty et al. (2014) on the parallel existence of different customer orientations in two-sided markets. Managers of free e-services refer to similar managerial capabilities for free customers as they do for paying customers in more traditional market settings. As such, they strongly focus on value-based customer orientation behavior, to efficiently and effectively address free customers' needs. With regard to interdependencies between customer groups, one

particular managerial capability becomes evident, namely to anticipate the effects customer orientation activities have on both customer groups, i.e., not only on the focal group which is presently in the focus of customer orientation activities, but also on its counterpart.

Notably, our results further shed light on potential heterogeneity in terms of full comprehension of customer orientation among distinct types of providers. Referring to the two examples of news platforms, we presume that prior strategic decisions can significantly alter managers' understanding of free e-services and their conception of customer orientation. Firms that used a business model of direct monetization of end consumers prior to launching a free e-service (*laggards*), have more difficulties when adopting a free e-service, than firms that built on the free business model from the start (*free-borns*). Obviously, laggards rely on their past experiences in markets with paying customer groups only, which hinders them in developing appropriate customer orientation capabilities that match the requirements of the free business model. Laggards strongly emphasize the (direct) monetization of their offering and thereby fail to recognize the importance of free customers. These findings corroborate research which reveals that firms' different prior strategic commitments provoke different understandings of market paradigms, which impacts the development of firm capabilities in different ways (Leonard-Barton, 1992; Srinivasan & Moorman, 2005; Teece, Pisano, & Shuen, 1997). Based on their strategic commitments, firms develop a "dominant logic" (Prahalad & Bettis, 1986) about the business reality and the necessary firm capabilities to reach their goals in this environment. However, this dominant logic biases the perception of new business realities, e.g., through disruptive technological innovations, or the entry into new markets that are distinct from the firm's original core business. Typically, firms try to

fit the new business reality into their existing schemas about the business environment (Danneels, 2003; Kanter, 2001; Prahalad & Bettis, 1986). Hence, firms can develop a defective understanding of the new business environment and its paradigms, so that they do not develop the capabilities necessary for responding to the challenges of the new business context. In this respect, capabilities become a “core rigidity” that do not allow firms to reach their own performance goals (Gary & Wood, 2011; Leonard-Barton, 1992).

Drawing on our results and discussion of Study 1 and on evidence from previous literature, we develop the conceptual framework for Study 2 in the next section. The major aim of Study 2 is to show how free-borns’ and laggards’ different conceptions of customer orientation influence the subsequent performance outcomes. Specifically, we investigate the influence a firm’s strategic commitment has on (a) their capability to satisfy both free and paying customers while being customer oriented toward only one of those customer groups, and (b) on how customer orientation impacts a platform firm’s financial goal attainment beyond the effect through free and paying customers’ satisfaction.

4.4 Conceptual Framework and Hypotheses

4.4.1 Cross-Effects of Customer Orientation

Our interviews reveal that free e-service providers are, in general, aware of interdependencies in free e-services. In this respect, they are able to anticipate the influence customer orientation behavior toward one customer group would have on the other group’s satisfaction, and vice versa. Accordingly, we expect them to shape customer orientation behaviors toward each of the customer groups in a way that satisfies both groups simultaneously. Satisfying both customer groups is of tremendous importance for free e-service providers for two reasons: First, it enables

providers to retain free customers and, hence have a higher number of free customers on the platform. A platform with a higher number of free customers is, in turn, more attractive to other free customers, but also to paying customers due to direct and indirect network externalities (Gupta & Mela, 2008; Kraemer et al., 2010; Rochet & Tirole, 2006). Whereas paying customers generate direct revenues, free customers contribute indirectly to a provider's financial performance. Second, customer orientation toward free as well as paying customers enhances paying customers' satisfaction. Extant research on customer satisfaction reveals satisfied customers' higher loyalty intentions (Anderson & Sullivan, 1993; Rust & Zahorik, 1993), and their willingness to deepen the customer-firm-relationship (Bolton, Lemon, & Verhoef, 2008; Lemon & Wangenheim, 2008). Further, satisfied customers are more prone to circulate news of their positive product or service experiences (Anderson, 1998), which can positively affect a firm's market share. As for free customers, additional indirect network effects from paying to free customers, are prevalent even if they are less pronounced than indirect network effects from free to paying customers (Gupta & Mela, 2008; Kraemer et al., 2010). For example, the numbers of paying customers, as in the number of hotels listed on TripAdvisor, renders the platform more attractive to free customers looking for a room.

Based on the interview results, however, we expect only free-borns to fully exploit the potential of customer orientation in free e-services. Their understanding of the key principles of free e-services, enables them to leverage the interdependencies between free and paying customers to satisfy both customer groups simultaneously by being customer oriented toward only one group. The satisfaction of both customer groups, in turn, contributes directly and indirectly to a firm's financial performance. Laggards, in contrast, are not likely to exploit customer orientation to the same extent.

Our interviews indicated that laggards' dominant logic to monetize their free offer, hinders their acknowledgment of free customers' superiority and relevance. Therefore, like free-borns, laggards conceive customer orientation toward free (paying) customers in a way that simultaneously increases free and paying customers' satisfaction. However, priming paying customers will hinder laggards in increasing free customers' satisfaction in the same way as free-borns who are customer oriented toward paying customers. Thus, laggards cannot benefit from the full potential of the interdependencies in free e-services. Following our reasoning, we hypothesize:

H1: Customer orientation toward free customers increases (a) free and (b) paying customers' satisfaction.

H2: Customer orientation toward paying customers increases (a) paying and (b) free customers' satisfaction.

H3: A provider's prior strategic commitment moderates the positive impact of customer orientation toward paying customers on free customers' satisfaction, such that customer orientation toward paying customers increases free customers' satisfaction to a greater extent for free-borns than for laggards.

H4: (a) Free and (b) paying customers' satisfaction increases the financial goal attainment of free e-service providers.

4.4.2 Customer Orientation Efficiency and Effectiveness

Research has shown that firms incur considerable costs with customer orientation and customer-oriented behaviors. Lee, Sridhar, Henderson, and Palmatier (2014) demonstrate that customer-centric firms can increase their long-term financial performance through increasing the satisfaction of their customers. However,

customer-centric structures also increase a firm's costs which, in turn, negatively affect their performance. According to the results of our interviews, free-borns are, in total, able to efficiently increase customer orientation behavior toward free customers. When being customer oriented toward free customers, free-borns align the value they create through customer orientation to the value they receive from free customers. They segment free customers based on their value and adjust their customer orientation behavior accordingly. Research has highlighted the benefits of such customer value-based marketing for the long-term success of customer-firm-relationships (Kumar & Reinartz, 2016), as customer value-based marketing is both effective and efficient. In this respect, Homburg, Droll, and Totzek (2008) demonstrate that such customer prioritization strategies increases customers' average satisfaction with the firm and simultaneously decreases firms' marketing and sales costs.

Our interviews reveal that laggards, in contrast, treat all free customers equally and do not segment them based on their value to the platform. Accordingly, the level of customer orientation behavior is the same for all free customers, and consequently, laggards cannot realize efficiencies through segmentation. We thus expect customer orientation behavior toward free customers to be less efficient for laggards than for free-borns. Inefficiencies can be fueled further by the realization of diseconomies of scope. Laggards try to embed new capabilities like customer orientation to free customers into their existing structures and processes. Thus, laggards rely on the same assets and resources for customer orientation behavior toward both free and paying customers, which causes inefficiencies through costly conflicts (Bresnahan, Greenstein, & Henderson, 2011). For instance, costly conflicts can arise when firms need to be customer-oriented toward either free or paying customers. Moreover,

laggards need to invest in the development of their employees' customer orientation capabilities toward free customers (Greenstein, 2017). In summary, we hypothesize:

H5a: A provider's prior strategic commitment moderates the effect of customer orientation toward free customers on a provider's financial goal attainment, such that the negative impact of customer orientation toward free customers is smaller for free-borns than for laggards.

Further, we expect inefficiencies and ineffectiveness for laggards when they are customer oriented toward paying customers, even if they are accustomed to this customer group through their experiences in their initial business. As outlined before, laggards perceive paying customers as very powerful because, in their perspective, finally they are most important for a service provider's success. We know from previous research that a firm's customer orientation behavior toward powerful customers is mainly characterized by a tight connection between firms and such powerful customers and by fulfilling their articulated needs (Danneels, 2003). However, this close connection inhibits laggards' proactive shaping of the relationship with paying customers. By identifying potential new customers or latent needs of existing ones, they could be driving a firm's performance. Further, laggards mostly assign too many resources to paying customers, thus creating additional inefficiencies (Christensen & Bower, 1996; Danneels, 2003). Free-borns, in contrast, we expect them to be more loosely connected to paying customers. Although free-borns are aware of paying customers' relevance for subsidizing the offer to free customers, they know that, in the end, it is the free customers who make up the free business model. Thus, free-borns will not fulfill all articulated needs of paying customers, but be more active in shaping the relationship with paying customers by also addressing their latent needs,

or identifying new segments of potential paying customers (Danneels, 2003). Therefore, we assume that, more than laggards, free-borns will create additional benefits from customer orientation behavior toward paying customers, besides just satisfying them. Hence, we hypothesize the following:

H5b: A provider's strategic commitment moderates the effect of customer orientation toward paying customers on a provider's financial goal attainment, such that the positive impact of customer orientation toward paying customers is higher for free-borns than for laggards.

4.5 Study 2: Quantitative Study – Outcomes of Customer Orientation

4.5.1 Method

Sample selection and data collection. To test the proposed conceptual model empirically, we conducted a cross-sectional online survey with key informants of free e-service providers in Germany. We compiled a database of free e-service providers in Germany, as there are no existing databases available with purely free e-services. Thus, in order to identify e-services, we conducted a thorough search, by turning to different sources, namely AGOF, a German association of online marketers, and IVW, the Information Community for the Assessment of the Circulation of Media. Further, we searched through online and offline outlets of business newspapers to identify additional free e-services relevant to our database. Additionally, we advertised our research project on professional social networks sites. We contacted every free e-service provider included in our database by phone to locate willing and knowledgeable informants. In total, our prequalified database consisted of 722 free e-services that received our survey.

Having identified free e-service providers and their key informants, we sent each a personal login for the online survey. We first explained the purpose of the study.

To incentivize participation, we provided the option of receiving a benchmark report. Also, we offered a €25 gift card for each completed survey. We used three screening questions at the beginning of our survey to ensure only free e-service providers with a two-sided market structure participate in the survey. We asked key informants whether their service offering is directed at B2C customers (instead of business customers) and whether the e-service is free for the majority of customers.⁴ To increase response rate, we sent a reminder about the survey after four weeks. In all, 95 key informants participated in the study, yielding a response rate of 13.2%.

Measures. Appendix E lists the items we used for Study 2 and their origins. To differentiate between free-borns and laggards, we assessed a service provider's *prior strategic commitment* to the free business model. In doing so, we relied on the operationalization provided by Srinivasan and Moorman (2005). This measure included questions about the year of firm founding and the year in which the firm launched the free e-service. We then calculated the difference in years, and coded providers which started with the free business model from the beginning (i.e., no difference between years of founding and launch) as 1, and those who did not with 0.⁵ We measured *customer orientation* toward each of the provider's customer groups (i.e., free and paying customers) separately. For this, our operationalization is based on the original scale of Narver and Slater (1990). Its applicability for measuring customer orientation in two-sided markets was demonstrated by (Chakravarty et al., 2014). Similar to customer orientation, *customer satisfaction* was measured separately

⁴ Freemium models are not multi-sided markets, but build on customer segmentation. As such, they lack network externalities which lies at the heart of the definition of two-sided markets (Rochet & Tirole, 2006).

⁵ We analyzed our results with an alternative operationalization that calculated the difference between founding and launch greater than one year. Those analysis yielded the same results in magnitude, direction and significance of the effects.

for both free and paying customers, using a three-item scale from Vorhies and Morgan (2005). We asked key informants how well free e-service providers did in satisfying their customer groups compared to similar offerings of competitors. A similar scale from Vorhies and Morgan (2005) was used to assess a free e-service provider's *financial goal attainment*. Managers were asked to assess how well they did in reaching their financial goals compared to their competitors. We used this subjective single-item measure to ensure that we could compare different free e-services which are at different stages of their business lifecycle and, thus, have different strategic objectives (i.e., growing their platform, being profitable). Kirca et al. (2005) demonstrated that in customer orientation research single-item performance measures yield similar results to multi-item performance measures.

Control variables. We included several covariates in our analysis. Following prior conceptualizations studying the outcomes of customer orientation, we included measures for both *firm size* and *firm age* in our questionnaire (Hult, Ketchen, & Slater, 2005). We assessed firm size by the number of employees working specifically for the free e-service. Finally, we differentiated between small providers with one to nine employees (= 0), and large providers with more than nine employees (= 1). *Firm age* was measured as the difference in years between 2016 (when data collection was completed) and the date of firm founding, which we then log-transformed. We included a provider's *revenue model* as a last covariate. A revenue model specifies how platform firm's generate revenues in a given business model (Amit & Zott, 2001). We classified service providers into two groups according to the indicated revenue model, assessing whether the paying customers' content is part of the platform's value-proposition to free customers (1 = *Content integration*), or not (= 0). This is the case for brokerage affiliates, like Booking.com, where advertised hotels constitute the

unique selling proposition to free customers. In the case of advertising-based revenue models, paying customers' content (e.g., ads) is distinct from the platform's value proposition to free customers (e.g., news).

Sample description. The final sample consisted of 53 free-borns and 38 laggards. As outlined in Appendix F and Table 3, there are no differences in the providers' characteristics except for a provider's funding and its revenues.⁶ Free-borns and laggards offer the same type of free e-service, refer to similar types of revenue models, have on average the same age and employ a similar number of employees. Based on the definition of laggard firms as ones that followed a non-free business model prior to launching a free e-service, it seems intuitive that free e-services are cross-subsidized by a firms' additional offers to a greater extent than free-borns, as they possibly adopted the free e-service as additional firm offering besides non-free ones.

⁶ With revenues, we refer to a firm's total revenues, i.e., including the revenues of additional offers, may they refer to the free business model or not.

									Free-Borns	Laggards	
	1	2	3	4	5	6	7	8	M (SD)	M (SD)	t-Value
Customer orientation FC	.76	.15	.37	.22	.12	-	-	-	5.27 (1.07)	5.14 (1.25)	<i>t</i> (87) =
Customer orientation PC	.03	.77	.13	.43	.19	-	-	-	4.67 (1.31)	4.68 (1.42)	<i>t</i> (88) =
Customer orientation FC	.34***	.12	.91	.26	.22	-	-	-	5.49 (1.04)	5.68 (0.98)	<i>t</i> (87) =
Customer orientation PC	.20 [†]	.39***	.24*	.92	.36	-	-	-	5.38 (1.20)	5.00 (1.47)	<i>t</i> (86) =
Personal goal attainment	-.12	.18 [†]	.22*	.34***	1.00	-	-	-	4.61 (1.22)	4.65 (1.58)	<i>t</i> (86) =
Perceived ease of use (log)	-.30**	-.01	-.20*	.08	.19 [†]	-	-	-	2.05 (0.85)	2.07 (0.86)	<i>t</i> (89) =
Perceived ease of use (1 = large)	-	-	-	-	-	-	-	-	0.37 (0.49)	0.29 (0.46)	<i>t</i> (87) =
Perceived ease of use (1 = Offer integration)	-	-	-	-	-	-	-	-	0.60 (0.49)	0.63 (0.49)	<i>t</i> (89) =
Cronbach's alpha	.85	.86	.90	.91	-	-	-	-			
Composite Reliability	.89	.90	.94	.94	-	-	-	-			
	.58	.59	.83	.85	-	-	-	-			

FC = free customers, PC = paying customers; diagonal elements represent square root of AVE; lower off-diagonal elements represent bivariate correlations between metric variables; higher off-diagonal elements represent average item-correlations between two items.
 † $p < .05$, ** $p < .01$, *** $p < .001$.

FC = free customers; diagonal elements represent square root of AVE; lower off-diagonal elements represent bivariate correlations between metric variables; higher off-diagonal elements represent average item-correlations between two items.
 † $p < .05$, ** $p < .01$, *** $p < .001$.

Measure validation. To assess the reliability of our measurement model, we refer to partial least squares structural equation modeling (PLS-SEM), using the software SmartPLS 3 (Ringle, Wende, & Becker, 2015). Using PLS-SEM to estimate structural equation models has recently expanded in top tier marketing journals and complements the use of covariance-based estimation techniques (CB-SEM). PLS-SEM is proven to be especially suitable in cases where sample sizes are below 250, as it yields more accurate estimates than CB-SEM (Hair, Sarstedt, Ringle, & Mena, 2012; Reinartz, Haenlein, & Henseler, 2009). Table 3 shows that all our constructs meet the necessary reliability and validity criteria. The average variance extracted is above the threshold of 0.50 (Bagozzi & Yi, 1988), and the alphas exceed 0.70 (Nunnally, 1978). Further, constructs have discriminant validity, as each construct's square root of the average variance extracted exceeds its bivariate correlations with all other constructs (Fornell & Larcker, 1981).⁷

Response and non-response biases. Referring to single source data with only one key informant for each free e-service could question the accuracy of our assessed variables of interest. Homburg, Klarmann, Reimann, and Schilke (2012) point out that the accuracy of key informants' estimates depends on the specific constructs used in a study, informants' personal characteristics, and organizational characteristics. They demonstrate that the more present-focused the study's constructs are, the more objective information constructs assess; also, the more salient constructs are to a firm, the higher key informants' accuracy. Further, a key informant's hierarchical position and the R&D intensity positively influence accuracy, whereas accuracy decreases with

⁷ We could show discriminant validity also based on the Heterotrait-monotrait ratio (HTMT) as suggested by Henseler, Ringle, and Sarstedt (2015).

increasing organization size and industry concentration. Turning to our conceptual framework, with customer orientation, customer satisfaction and a firm's competitive advantage, we assess constructs that are present-focused, salient to the service provider, and have objective referents, at least for customer satisfaction and a firm's competitive advantage. Moreover, as 89% of the respondents have an executive position, and our sample's service provider size is small (64% of all providers in the sample employ nine or less employees), we are confident that inaccuracy in responses due to single-source data is not of concern in this study.

Furthermore, we tested our measurement model for common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We assessed common method variance using the marker variable approach proposed by Lindell and Whitney (2001), a common technique for PLS-SEM estimations (Sattler, Völckner, Riediger, & Ringle, 2010; Wunderlich, Kranz, Totzek, Veit, & Picot, 2013). In the marker variable approach, a theoretically irrelevant variable is included in the estimation of the path model. If the marker variable highly correlates with the independent and dependent variable of the structural model and its inclusion changes the direction, strength and significance, common method variance needs to be assumed. However, including a marker variable in our structural model, did not show any such changes. Thus, we are confident that our results are not subject to common method bias, and our estimated path coefficients and significances are reliable.

Non-response bias is another concern in survey-based research. Therefore, we split our respondents' data into thirds, based on the time distance between the date we sent out the survey and the time we received it. We then compared the answers of the first third with the last third, expecting the latter to resemble non-respondents. Group

comparisons yielded no significant differences, thus there is no evidence for non-response bias (Armstrong & Overton, 1977).

4.5.2 Results

Table 3 displays correlations, means, and standard deviations for the constructs included in our conceptual framework. All constructs have weak to moderate correlations ($r_{\max} = .39$), suggesting no problems of multicollinearity. The Variance Inflation Factors (VIF) of our structural model further confirm this suggestion. The variance inflation factors lie between $VIF_{\min} = 1.07$ and $VIF_{\max} = 1.41$, which is well beyond the critical value of 10 as suggested by Hair, Black, Babin, and Anderson (2014). Analyzing the mean values of our central constructs reveals that free e-services have higher customer orientation to free than to paying customers ($M_{CO,FC} = 5.22$ vs. $M_{CO,PC} = 4.66$). The difference in means is significant ($t(91) = 3.017, p = .003$).

Cross-effects of customer orientation. We referred to PLS-SEM, using SmartPLS 3, to test our subsequent hypotheses. We used 10,000 bootstrapping samples to assess the significance of our results (see Table 4), no sign changes were allowed. We imputed missing values by mean replacement. To test for group differences between free-borns and laggards, we applied the Multi-Group Analysis of SmartPLS 3 (Table 5).

Looking, first, at the outcomes of customer orientation of free e-service providers to free customers, our analysis yields a significant positive effect of customer orientation on free customers' satisfaction ($p_1 = 0.324, p = .003$), confirming H1a. Additionally, customer orientation to free customers exhibits a significant positive effect on paying customers' satisfaction ($p_2 = 0.212, p = .048$). No significant differences emerge between free-borns and laggards ($\Delta p_2 = 0.018, p = .535$), thus

supporting our hypothesis H1b. In line with H2a, customer orientation to paying customers increases their satisfaction significantly ($p_3 = 0.325, p = .002$). However, it does not increase free customers' satisfaction significantly ($p_4 = 0.142, p = .278$), as proposed in H2b. But, as outlined in H3, we find partial support for the moderating effect of free e-service providers' prior strategic commitment. For free-borns, customer orientation to paying customers leads to higher satisfaction of free customers ($p_{4,FB} = 0.322, p = .064$). For laggards, customer orientation to paying customers has no significant effect on free customer' satisfaction ($p_{4,LAG} = -0.061, p = .736$). The difference in the path coefficients is significant ($\Delta p_4 = 0.384, p = .070$). In turn, free and paying customers' satisfaction positively influences the platform firm's financial goal attainment, both for free-borns and laggards ($p_5 = 0.262, p = .004; p_6 = 0.282; p = .009$). These findings support our hypotheses H4a and H4b.

Hypothesized Paths				b	SE	t
<i>Cross-effects of customer orientation</i>						
p1:	Customer orientation FC	→	Customer satisfaction FC	.324**	.110	2.947
p2:	Customer orientation FC	→	Customer satisfaction PC	.212*	.110	1.974
p3:	Customer orientation PC	→	Customer satisfaction PC	.325**	.104	3.142
p4:	Customer orientation PC	→	Customer satisfaction FC	.142	-.131	1.084
p5:	Customer satisfaction FC	→	Financial goals	.262	.091	2.888
p6:	Customer satisfaction PC	→	Financial goals	.282	.108	2.618
<i>Customer orientation efficiency and effectiveness</i>						
p7:	Customer orientation FC	→	Financial goals	-.226 [†]	.124	1.824
p8:	Customer orientation PC	→	Financial goals	.028	.129	.221
<i>Controls</i>						
Table 4. Smart PLS Estimation Results Full Model						
Firm age	→	Customer satisfaction FC		-.081	.118	.694
Firm age	→	Customer satisfaction PC		.081	.095	.861
Firm age	→	Financial goals		.133	.127	1.043
Firm size	→	Customer satisfaction FC		-.129	.102	1.262
Firm size	→	Customer satisfaction PC		.235**	.089	2.641
Firm size	→	Financial goals		.065	.105	.620
Revenue model	→	Customer satisfaction FC		-.077	.099	.780
Revenue model	→	Customer satisfaction PC		.033	.093	.357
Revenue model	→	Financial goals		.001	.093	.010
<i>Notes: N = 95; FC = free customers, PC = paying customers.</i>						
[†] p < .10, * p < .05, ** p < .01, *** p < .001.						

	Path Coefficient		Difference in Path Coefficient
	Free-borns	Laggards	
Customer orientation FC → Customer satisfaction PC	.237 ^{n.s.}	.219 ^{n.s.}	.018 ^{n.s.}
Customer orientation PC → Customer satisfaction FC	.322 [†]	-.061 ^{n.s.}	.384 [†]
Customer orientation FC → Customer satisfaction goals	-.038 ^{n.s.}	-.587 ^{**}	.549 [*]
Customer orientation PC → Customer satisfaction goals	.397 [*]	-.218 ^{n.s.}	.615 [*]

FC = free customers, PC = paying customers, n.s. = not significant, † p < .05, ** p < .01, *** p < .001.

FC = free customers, PC = paying customers.

Customer orientation efficiency and effectiveness. In the second part of our conceptual framework, we hypothesized that free-borns and laggards differ in the efficiency and effectiveness of customer orientation behavior. For this reason, we compare the direct effects of customer orientation to free and paying customers on the service providers' financial goal attainment for free-borns and laggards through multi-group comparisons. In doing so, we find support for H5a, and partial support for H5b. For laggards, customer orientation to free customers significantly diminishes their financial goal attainment ($p_{7,LAG} = -0.587, p = .001$). For free-borns, in contrast, customer orientation to free customers does not influence the provider's financial performance ($p_{7,FB} = -0.038, p = .786$). This difference is significant ($\Delta p_7 = 0.549, p = .010$), in that the provider's prior strategic commitment moderates the effect of customer orientation to free customers on the service provider's financial goal attainment. With regard to H5b, our analysis provides evidence that free-borns reap additional benefits from customer orientation to paying customers beyond its effect on the financial goal attainment through paying customers' satisfaction. Customer orientation to paying customers directly increases a free-born's financial goal attainment ($p_{8,FB} = 0.397, p = .012$). For laggards, however, customer orientation to paying customers does not yield any additional benefits besides satisfying them ($p_{8,LAG} = -0.218, p = .336$). The difference in path coefficients between free-borns and laggards is significant ($\Delta p_8 = 0.615, p = .022$). The prior strategic commitment of a free e-service provider moderates the effect of customer orientation to paying customers on the provider's financial goal attainment.

In H5b, we argued that free-borns generate higher additional benefits through customer orientation to paying customers, as their customer orientation behavior is less driven by perceptions of paying customers' power than it is for laggards.

Consequently, free-borns are more loosely connected to paying customers, and can shape the relationship by addressing the articulated and latent needs of existing paying customers, as well as by identifying potential new segments of paying customers. Additional survey data support this argumentation. We assessed the perceived power of paying customers based on Agle, Mitchell, and Sonnenfeld (1999)'s measure. Regressing customer orientation to paying customers on their perceived power, yields the following results: Whereas free-borns' customer orientation to paying customers is not driven by the perceived power paying customers ($p_{POW,FB} = -0.165, p = 0.243$), perceived power does influence laggards' customer orientation significantly ($p_{POW,LAG} = 0.298, p = .082$). The higher laggards perceive the power of paying customers, the higher is their customer orientation to them. This difference is significant ($\Delta p_{POW} = 0.938, p = .001$).

Additional Analysis. To further test whether laggards are less performant than free-borns, we conducted an additional analysis with our survey data. Research on business models demonstrates that firms intention to change their business model is a direct reaction to performance shortfalls (Osiyevskyy & Dewald, 2015). Assuming laggards to be less performant than free-borns based on the results of Study 2, this would suggest that laggards are more likely to switch to a different revenue model than free-borns. In our survey, we included a question that asked participants to state whether they wanted to change their revenue model⁸ in the near future. Thus, we performed a simple chi-square test to determine whether free-borns were more likely to stick to their current revenue model than laggards. Indeed, we found support for this

⁸ For the additional analysis, we did not classify revenue models according to their integration of paying customers' service offering into the platform firm's own offer as we were interested in each instance of change in business model.

assumption. The chi-square test is significant ($\chi^2 (1, N = 91) = 5.429, p = .020$), confirming that a firm's intention to change its revenue model is not independent of its prior strategic commitment. Of the laggards in our sample, 53% that answered the respective survey question intended to change their revenue model. Free-borns, though, seem to be satisfied with their revenue, as only 26% of those platform firms (14 out of 53) stated that they would change their revenue model in the near future. This result further confirms the difficulties laggards have with the free business model.

4.6 General Discussion

The results of Study 1 and 2 demonstrate that free-borns have a better understanding than laggards of free e-services' particularities. As such, they develop more appropriate customer orientation capabilities and can serve free and paying customers' needs more effectively and efficiently. Free-borns conceive customer orientation as that it allows customer orientation to each customer group in a way that increases the satisfaction of both groups simultaneously. Then, higher customer orientation to free customers does not yield higher costs, as free-borns align the extent of their customer orientation behavior to the value free customers give them. Customer orientation to paying customers even yields additional financial benefits, as service providers proactively shape their relationship with paying customers. Laggards, in contrast, overemphasize the importance of paying customers for the free business model, which hinders their ability to leverage the full potential of customer orientation in free e-services. Then, being customer oriented only to paying customers, they are unable to satisfy free customers. Further, laggards' customer orientation behavior is highly driven by paying customers' perceived power, and they do not segment free customers in terms of value. This results in laggards' customer orientation behavior in

free e-services being inefficient and ineffective. Our findings make several theoretical contributions, specifically to the three important marketing research fields of customer orientation, two-sided markets, and stakeholder marketing.

4.6.1 Theoretical Contributions

Contribution to research on customer orientation. Our contributions to research on customer orientation are three-fold: First, our findings expand existing knowledge about customer orientation in two-sided markets by applying a disaggregated perspective on customer orientation. In contrast to Chakravarty et al. (2014), who investigated the effects of two aggregated measures of customer orientation, namely total customer orientation and asymmetric customer orientation, we investigated customer orientation to each customer group separately, and assessed their individual outcome effects. Our results demonstrate that, in two-sided markets, firms can make use of customer orientation to one customer group to satisfy not only the focal group, but also the other one. Looking at the underlying mechanism with the help of our qualitative interview data, we identified an important capability of platform firms: Platform firms anticipate the potential impact of customer orientation behavior toward one customer group on the satisfaction of the other group and vice versa, which allows them to satisfy both customer groups at once. As, in turn, the customer groups' satisfaction helps platform firms to reach their financial goals, customer orientation to both free and paying customers, contributes to firms' financial performance. This finding suggests that the well-established link between customer orientation and firm performance in traditional markets with only one customer group (Jaworski & Kohli, 1993; Kirca et al., 2005; Narver & Slater, 1990) is also applicable to each of the customer groups in two- or multi-sided markets.

Second, we show that customer orientation is a necessary firm capability, even toward customer groups that do not provide any monetary value. This extends prior research looking at bi- and multilateral value exchanges between customers and firms that focused solely on paying customers (Chakravarty et al., 2014; Jaworski & Kohli, 1993; Narver & Slater, 1990). We find evidence that being customer oriented to free customers influences a firm's financial performance, as long as they interact with paying instances. Customer orientation toward free customers increases paying customers' satisfaction, which in turn directly contributes to a service provider's revenues (Anderson & Sullivan, 1993). Further, due to network externalities, satisfying free customers by means of customer orientation to them, contributes to a firm's financial performance. Satisfied free customers have a higher propensity to stick with the platform, thereby rendering the platform more attractive to potential new paying customers. New paying customers, then again, generate new revenues (Zhang, Evgeniou, Padmanabhan, & Richard, 2012).

Third, we disclose a firm's prior strategic decisions as a contingency factor of customer orientation, by showing that a firm's prior strategic commitment influences free e-service providers' conception and outcomes of customer orientation. Existing research on customer orientation, instead, focusses mainly on exogenous factors that affect the link between customer orientation and a firm's performance, as for example, the market or environment turbulence, the technological turbulence, competitive intensity (Jaworski & Kohli, 1993; Kirca et al., 2005) or, in the case of two-sided markets, the market concentrations of both market sides (Chakravarty et al., 2014). Our findings highlight that firm-internal factors also influence the outcomes of customer orientation. Only firms that committed themselves to the free business model from the beginning, leverage the full potential of customer orientation. Free-borns

understand the particularities of free e-services, i.e., the criticality of free customers for the free business model, and the interdependencies between free and paying customers. Thus, they leverage customer orientation behavior to one customer group to satisfy both customer groups at once. In contrast, laggards have difficulties to fully capture the importance of free customers. They apply customer orientation behavior to them and satisfy them, as well as paying customers. However, they do not include free customers' satisfaction in their conception of customer orientation toward paying customers. Further, the data reveals that laggards are too tightly connected to the articulated interests of paying customers, which in turn leads to ineffectiveness and inefficiency in their customer orientation behavior toward them. As for free-borns, customer orientation to paying customers yields additional financial benefits besides the financial gain already generated through the satisfaction of paying customers.

Contributions to research on two-sided markets. First, we add meaningful insights to research on two-sided markets by identifying customer orientation as an appropriate coordination strategy for a platform's sustainability. Platform firms' main interest lies in attracting and bonding both market sides to the platform in order to be successful (Rochet & Tirole, 2006). Due to the interaction of both market sides, platform firms simultaneously need to coordinate the expectations of both market sides (Anderson & Gabszewicz, 2006; Armstrong, 2006; Eisenmann, Parker, & van Alstyne, 2006). Whereas previous research in this regard highlights pricing mechanisms (Armstrong, 2006; Caillaud & Jullien, 2003; Rochet & Tirole, 2006), as well as platform content (Anderson & Gabszewicz, 2006; Hagiu & Spulber, 2013; Wilbur, 2008) as important marketing strategies, our results emphasize the specific role of customer orientation in two-sided markets. We demonstrate that customer orientation is an appropriate capability coordinating both customer groups. Customer

orientation toward one group simultaneously fulfills expectations of the same and the other customer group. However, platform firms need to consider the impact customer orientation behavior toward one customer group has on the satisfaction of the other group. In this regard, we provide additional evidence that marketing activities directed at advertisers as one manifestation of paying customers, need not necessarily have a negative impact on the satisfaction of free customers as highlighted by prior research (Wilbur, 2008).

Second, we show that the level of customer orientation to free customers is higher than to paying customers, even if the former do not bring revenue. This finding makes an important contribution to our knowledge on two-sided markets with a non-paying customer population. By modelling the customer value of free customers, previous studies showed that free customers are very valuable to service providers, and that platform firms therefore should assign more importance to them in their marketing activities (Gupta & Mela, 2008; Kraemer et al., 2010; Zhang et al., 2012). Our results extend these findings by confirming that providers are actually aware of free customers' value, and indeed assign high importance to them.

Third, we contribute to research on free e-services by showing that a free e-service provider's prior strategic commitment influences the success of the free business model. Our results demonstrate that free-borns stick to the free business model to a greater extent than laggards, as they have a better understanding of the free business model's particularities. Consequently, free-borns develop appropriate customer orientation capabilities which contribute to their financial performance. Thus, our results indicate that an accurate understanding of how to respond to the particularities of free e-services in the development of customer orientation capabilities helps laggards to turn the free business model into a successful one. Extant

research investigating this question mainly focused on freemium pricing strategies, where a part of the offer is not free to end customers (Lambrecht & Misra, 2016; Pauwels & Weiss, 2008).

Contributions to stakeholder marketing. The results of our study directly respond to prior research calls in stakeholder marketing which point to a continued need for more scholarly work that (1) applies a systemic perspective to capture complex value-exchange relationships, and (2) provides evidence on how marketing in this context materializes in concrete marketing capabilities (Hillebrand et al., 2015). Responding to the first research call, our study simultaneously takes into account customer orientation to two distinct stakeholders, free and paying customers, and its effects on both stakeholders' satisfaction. Addressing the second research call, our evidence demonstrates that systems thinking is an essential capability of marketing managers, at least for free-borns. Thus, we empirically confirm its existence, as was claimed by Hillebrand et al. (2015).

4.6.2 Managerial Implications

Our results provide meaningful and actionable implications for managers of free e-services. First, the results of both studies demonstrate that customer orientation is a necessary and valuable firm capability for reaching one's own financial goals in the context of free e-services. Free e-service providers need to be customer oriented to free and paying customers. Free e-service providers must be especially aware of the critical role of customer orientation to free customers: Even if they do not provide any direct monetary revenue in exchange for the service offer, customer orientation toward free customers indirectly contributes to a service provider's success. Hence, it is as

important for providers to fulfill the needs of free customers as it is to meet those of paying customers.

Second, free e-service providers should leverage the interdependencies inherent in free e-services. Customer orientation behavior toward one customer group can be used not only to satisfy this customer group, but also, simultaneously, the other group. To do so, free e-service providers need to develop a new capability: At any point when they are customer oriented toward one customer group, managers should be aware of the consequences their activities have for the other group's satisfaction. By anticipating those effects, managers can shape customer orientation behavior toward one customer group in a way that satisfies both groups at once. Developing such customer orientation capabilities is an organization-wide task which needs the top management's support and appropriate coordinating of customer orientation activities toward free and paying customers, e.g., through centralization or a steady knowledge flow if customer orientation is decentralized. Developing such capabilities also requires training of employees, and the adjustment of key performance indicators (Jaworski & Kohli, 1993).

Third, our results will prove to be especially valuable for laggards, i.e., for free e-service providers who had non-free business models prior to launching a free e-service. These service providers need to acquire an accurate understanding of free e-services to develop appropriate customer orientation capabilities. Only then, will they know how to positively leverage the particularities of free e-services, to render customer orientation behavior toward free and paying customers effective and efficient. Most importantly, free e-service providers should be aware of the criticality of free customers for the free business model. They not only need to be customer oriented toward free customers directly, but also have to keep their interests in mind

when they are customer oriented toward paying customers. Raising awareness for free customers' value implies shifting attention from key performance indicators, which capture consumers' monetary value contributions only to key performance indicators that also include non-monetary value contributions, such as word-of-mouth, co-production, network effects, attention, or data (Anderl, März, & Schumann, 2016). Further, customer orientation toward free and paying customers needs to be more efficient and effective. Regarding customer orientation toward free customers, laggards should align their customer orientation behavior to the value free customers have to the service provider. Additionally, they should recognize that customer orientation behavior is different for free and paying customers. For instance, the needs of paying B2B customers could be assessed directly through key account managers, whereas this is hardly actionable with free customers due to their large numbers. Text-mining and online-surveys could be a valuable alternative. Regarding customer orientation toward paying customers, laggards should be cautious to not only fulfill paying customers' obvious and articulated needs, but also to proactively shape the relationship with paying customers by addressing their latent needs. To do so, laggards must understand the subordinate importance of paying customers for the free business model. Changing a company's mindset and developing new capabilities, as in the case of laggards, is not easy, as it implies investments throughout the whole organization as outlined by research on firms' capabilities (Leonard-Barton, 1992; Teece et al., 1997; Tripsas & Gavetti, 2000). For example, the top management has to allocate sufficient resources for the organization to build an adequate knowledge base about free e-services, and to adapt organizational routines and processes to the particularities of free e-services. However, our results provide evidence that those investments pay-

off, as service providers are enabled to leverage the full potential of customer orientation in free e-services.

4.6.3 Limitations and Future Research

The limitations of our study provide several avenues for further research. First, we assessed the outcomes of customer orientation (i.e., free and paying customers' satisfaction and service provider's financial performance) based on the perceptions of one single key informant. Future research should identify additional data sources to validate our findings. Besides using survey data from managers of free e-service platforms, future research could additionally build on survey data of free as well as of paying customers. These data sources could add further perspectives and deliver a more reliable measurement of the customer groups' satisfaction, but also provide insights into customers' perception of customer orientation behavior targeted toward them. Nevertheless, following Homburg et al. (2012), we are confident that our results yield first valuable insights into customer orientation and its outcomes in free e-services. For instance, they point out that information's accuracy is high, if respondents are asked about salient constructs, if they have an executive position, or if they are employed in small firms, as is the case in our study.

Second, validating the impact customer orientation toward free customers has on financial performance, is another promising research issue. However, this might be a challenging task, as many small and young firms identify as free e-service providers who are not required to disclose their financial data publicly. An alternative to this approach could be to run a longitudinal study to determine firm survival and success, which is a common approach in research on market entry timing (Kalyanaram, Robinson, & Urban, 1995), closely related to our measure of a service provider's

strategic commitment. Third, and related to this, additional research is needed that will analyze the impact of customer orientation on different performance indicators. In this research, we focused on a firm's financial goal attainment to be able to compare the free e-service providers of our sample. However, free e-service providers pass distinct phases throughout their business life cycle, with distinct strategic goals. While the growth of free and paying customers is of particular interest at the beginning of the life-cycle, at later stages providers focus on the platform's profitability. Future research could examine whether anticipating the needs of one customer group, while being customer oriented toward another group, has equal positive effects on distinct strategic goals. Fourth, another promising area for in-depth future research is the free e-service provider's capability to anticipate the effects customer orientation toward one customer group has on the other group's satisfaction. In this respect, we argue, that free-borns leverage this systems thinking capability better than laggards do. We propose the underlying reason is that free-borns acknowledge the needs of both customer groups, while laggards are too heavily tied to paying customers and their needs. However, this proposition requires empirical validation. As such, future research could use experimental studies with managers, in order to analyze whether the dedicated focus on paying customers in their experience with non-free business models, causes laggards to neglect the interests of free customers while being customer oriented toward paying customers. Fifth, analyzing additional moderators or sub-groups among free-borns and laggards could yield new interesting and valuable insights. For instance, future research could disclose whether particular free-borns cope better with the free business model than others do. For laggards, it would be worthwhile to investigate whether insufficient understanding of the paradigms of

customer orientation in the free business setting can be compensated for by other capabilities.

4.7 Conclusion

Extant conceptions of customer orientation are not sufficient to explain how free e-service providers should respond to the particularities of free e-services and how their conception of customer orientation influence customer orientation outcomes. Using two studies, we have demonstrated that free e-service providers are heterogeneous in their understanding of those particularities and, thus, in their customer orientation behavior and its outcomes. Free-borns, who strategically committed themselves to the free business model from the beginning, possess the necessary knowledge of free e-services' particularities and are therefore able to create value for free and paying customers efficiently and effectively. Laggards who committed themselves to non-free business models prior to launching a free e-service, in contrast, are inefficient and ineffective in their customer orientation behavior as they underestimate the importance of free customers, and overestimate that of the paying ones. We suppose this to be the underlying reason why laggards are finding it difficult to adjust to the free business model.

4.8 References

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4.9 Appendices

Appendix D. List of Interview Participants — Study 1

Interview	Function	Business Field	Number of Employees	Founded in
A	CRM Manager	Online Gaming Provider	>200	2005
B	General Manager	Publishing House (with Online Sector)	>200	1949
C	General Manager	Online Community	10–49	2011
D	General Manager Digital	Publishing House (with Online Sector)	50–199	2001
E	General Manager	Online Career Network	10–49	2000
F	General Manager	Online Community	10–49	2010
G	Marketing Manager	Real Estate Marketplace	>200	1997
H	General Manager	Online Community	<10	2009
I	General Manager	Software Provider	50–199	2003
J	Head of Operations	Online Community	10–49	2002
K	General Manager	Online Community	10–49	2012
L	Marketing Manager	Couponing App Provider	10–49	2009
M	General Manager	Tariff Consultancy	<10	2012
N	Marketing Manager	Online Community	50–199	2006
O	General Manager Digital	Publishing House (with Online Sector)	>200	1946
P	Marketing Manager	Price Comparison Website	>200	1999
Q	General Manager	Price Comparison Website	>200	1999
R	Head of Strategy	Online Marketplace (Real Estate, Cars)	>200	1993
S	General Manager	Price Comparison Website	50–199	1999
T	General Manager	Publishing House (with Online Sector)	>200	1974

Construct (Source)	Items	Scale
Customer orientation (Carver & Slater, 1990)	<p>Our business objectives are driven primarily by the satisfaction of free (paying) customers.</p> <p>We constantly monitor our level of commitment and orientation to serving the needs of free (paying) customers.</p> <p>Our strategy for competitive advantage is based on our understanding of the needs of free (paying) customers.</p> <p>Our business strategies are driven by our beliefs about how we can create greater value for free (paying) customers.</p> <p>We measure the satisfaction of free (paying) customers systematically and frequently.</p> <p>We give close attention to customer service for free (paying) customers.</p>	<ul style="list-style-type: none"> • Reflective measure • Seven-point scale anchored by “strongly disagree” (1) and “strongly agree” (7)
Measurement Items for Central Constructs		
Customer satisfaction (Thorpe & Morgan, 2005)	<p>Satisfaction of free (paying) customers</p> <p>Delivering value to our free (paying) customers</p> <p>Delivering what our free (paying) customers</p>	<ul style="list-style-type: none"> • Reflective measure • Seven-point scale anchored by “worse than competitors” (-3) and “much better than competitors” (3)
Financial goal attainment (Thorpe & Morgan, 2005)	<p>Reaching financial goals</p>	<ul style="list-style-type: none"> • Reflective measure • Seven-point scale anchored by “worse than competitors” (-3) and “much better than competitors” (3)

Construct (Source)	Item	Scale
Firm size	Please indicate how many employees work for your free e-service at the present. <ul style="list-style-type: none"> • 0 • 1-49 • 50-249 • 250-499 • 500 or more 	<ul style="list-style-type: none"> • Nominal scale
Firm age	Please indicate your firm's date of funding.	<ul style="list-style-type: none"> • Ratio scale
Measurement Items for Central Constructs (Continued)	Please indicate the frequency of your free e-service. <ul style="list-style-type: none"> • Advertising • Marketing research • Data selling • Commissions / Transaction fees 	<ul style="list-style-type: none"> • Nominal scale

Appendix F. Sample Characteristics

	Free- Borns	Laggards	χ^2 -Test
Revenue Model			
	%	%	
Brokerage Affiliate	60	63	$\chi^2 (1, N = 91) = 0.003$
Advertising	91	84	$\chi^2 (1, N = 91) = 0.349$
Marketing Research	4	8	$\chi^2 (1, N = 91) = 0.148$
Data selling	13	3	$\chi^2 (1, N = 91) = 1.909$
Category			
News	36	37	$\chi^2 (1, N = 91) = 0.000$
Entertainment	36	39	$\chi^2 (1, N = 91) = 0.018$
Advice	23	45	$\chi^2 (1, N = 91) = 4.011^*$
Social networks/communication	28	24	$\chi^2 (1, N = 91) = 0.063$
Services	21	32	$\chi^2 (1, N = 91) = 0.860$
Travel, weather and navigation	15	26	$\chi^2 (1, N = 91) = 1.120$
Economy, finance and classified markets	15	18	$\chi^2 (1, N = 91) = 0.018$
Sport and fitness	13	16	$\chi^2 (1, N = 91) = 0.002$
Shopping/Catalogues	13	8	$\chi^2 (1, N = 91) = 0.211$
Games	9	11	$\chi^2 (1, N = 91) = 0.000$
Food and drinking	4	8	$\chi^2 (1, N = 91) = 0.148$
Funding			
Bootstrapping	47	32	$\chi^2 (1, N = 91) = 1.042$
Equity parent company	15	32	$\chi^2 (1, N = 91) = 2.612$
Subsidies other company's offers	8	37	$\chi^2 (1, N = 91) = 10.195^{***}$
Business angel	13	16	$\chi^2 (1, N = 91) = 0.002$
Venture capital	13	5	$\chi^2 (1, N = 91) = 0.803$
Subsidies parent company	6	13	$\chi^2 (1, N = 91) = 0.757$
Bank credit	9	5	$\chi^2 (1, N = 91) = 0.114$
Public financing	8	5	$\chi^2 (1, N = 91) = 0.000$
Crowdfunding	2	8	$\chi^2 (1, N = 91) = 0.740$
Shares	0	0	$\chi^2 (1, N = 91) = 2.473$
Revenues (in thousands of euros)			
			$\chi^2 (5, N = 79) = 11.815^*$
< 100	31	43	
100 < 1,000	36	18	
1,000 < 5,000	11	28	
5,000 < 10,000	0	6	
10,000 < 50,000	11	9	
> 50,000	0	6	

Sample Characteristics (Continued)

	Free- Borns	Laggards	χ^2-Test
Free customers (in thousands)	%	%	
			$\chi^2 (5, N = 87) = 3.850$
< 10	5	10	
10 < 50	27	16	
50 < 250	30	22	
250 < 1,000	14	24	
1,000 < 10,000	19	24	
> 10,000	5	4	

5 Overall Discussion

In three independent essays, this dissertation addresses current challenges and opportunities for marketing in an evolving technological environment. Essay 1 and Essay 2 focus on opportunities and challenges sprouting in the realm of digitized physical retail environments. Thereby, Essay 1 provides an overview of prior research on the impact of retail technologies on consumer behavior at physical retail stores and derives potential questions to set a research agenda. Essay 2 focuses on one particular retail technology and sheds light on new types of data collection, by analyzing the influence which personalized advertising via in-store consumer tracking technology can have on consumers' emotions and downstream purchasing behavior. Finally, Essay 3 addresses the role of new, complex business models in an evolving technological environment. Specifically, Essay 3 investigates how the particularities of free e-services and their underlying business model challenge firms' capabilities, customer orientation behavior, and current knowledge from customer orientation research.

In the following, we discuss implications for academia, whereby we first take a broader perspective on the overall theoretical implications of this dissertation and, thereafter, shortly summarize implications from each of the three essays individually. Subsequently, we highlight the most important managerial implications derived from this dissertation as a whole and conclude with an outlook identifying potential future research avenues.

5.1 Implications for Research

Beyond the individual contribution of each essay, this dissertation as a whole provides at least five valuable implications for academic research in marketing in an evolving technological environment.

Shift from traditional to new ways of doing business. Taking a broader perspective, this dissertation presents valuable insights and implications for marketing research on how digital technology disrupts existing business and how incumbents consequently shift from traditional to new ways of doing business (Inman & Nikolova, 2017; Leeflang, Verhoef, Dahlström, & Freundt, 2014; Marketing Science Institute, 2016). While Essay 2 highlights potential downsides for retailers and consumers in the realm of transforming traditional physical retail stores to digitized environments, Essay 3 sheds light on how the shift to adopting an innovative, complex business model may challenge firms (e.g. traditional publishing houses adopting the free business model) and their capabilities. As such, this dissertation contributes to the call for research on strategies firms employ, which shift from traditional to more competitive ways of doing business in the digital era (Marketing Science Institute, 2012).

New approaches, new data, and new skills. This dissertation furthermore responds to the call for research on new approaches, new data, and new skills in the realm of the digital transformation, which has been highlighted as one of the top tier future research priorities by the Marketing Science Institute (2016). Essay 1 conceptually points to innovative retail technologies traditional physical retail stores embrace to engage with customers throughout the shopping cycle. Thereby, Essay 1 advances knowledge on the role of innovative approaches to impact consumer behavior (e.g., Lambertson & Stephen, 2016; Lemon & Verhoef, 2016; Shankar, Inman,

Mantrala, Kelley, & Rizley, 2011). Essay 2 opens the discussion on new data collection methods for personalized public advertisements via new in-store tracking technology and adds to a better understanding of possible risks and negative consequences for consumers and retailers. As such, Essay 2 contributes to advancing knowledge on new types of data and consumer insights available due to technological advancements (e.g., Erevelles, Fukawa, & Swayne, 2016; Marketing Science Institute, 2016). Whereas Essay 1 and Essay 2 focus on new technological approaches and new data available, Essay 3 advances knowledge on new skill sets and firm capabilities needed (e.g., Day, 1994, 2011; Leeflang et al., 2014) in order to understand and effectively manage the complexity of innovative business models (Marketing Science Institute, 2016).

Innovation, design, and strategy in an age of disruption. This dissertation follows the call for required research on innovation, design, and strategy in an age of disruption by the Marketing Science Institute (2016). Essay 1 and Essay 2 contribute to advancing our understanding of innovative store design, and in-store customer experience related to the embracing of retail technologies (e.g., Lemon & Verhoef, 2016; Shankar et al., 2011). Essay 3 reveals strategically highly relevant insights on the efficient and customer centric design of complex service offerings, by unearthing new strategies to accommodate the paradigms of free business models. Thereby, Essay 3 adds to research by providing new insights into customer orientation in multi-party settings (e.g., Huang & Rust, 2013; Narver & Slater, 1990; Rochet & Tirole, 2006; Rust & Kannan, 2003; Sorescu, Frambach, Singh, Rangaswamy, & Bridges, 2011).

Divergence of practical relevance versus rigor in marketing. This dissertation follows the call for research that reduces the divergence of practical relevance versus

rigor in marketing research (e.g., Reibstein, Day, & Wind, 2009; Roberts, Kayande, & Stremersch, 2014). With Essay 1 and Essay 2, we elaborate on emerging, highly innovative retail technologies, which thus far have gained little attention in marketing research, such as the use of audience-measurement tools in physical retail stores. Shugan (2004) lamented that academic research in marketing tends to build on prior research topics or well-established industry practices, and thus risks to foresee enduring trends. As such, with Essay 1 and Essay 2 we follow the call by Shugan (2004) for research on emerging technologies which have the potential to heavily reshape existing retail practices and, as such, ensure both, practical relevance and rigor of our research topics. Furthermore, with Essay 3 we focus on issues of high managerial and strategic relevance, by making use of in-depth interviews and a survey of senior executives of free e-service providers.

Methodological diversity. This dissertation moreover analyzes the opportunities and challenges for marketing in an evolving technological environment from various angles and thus emphasizes on the benefits of methodological diversity (Davis, Golicic, & Boerstler, 2011). Following Davis et al. (2011), we employ a variety of research designs, including laboratory experiments, in-depth interviews, but also survey research. Moreover, we use a variety of data analysis approaches, such as moderated mediation analysis with spotlight analysis or partial least squares structural equation modeling.

Beyond the five outlined overall contributions of this dissertation, each essay individually offers several contributions to research on marketing in an evolving technological environment. Essay 1 addresses digitized physical retail environments and outlines an overview of previous research on retail technologies' impact on

consumer behavior at physical stores. Essay 1 thereby makes several conceptual contributions (MacInnis, 2011) to research in marketing and retailing, such as research on customer experience (e.g., Lemon & Verhoef, 2016; Verhoef et al., 2009), shopper marketing (Shankar et al., 2011), and specifically on the evolving role of technologies in retailing (e.g., Grewal, Roggeveen, & Nordfält, 2017) by applying a shopping cycle based framework to organize, delineate and summarize findings from extant literature. Moreover, we identify specific gaps in existing literature relative to currently applied practices of retail technology, but furthermore gaps in research on emerging trends, which have the potential to reshape the retailing environment (Shugan, 2004). The extensive research agenda proposed in Essay 1 thereby contributes to the development of an impactful research program to advance the generation of knowledge development on retail technologies' behavioral impact.

Building on particular questions, which we have pointed to in the research agenda developed in Essay 1, Essay 2 analyzes the perceptions and consequences of personalized advertising in physical retail stores, which is based on consumer data provided by facial recognition technologies. As such, Essay 2 addresses the challenges related to new types of consumer data and the customization of shopping experiences with the help of innovative retail technology. The results of two experimental studies enhance research on personalized advertising (e.g., Bleier & Eisenbeiss, 2015; Schumann, Wangenheim, & Groene, 2014; Speck & Elliott, 1997) by expanding current marketing knowledge on how personalization alters effects of advertisements in public vs. private environments. Further, we add to research on shopper marketing (e.g., Shankar et al., 2011) and customer experience (e.g., Lemon & Verhoef, 2016; Verhoef et al., 2009) by answering the call for research that advances knowledge on how new in-store technologies and social environments impact consumers at physical

retail stores. Additionally, we contribute to prior research on self-concept congruity (e.g., Hosany & Martin, 2012; Kressmann et al., 2006; Sirgy et al., 1997) by showing that it is important to examine the direction (i.e., valence) of advertising-self-incongruity as it alters consumer response to personalized advertising. Finally, Essay 2 adds to prior literature on identity marketing (e.g., Bolton & Reed, 2004; Forehand, Deshpandé, & Reed, 2002; Reed, Forehand, Puntoni, & Warlop, 2012) by documenting potential risks and limitations of identity appeals in advertising, especially in public settings such as retail stores.

Essay 3 relates to the particularities and challenges of new business models in an evolving technological environment. Specifically, this essay focusses on the complex multiparty interactions of free e-services and how two major particularities (i.e., interdependencies between free customers and paying customers; superiority of the free customers, even if they do not bring monetary proceeds) challenge firms' customer orientation behavior. The findings of our research contribute to marketing theory in at least three major important ways: First, our findings expand customer orientation research (e.g., Chakravarty, Kumar, & Grewal, 2014; Jaworski & Kohli, 1993; Narver & Slater, 1990) by applying a disaggregated perspective on customer orientation and its outcomes in a multi-party setting (Chakravarty et al., 2014) and further by taking customer orientation towards free customers into account, which thus far has been neglected in prior research on multilateral value exchanges (e.g., Chakravarty et al., 2014; Jaworski & Kohli, 1993; Narver & Slater, 1990). Moreover, we extend prior customer orientation research by providing evidence of strategic commitment as a firm-internal contingency factor of customer orientation (Jaworski & Kohli, 1993; Kirca, Jayachandran, & Bearden, 2005). Second, Essay 3 makes valuable contributions to research on two-sided markets (e.g., Anderson &

Gabszewicz, 2006; Armstrong, 2006; Zhang, Evgeniou, Padmanabhan, & Richard, 2012) by identifying customer orientation as an appropriate coordination strategy to meet the expectations of multiple market sides, and, hence, gaining their commitment to the platform. Moreover, we expand research on two-sided markets by showing that the level of customer orientation behavior toward free customers is higher than toward paying customers, but also by unearthing new strategies for laggards to accommodate free business. Finally, we directly answer prior calls from stakeholder marketing research (Hillebrand, Driessen, & Koll, 2015) by taking a systemic perspective to investigate complex value exchange relationships in free e-services.

5.2 Implications for Management

From a managerial perspective, this dissertation holds valuable insights and implications for businesses in an evolving technological environment, which are relevant for both – the virtual, but also the physical world. In this section, we highlight managerial implications that can be generalized to the two major settings we focus on: the digitization of physical retail stores and the management of innovative business models. A more detailed and specific discussion of managerial implications can be found in the respective essays. As such, over the course of all three essays, at least two major implications are noteworthy.

Development of new firm capabilities and skill sets. Managers need to be aware that a shift from traditional to new ways of doing business requires the development of new firm capabilities and skill sets. Prior knowledge on business paradigms and effective marketing strategies might not be directly transferable to new technology-driven settings. In the realm of digitizing physical retail environments, the results of Essay 2 show that personalization in a public setting (e.g. physical retail

stores) is different from personalization in a private context, as the effectiveness of personalized advertisements is significantly lower in the social presence of others. These findings are important, as they show that well established prior personalization strategies (e.g. personalized e-mail marketing, personalized online marketing, and personalized postal and phone marketing) and related prior managerial knowledge as well as skill sets do not generalize to personalized advertising that consumers receive in physical retail stores. Subsequently, managers need to be aware of the paradigms of personalization strategies in public and create new knowledge and capabilities. Essay 3 further supports our argument and recommendation that managers need to be aware that prior knowledge is not directly transferable when shifting from traditional to new ways of doing business. Our results of Essay 3 show that for effectively managing new and complex business models, managers need to advance their knowledge on business paradigms and develop new skill sets, such as systems thinking capability, which helps them to manage multi-party value exchanges. This is specifically important for firms which started with a non-free business model before launching their free e-service and then later adapted the free business model. Our results prove evidence, that with to the shift to the free business model, those firms struggle to respond to the particularities and the complexity of the free business model, as they seem not to have developed an accurate understanding of free e-services and their paradigms.

Holistic managerial perspective. There is a strong need of a holistic managerial perspective, as the evolving technological environment yields an increasing complexity of businesses, markets and outcomes of marketing strategies. Managers need to consider a growing number of multiple contextual factors influencing their marketing actions. Moreover, managers are required to acknowledge what effects the marketing actions they take not only have on focal, targeted

consumers, but also on others, due to the complexity and interconnectedness of stakeholders involved in a business. In Essay 2, we highlight that for personalization in physical retail stores, the effects of the presented marketing content on consumer response are highly dependent on contextual factors, such as social presence of other consumers. Essay 3 further affirms the need of a holistic managerial perspective by showing how marketing actions directed to one market side in a multi-party setting also impact the other market side. By being aware of this interconnectedness of market sides and outcomes of managerial actions, and by consequently taking a holistic perspective, firms will be more efficient and successful in the management of new, complex business models.

5.3 Outlook

This dissertation contributes to a better understanding of the evolving relationship between marketing and technology and provides meaningful insights for academia and practice. However, this dissertation is subject to limitations that provide various promising avenues for future research. While detailed and specific discussions can be found in the research agenda developed in Essay 1 and in the other respective essays, in this section we take a broader perspective by summarizing a more general outlook for research resulting from the implications of the dissertation as a whole. Key areas for future research are summarized in the following subsections.

Adding additional research designs and data sources. Even though we use a multi-method approach in this dissertation, the setups of Essay 2 and Essay 3 offer at least two opportunities for future research: First, *adding additional research designs and data sources* could reconfirm our findings and improve generalizability of our results. In our studies in Essay 2, we used scenario-based experiments, conducted

either online or in a computer lab. Even though controlled experimental studies are advantageous in terms of internal validity, supplementing field experiments to test for external validity (Calder, Phillips, & Tybout, 1982) of the findings of Essay 2 would follow the research approach of prior studies (e.g., Schumann et al., 2014) and be a valuable addition to our research. In Essay 3, we build on survey data of single key informants to assess the outcomes of customer orientation (i.e. free and paying customers' satisfaction and service providers' financial performance). Future research is required to validate our findings by identifying additional data sources. For instance, to add further perspectives and to provide a more reliable measurement of customer satisfaction, survey data of free as well as paying customers would be a valuable addition to our research. Nevertheless, referring to Homburg, Klarmann, Reimann, and Schilke (2012), information's accuracy is high, if respondents are asked about salient constructs, if they have an executive position, or if they are employed in small firms. As this is the case in our study, we are confident our results yield first valuable insights into customer orientation and its outcomes in free e-services.

Second, we suggest *conducting longitudinal studies* to take on a long-term perspective on our research findings of Essay 1, Essay 2 and Essay 3. Extending the conceptual and empirical findings from Essay 1 and Essay 2 by longitudinal studies would provide valuable insights into the emerging retail practice of digitizing physical stores. Some of the retail technologies presented and discussed in Essay 1 and Essay 2 are just beginning to be introduced and further research is needed to understand, whether the application of innovative technologies (e.g., advanced technologies) enables retailers to successfully compete with digital players. Do retail technologies help retailers to renovate traditional retail space to benefit from digital innovation? Does the application of retail technologies pay off for physical stores in the long run

to operate in a sustainable manner? Will, in the long run, retail technologies significantly help to sustain the role of physical stores and to compete with e-commerce players, such as Amazon?

The usage of longitudinal studies would furthermore add important additional insights to Essay 3. Our findings revealed that laggards (i.e. free e-service providers whose core business did or does not make use of the free business model) still need to develop an accurate understanding of free e-services and how they work. Furthermore, they need to develop related firm capabilities. As such, longitudinal studies would advance our findings, for instance by studying the development of firm capabilities of laggards and how those will, in the long run, affect firm performance. Moreover, conducting longitudinal studies could validate our findings on the impact customer orientation toward free customers has on financial performance, by determining firm survival and success. This would be a common approach following research on market entry timing (Kalyanaram, Robinson, & Urban, 1995), closely related to our measure of a service provider's strategic commitment.

Investigating the interplay and potential synergies between offline and online channels. As many firms rely on offline and online channels in parallel (Raman, Mantrala, Sridhar, & Tang, 2012), further research could investigate the interplay and potential synergies between offline and online channels. In Essay 1 and Essay 2 we focus on retail technologies applied within physical retail stores and their effects on in-store consumer behavior. However, some forms of retail technologies enable retailers to connect the physical store with their online channel, for example self-service technologies that allow consumers to search for products and order them online, if they are currently not available at the physical store. Offline-online channel integration, multi-channel management (e.g., Herhausen, Binder, Schoegel, &

Herrmann, 2015; Konuş, Verhoef, & Neslin, 2008), and leveraging synergies between channels (e.g., Joo, Wilbur, Cowgill, & Zhu, 2014; Naik & Peters, 2009) are topics that have gained increased research attention. However, research lacks findings on the application of retail technologies which integrate the online channel within physical retail stores. Studying this interplay opens ample opportunities for future research. For instance, how does the application of retail technologies which connect the consumer to a retailer's online channel within a store affect purchase behavior of consumers? What is the impact on overall store performance? To what extent should retailers strive for integrating the online channel within physical stores?

Furthermore, future research with an integrated perspective on offline and online channels would add additional meaningful insights to Essay 3. In Essay 3, we study challenges related to the particularities of new, complex business models in the virtual world with a specific focus on free e-service providers. However, for such providers, the complexity of their business model may not be limited to the virtual world. Providing free e-services is not the core business of some of the respondents of our qualitative and quantitative studies. Some firms, such as publishing houses launched online news platforms, yet still heavily rely on the printed newspapers market as their core business. As such, not only firm capabilities for effective management of the online business, but also of the offline business are required. Further research, thus, should look for ways to expand the perspective presented in Essay 3 in order to account for the complexity of simultaneous offline and online business operations.

New, complex business models based on sensitive consumer data. In Essay 2, we elaborate on personalization via consumer tracking technologies, based on new types of data and consumer insights within physical stores. Essay 3 focusses on new, complex business models in an evolving technological environment. Bridging these

two research areas (i.e., new consumer data; new and complex business models) offers potential for future research. Within the evolving technological environment innovative, complex business models emerge which are based on highly sensitive and new consumer data (e.g., Huang & Rust, 2013). For instance, insurance companies started offering personalized insurance tariffs, such as the concept of pay-how-you-drive insurance tariffs. Those are based on driver behavior, considering factors such as acceleration or braking behavior of a driver (Gerpott & Berg, 2012). This trend toward data driven, complex business models urges the need for research providing early insights in these emerging areas. For instance, which customization and personalization techniques can be used most effectively for new consumer data-driven business models? When does personalization go too far? Which form of data collection is seen most (un)favorably by consumers? How can firms ensure that consumers understand how their data are being collected and used?

In summary, new technology-driven challenges and opportunities for marketing research and practice emerged, offering ample areas for future research, since the increasing digitalization will continue and will have enduring effects on the marketing landscape. Thus, future research will be indispensable in order to gain deeper insights into technology-driven changes and how those challenge classic theories, models, and frameworks hitherto applied in marketing.

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