Shopping App Features:

Their Impact on Consumers' App Download, Usage, and Satisfaction

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1 Introduction

1.1 Relevance of shopping apps for retail research and practice

Customer behavior is changing as today's consumers are increasingly using electronic shopping channels for their purchases: in addition to the traditional offline and online channels, mobile channels are also being employed (see Lemon and Verhoef, 2016; Verhoef, Kannan, and Inman, 2015). The mobile channel in particular has experienced an upswing in recent years (Sing and Jang, 2020). In Germany, mobile commerce revenue increased by 19.1% from 72.8 billion Euro in 2020 to 86.7 billion Euro in 2021. The forecast for 2022 is 97.4 billion Euro (HDE, 2022). This can presumably be attributed to the fact that almost every consumer owns a smartphone nowadays (approx. 83%[1] in Germany; Bitkom, 2022). Consequently, in times of omni-channel-retailing, mobile applications (hereafter "apps") have become increasingly important (Groß and Sohn, 2021; Taylor and Levin, 2014). "Mobile applications are software or applications for the purpose of performing specific tasks for the user and are suited to run on mobile devices such as phones, smartphones, and electronic devices" (Chang, 2015, p. 679). The number of apps available, which remains immensely high (State 3. Quarter 2022: 3.5 Mio. Google Play Store; 2.2 Mio. Apple AppStore, Statista 2022), also reflects the importance of mobile apps. In consequence, the usage of apps is in a constant growth (Boyd, Kannan, and Slotegraaf, 2019; De Haan et al., 2018; Herhausen et al., 2019; Verhoef et al., 2017). As of now, every smartphone user has an average of 80 apps on their smartphone (buildfire, 2021). Apps offer consumers convenient use from anywhere (Chang, 2015; Kim, Lin, and Sung, 2013; Roy, 2017). Everything the consumer needs is a functioning internet connection. Given this, the consumer can use apps from the comfort of their sofa at home or while on the move in the subway. The app is opened with just one touch (Kim and Baek, 2017). There is an abundance of different categories of mobile apps such as messengers, weather information, games, and social networking platforms (Hsu and Lin, 2015; Roy, 2017). An important category is shopping apps (Kim, Lin, and Sung, 2013) since a study by Statista Global Consumer Survey 2022 shows that 42% of the respondents[2] state using shopping apps regularly. Shopping apps play an important role for retailers as they represent another touchpoint or channel in the customer journey (Wagner, Schramm-Klein, and Steinmann, 2020). The customer journey becomes increasingly comprehensive as customers use more different channels (Edelmann and Singer, 2015). Some customers prefer to search online and buy afterwards in-store. These are the so-called webroomers (Flavián, Gurrea, and Orús, 2019; Jing, 2018). Others on the contrary prefer

[1] Refers to the age group 16 years and older.

[2] Smartphone users aged 18-64 years.

the reverse, that is, they search offline in the shop and later buy online or via smartphone while in the shop. These are the so-called showroomers (Gensler, Neslin, and Verhoef, 2017; Rapp et al., 2015). This channel-switching behavior is referred to as multi-channel behavior (Verhoef, Neslin, and Vroomen, 2007) and presents retailers with the challenge of offering customers a variety of channels and linking them together to create an omni-channel experience (Verhoef, Kannan, and Inman, 2015). In this context, shopping apps might be a solution. Firstly, they represent an additional sales channel for consumers to do their shopping (Verhoef, Kannan, and Inman, 2015). Secondly, they offer the option of personal communication with the consumer as another touchpoint (Andrews et al., 2016; Natarajan, Balasubramanian, and Kasilingam, 2017; Park and Lee, 2017; Shankar et al., 2010). As a consequence, retailers can get in touch with their customers and strengthen the customer relationship (see Peng, Chen, and Wen, 2014; Taylor and Levin, 2014). Thirdly, shopping apps provide the option to connect different channels through various features, such as visual search or the QR code scanner (Hagberg, Sundström, and Egels-Zandén, 2016; Okazaki, Li, and Hirose, 2012). This enables retailers to keep consumers in their own channels, i.e., they do not switch to a competing retailer when they switch channels (Strähle and Girwert, 2016). Thus, they can prevent unwanted behavior such as competitive showrooming, where consumers gather information about a product from a retailer in a brick-and-mortar store but purchase it online at a competitive retailer (Gensler, Neslin, and Verhoef, 2017). In conclusion, shopping apps support the handling of the complex customer journey and channel switching as consumers can use the app in many ways.

Shopping apps can include different features (Kim, Yoon, and Han, 2016), such as a chat function (see Roggeveen and Sethuram, 2020), a product availability check (see Ortlinghaus, Zielke, and Dobbelstein, 2019), or a store finder (see Fang, 2019). App features support customers in their shopping process (Kim, Lin, and Sung, 2013) as they have different roles and provide various benefits. For example, an online magazine inspires customers with current trends, data preservation facilitates the online transaction, the feature to share product links to friends and family allows consumers to connect socially to get advice and due to the electronic receipt, no receipt can go lost anymore. Hence, app features support customers in different stages of the complex customer journey and are helpful for various customer segments. Online shoppers, who mostly use the online channel for shopping (Herhausen et al., 2019), find all features they need to purchase a product in the app, e.g., product finding tools and data preservation. Offline shoppers, who mostly go to a brick-and-mortar store for shopping (De Keyser, Schepers, and Konuş, 2015; Frasquet, Ieva, and Ziliani, 2019; Konuş, Verhoef, and Neslin, 2008) can use app features to prepare their shopping in-store, e.g., with the help of multi-channel technologies such as click & collect or check & reserve, or they can use features to find more

information about a product in-store such as the QR code scanner. Accordingly, multi-channel shoppers, who use more than one channel for their shopping (Konuş, Verhoef, and Neslin, 2008; Nakano and Kondo, 2018; Frasquet, Ieva, and Ziliani, 2019), find suitable features depending on the shopping stage of the shopping process and the desired channel. Consequently, shopping apps are an outstanding instrument to appeal to a broad audience because of their comprehensive features.

As shown, shopping apps with all their specific app features are powerful tools for retailers to entice customers to buy and to retain them in the long-term. However, the question arises how retailers can influence consumers to use their shopping app and in which way retailers can benefit from its use. Since it is not possible to use an app without a prior download (Peng, Chen, and Wen, 2014; Wang, 2017), the first question is how retailers can encourage their customers to download their shopping app through monetary (rebate) and nonmonetary (features) incentives. As app features support customers while they shop and address different customer segments, they might act as an excellent incentive to attract customers to download and subsequently use the app. Further, it is questionable which effects app features have in the long-term. As previous literature has shown, customer satisfaction is a key determinant of customer loyalty (e.g., Atulkar and Kesari, 2017; Harris and Goode, 2004; Olsen, 2007; Picón-Berjoyo, Ruiz-Moreno, and Castro, 2016; Santouridis and Trivellas, 2010; Shankar, Smith, and Rangaswamy, 2002; Wallace, Giese, and Johnson, 2004; Yang and Peterson, 2004) and loyal customers increase retailer's success (Lin and Wang, 2006; Reichheld and Schefter, 2000). Consequently, loyalty is an essential aim that every retailer strives to achieve. Although shopping apps provide great chances to increase loyalty and therefore revenue (Kim, Wang, and Malthouse, 2015), 64% of German retailers do not offer a shopping app (EHI, 2021). The most frequent argument is the cost. The development of an app is associated with high costs depending on the design (Thomas and Jayanthila Devi, 2021). Accordingly, retailers should think carefully about the features to be implemented in order to invest into the app efficiently. Deciding not to offer an app would be squandering the potential to strengthen customer relationships (see Peng, Chen, and Wen, 2014; Taylor and Levin, 2014) and therefore remain competitive in the long-term, especially in light of the upswing in the mobile market. Therefore, app features must be thoroughly thought out and effective in their intended functionalities to justify the investment.

Despite the high relevance of app features, they have not been sufficiently considered in the literature so far. Firstly, a systematic overview of app features in the mobile shopping app context is missing. There are studies that deal with features, but these studies do not focus on the mobile channel (e.g., Baier and Rese, 2020; McCormick and Livett, 2012; Ortlinghaus, Zielke, and Dobbelstein, 2019; Roggeveen and Sethuraman, 2020). The studies that deal with the app context merely select individual features (e.g., Kim, Wang, and Malthouse, 2015) or do not concentrate on the shopping context

(Kim, Lin, and Sung, 2013; Zhao and Balagué, 2015). To get an overview, a comprehensive study of different retailers in different sectors should be conducted to see which features exist and for which purpose the customer can use the features. The overview is important for retailers to get an impression of the current market situation regarding apps. From this, retailers can draw conclusions as to whether or not there is a need for action in the form of implementing various features or an app in general.

Secondly, there is a lack of empirical evidence on the impact of app features on app adoption. Previous research tends to look at general influencing factors on these variables, such as perceived usefulness (Chopdar et al., 2018; Hubert et al., 2017; Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Roy, 2017), ease of use (Groß and Sohn, 2021; Li et al., 2020; McLean and Wilson, 2019), or enjoyment (Groß, 2015; Ko, Kim, and Lee, 2009; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Roy, 2017; Saprikis et al., 2018). But specific influencing factors on app download and subsequent usage are missing. Here, there is a need for research that deals more specifically with app design features in order to be able to give retailers concrete recommendations for action with regard to app design and communication.

Thirdly, there is a lack of empirical evidence on the impact of app features on customer satisfaction and loyalty. Previous literature has mainly focused on the intention to use mobile app (e.g., Hew et al., 2015; Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Shen, 2015) while less studies concentrate on app use outcomes, such as customer satisfaction and loyalty (e.g., Omar et al., 2021). These outcomes are important for retailers as customer satisfaction leads to consumer loyalty and loyal customers spread positive word of mouth about the retailer, purchase repeatedly, and are willing to pay higher prices (Bhattacherjee, 2001; Zeithaml, Berry, and Parasuraman, 1996).

This dissertation closes the research gaps by first providing a systematic overview of various app features in a sector comparison and then looking at the effects of app features on download and use intention as shorter-term effects as well as on customer satisfaction and loyalty as potential long-term consequences. Furthermore, as consumers can use different channels for their shopping (Verhoef, Neslin, and Vroomen, 2007), consumers' channel preference is considered in the examinations in order to be able to give target-related implications. From the management perspective it is important to close the research gaps as consumers increasingly use the mobile channel (see Frasquet, Mollá, and Ruiz, 2015; Lemon and Verhoef, 2016; Verhoef, Kannan, and Inman, 2015) and retailers have to get their app downloaded and used in a competitive environment. If the app is well designed, the features can contribute to customer satisfaction and loyalty.

1.2 Research objectives and framework

The aim of this dissertation is to close the identified research gaps by analyzing app features in detail and by empirically examining their influence on consumers' app download, usage, and satisfaction. In this respect, the following superordinate research question is posed:

Which app features exist and how do they influence consumers' app download, usage, and satisfaction in multi-channel shopping?

To answer the superordinate research question, the pre-study provides a conceptual overview of various app features from different sectors. Afterwards two empirical projects with two studies each on the influence of features on consumers' app download, usage, and satisfaction are conducted. The first research project examines the influence of app features in comparison to a monetary incentive in form of a rebate on consumers' app download and use intention. The second research project analyzes the influence of different app feature groups on customer satisfaction and loyalty. The three dissertation projects are independent of each other. However, they complement each other in terms of content and thus jointly contribute to answering the superordinate research question.

The individual projects have the following focus:

Pre-study:	Focus on description of app features in different sectors (conceptual/descriptive)
Research Project 1:	Focus on consumers' download and use intention (quantitative)
Research Project 2:	Focus on customer satisfaction and loyalty (quantitative)

The pre-study provides a comprehensive overview of various app features. Retailers from three specific sectors as well as cross-sector retailers are considered: apparel, electronics, furniture, and generalists. A total of 41 apps are examined. First, this pre-study explains different features. Second, this project conducts a sector comparison in terms of the presence of each feature in the app. Third, additional studies consider the consumer perspective in terms of perceived usefulness and actual use of specific app features. Thus, this project addresses the following research questions:

(1) Which features of shopping apps are used in practice, and to what extent does their use differ between different sectors?
(2) Which app features do consumers use and which do they perceive as useful?

This project encompasses two analyses; one conceptional examination and one online survey. The conceptual study examines 41 apps of the 100 top-selling e-commerce retailers, among others, with regard to their app features. The online survey refers to the consumers' point of view. The study

examines consumers' perception of the usefulness of the app features and their usage behavior of the features. The evaluation is descriptive.

The research project contributes to existing literature by (1) conducting an extensive examination of most features from different sectors. This is relevant for practice, as retailers receive evidence for the design of their app, e.g., which features are customary in the sector and should definitely be implemented. This results in a need for further research, e.g., what influence the use of app features has on consumer behavior. Further, this project contributes to existing literature by (2) providing first insights into the consumer perspective regarding the perceived usefulness and use of individual features.

Research project 1 analyzes retailers' options to encourage consumers to download a shopping app and subsequently use it in the long-term. This research examines the impact of monetary (rebate) and nonmonetary (online and in-store features) incentives on both the download and use intention of a shopping app separately. This project considers retailers' opportunities to advertise their app with monetary and nonmonetary incentives. It looks at these incentive types to see if a rebate is necessary as an incentive to download, or if the app features themselves are the key benefit. Further, this research project contributes to existing literature by examining which features have an impact on consumers' perceived usefulness of the app. Finally, the research project considers the omni-channel environment regarding consumers' channel preference. This research project contributes to closing the following main research gaps: First, most of the recent literature focuses on the intention to use mobile apps (e.g., Hew et al., 2015; Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Shen, 2015). It neglects the topic of downloading, although this topic is extremely important, since it is not possible to use a mobile app without downloading it (Peng, Chen, and Wen, 2014; Wang, 2017). Second, recent literature neglects the consideration of consumers' channel preference. In an omni-channel environment, consumers have the option to use different channels such as the online channel and the physical store (see Gao and Su, 2017; Shankar and Kushwaha, 2021; Valentini, Neslin, and Montaguti, 2020). Shopping apps consider this possibility and offer online and in-store features. Online features refer to the use of the mobile channel regardless of location. In-store features refer to the use of the smartphone in the brick-and-mortar store. In consequence, depending on consumers' channel preference, the perceived usefulness of the different app features might differ. The project includes the following research questions:

(3) How do different types of incentives (monetary and nonmonetary, the latter in form of in-store - and online-features) influence consumers' intention to download and use shopping apps?

(4) Does the perceived usefulness of the shopping app moderate the effects of the rebate and mediate the effect of the nonmonetary incentives on the download and use intention?
(5) Does consumers' channel preference have a moderating impact on the relationship between the nonmonetary incentives and the perceived usefulness of the shopping app?

This project comprises two experimental online surveys in the apparel sector. It considers the apparel sector because the pre-study showed that most shopping apps exist in this sector. The first study uses a scenario-based online experiment with a 2 (rebate: yes/no) × 2 (online feature: yes/no) × 2 (in-store feature: yes/no) between-subjects design and data from 332 respondents. An online magazine serves as an example for an online feature and the QR code scanner for an in-store feature. This project considers these features as the pre-study showed that these features are common in the apparel industry. The second study uses an online experiment with a 2 (online/offline channel preference) × 3 (online/in-store/both feature/s) between-subjects design and data from 200 respondents. This follow-up study supplements the main experiment. In this study, the online feature is adjusted. The availability check is selected as it is also a common feature and the exact opposite of the QR code scanner. M/ANCOVA and PROCESS were used for data analysis.

The results of the project contribute to previous literature by (1) examining the effect of monetary (rebate) and nonmonetary (app features) incentives on the intention to download and to use a shopping app, (2) examining which features have an impact on consumers' perceived usefulness of the app, and (3) considering the omni-channel environment by analyzing moderating effects of consumers' channel preference for purchase.

Research project 2 deals with the topic of the consequences of app use, such as customer satisfaction and loyalty. Multiple studies mainly focus on the intention to use mobile apps (e.g., Hew et al., 2015; Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Shen, 2015), while this study investigates the potential outcomes. It further considers the app design by analyzing how three app feature groups (pre-purchase, transaction, cross-channel) influence app and retailer satisfaction. Compared to research project 1, three app feature groups are considered, as research project 2 includes a more comprehensive range of app features. Moreover, it considers consumers' channel preference at different stages of the customer journey. Retailers want to ensure that their customers are loyal since loyal customers are attractive customers who spend more money (Kim, Wang, and Malthouse, 2015; Liu et al., 2019). Loyalty is achieved by keeping customers satisfied (e.g., Atulkar and Kesari, 2017; Harris and Goode, 2004; Olsen, 2007; Picón-Berjoyo, Ruiz-Moreno, and Castro, 2016; Santouridis and Trivellas, 2010; Shankar, Smith, and Rangaswamy, 2002). However, the influencing factors of customer satisfaction in the context of shopping apps are neglected.

This research project addresses this research gap. To do so, it first looks at the question whether app users are more satisfied and loyal than nonusers. Second, the project differentiates app features systematically and identifies three feature groups: pre-purchase, purchase, and cross-channel features. Third, it examines the influence of various shopping app features on customer satisfaction. In doing so, the channel preference of consumers is also considered, since app features are able to combine the mobile channel with the offline channel. In addition, the project divides consumers' channel preference into pre-purchase and purchase stages, since preferences can differ at the individual stages of the customer journey (see Balasubramanian, Raghunathan, and Mahajan, 2005; Frambach, Roest, and Krishnan, 2007). Therefore, research project 2 answers the following research questions:

(6) Are shopping app users more satisfied and loyal toward the retailer than nonusers?
(7) Do different feature groups have a positive impact on customer satisfaction with the app and with the retailer?
(8) Does the consumers' channel preference moderate the impact of different feature groups on customer satisfaction with the app?

This research project comprises two online surveys. The first study relates to the apparel sector. The second study relates to the cosmetics and electronics sector. This project considers these sectors as they provide three appropriate apps with a comprehensive range of features. The aim of the second study is to validate and generalize the results of the first study. First, propensity score matching (PSM) and ANCOVA are used to examine differences in the two groups – app user and nonuser. Second, structural equation modelling (SEM) in PLS is used to calculate the influence of app features on customer satisfaction. Third, moderation effects are analyzed with PROCESS in SPSS.

The results contribute existing literature by (1) investigating the difference of app users and nonusers regarding their satisfaction with the retailer and loyalty toward the retailer, (2) classifying a comprehensive range of app features into systematic groups, (3) confirming the positive effect of app feature groups on customer satisfaction across sectors, and (4) considering consumers' channel preference in the pre-purchase and purchase stage as moderators. Figure 1 shows an overview of all research projects and their specific research gaps.

Analysis	Conceptual/descriptive	Empirical	
Research project	**Pre-study** Overview of app features in different sectors	**Research project 1** Download and use intention	**Research project 2** Customer satisfaction and loyalty
Research gap	No detailed overview of possible shopping app features No comparison of app features in different sectors Lack of comparison of practice and consumer perspective in the app context	No differentiation between download and use intention Lack of consideration of app features as incentives Lack of consideration of channel preference in app context	Lack of systematic classification of app features Lack of consideration of customer satisfaction and loyalty in the app context Lack of consideration of channel preferences in app context

Figure 1. Schematic overview of research projects.

Overall, this work shows through different projects that shopping app features are an effective tool to convince consumers to download and to then also use the app long-term, which in turn has a positive impact on overall satisfaction and loyalty. Shopping apps do not have to pose a threat of cannibalizing other channels. Quite the contrary, they complement other channels, such as the offline channel. With the help of an extensive range of relevant features, retailers have the opportunity to cater to the individual needs of consumers. The features offer consumers the opportunity to be inspired online, they support their purchase online and also on-site in the store, and they offer the possibility to switch back and forth between the channels. However, retailers need to highlight each feature with consistent marketing so that consumers are informed about the presence of the features and the benefits are understood. Then, retailers can be rewarded with loyal customers.

1.3 Structure of dissertation

This doctoral thesis comprises five chapters. Chapter 1 contains the “Introduction”, which outlines the relevance of the topic of shopping apps for research and retailers. Furthermore, the research objectives and the framework are explained. Chapter 2 presents the pre-study and gives an overview of “Shopping app features in practice” in detail in different sectors. Chapter 3 and 4 each represent a research project with different consumers studies. Chapter 3 comprises the research project regarding the “Adoption of shopping apps” and deals with consumers' download and use intention. Chapter 4

comprises the “Consequences of app feature usage” and considers consumers' satisfaction and loyalty in the shopping app context. The thesis closes with chapter 5, which includes a “General discussion” of the core results. This contains a summary of results, implications for management and the theoretical contribution as well as a presentation of relevant limitations and resulting future research approaches. Figure 2 illustrates the structure of the dissertation.

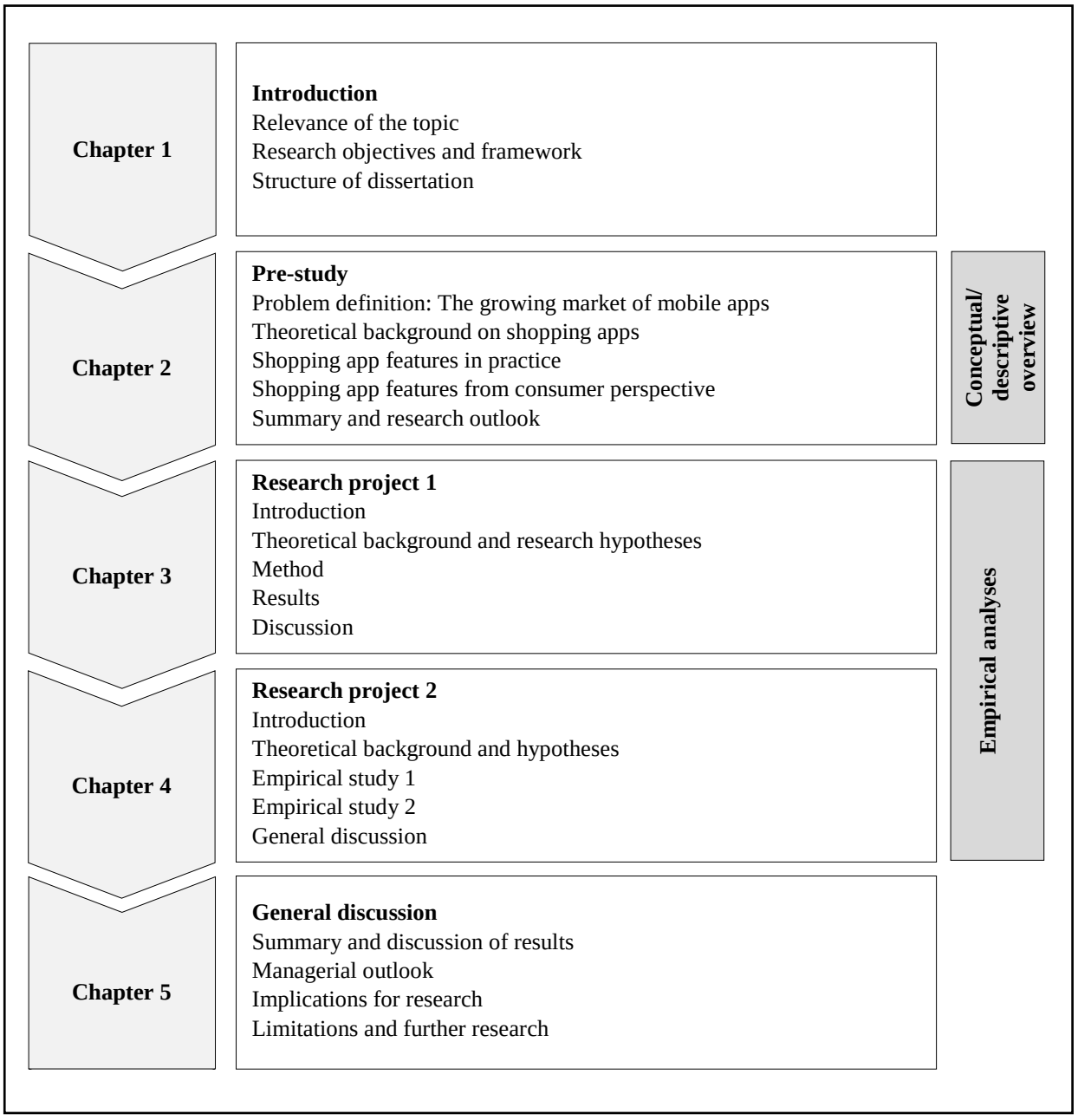

Figure 2. Structure of dissertation.

2 Shopping app features in practice[3]

Abstract

Increasingly, retailers are offering their customers a shopping app that allows them to make purchases via their smartphone. In addition, various other features can be integrated to make the buying process easier for customers. The following article analyzes the dissemination of such features of shopping apps in the apparel, electronics, and furniture sectors as well as in cross-sector retailers (generalists). It identifies and compares apps with regard to their features. In addition, this article considers the consumer's perspective. Two additional descriptive studies provide insights into consumers' perceived usefulness of specific app features and their usage. The findings provide implications for retailers on how to design their apps with regard to the implementation of specific app features.

Co-author: *Stephan Zielke (University of Wuppertal)*

[3] Chapter 2 is based on the following article by permission from Springer Nature**:** Springer Nature. Zielke, S., Sinemus, K. (2020). Shopping Apps: Servicefunktionen im Branchenvergleich. In: Roth, S., Horbel, C., Popp, B. (eds) Perspektiven des Dienstleistungsmanagements. Springer Gabler, Wiesbaden. Copyright: Springer Fachmedien Wiesbaden GmbH, part of Springer Nature, 2020. doi:10.1007/978-3-658-28672-9_33.

2.1 Introduction: The growing market of mobile apps

The use of smartphones has increased significantly in recent years. While there were 6.31 million smartphone users in Germany in 2009, 60.7 million people[4] were already using a smartphone in 2020 (Statista, 2021a). This corresponds to about 73% of the entire population of Germany[5]. The smartphone is a constant companion of consumers. According to a study of Bitkom (2017), more than 80% of smartphone users in all age groups check their device at least once a day. Among the youngest generation (18-24 years), as many as 40% look at their smartphone more than 50 times a day (Bitkom, 2017). Consumers use the smartphone for various purposes, such as making phone calls, sending text messages, using social networks, or shopping (Ametsreiter, 2017). The range of apps available in app stores is immense. In the second quarter of 2022, the Google Play Store had 3.5 million apps on offer and the Apple App Store 2.2 million apps. Meanwhile, the Amazon App Store offered 476.000 apps for download (Statista, 2022). It is estimated that above 200 billion apps were downloaded worldwide in both 2020 and 2021 in both the Google Play Store and the Apple App Store combined (Statista, 2021b).

Shopping apps for all retail sectors can be found in the app stores. A shopping app is defined as an app that allows consumers to make shopping transactions with their smartphone via the app (Kim et al., 2017). In apparel, e.g., we find apps from Zalando (10m+), H&M (10m+), and Asos (10m+) in the Google Play Store. Regarding electronics, MediaMarkt (1m+), Saturn (1m+), and Cyberport (100k+) offer an app. In the furniture category, IKEA (10m+), Wayfair (10m+), and Home24 (100k+) offer an app. One app that is installed frequently on consumers' smartphones is the Amazon Shopping app (100m+).

The obvious increase in the importance of the mobile channel and the high level of customer interest in shopping apps raise the question of what kinds of features the apps can be designed with to encourage customers to use the app. The usage of the app increases consumers' interest in the retailer, and with it, their interest in buying (Bellman et al., 2011). In addition to the pure shopping function, apps can integrate various other features (Kim, Yoon, and Han, 2016) that make it easier for customers to search for information, select products, make purchases, and make payments. Therefore, retailers have many possibilities when it comes to designing an app. We define a shopping app feature as a tool within a shopping app, which supports consumers in their shopping process. It is interesting for retailers to know which features are common in their sector and what they can learn from other

[4] Refers to the age group 14 years and older.

[5] We have projected a total population of 83 million people in 2020 (Statistisches Bundesamt, 2022).

sectors. With this knowledge, retailers are able to suitably design their app. To the best of our knowledge, no such sector comparison exists in current literature. Consequently, there is a need for such a structured app feature comparison. This paper analyzes these features of shopping apps. Furthermore, this paper investigates which app features consumers already use and which they perceive as useful. The results also provide retailers with suggestions for the design of their app. We will answer the following research questions:

- Which features of shopping apps are used in practice, and to what extent does their use differ between different sectors?
- Which app features do consumers use and which do they perceive as useful?

In order to answer these research questions, we first review the current state of research. Then, we identify, analyze, and compare existing shopping apps in the apparel, electronics, and furniture sectors as well as apps from generalists that offer products across sectors with regard to their features. Afterwards, we consider the consumers' perspective regarding their usage and perceived usefulness of specific app features.

2.2 Theoretical background on shopping apps

2.2.1 Usage of the mobile channel in the customer journey

The customer journey describes the usage of channels and touchpoints of a customer across the different stages of any buying process, e.g., the pre-purchase and purchase stage (see Lemon and Verhoef, 2016). A considerable amount of recent literature has examined the usage of stationary and online channels in the search and purchase stages (e.g., Goraya et al., 2020; Singh, Ratchford, and Prasad, 2014; Verhoef, Neslin, and Vroomen, 2007). In contrast, less attention has been paid to the usage of mobile channels in the customer journey (e.g., Lemon and Verhoef, 2016; Herhausen et al., 2019). A study by KPMG (2021) has shown that consumers still use stationary computers and laptops more frequently for shopping than the smartphone. Consumers use the smartphone predominantly in the pre-purchase stage to search for information, but less so in the purchase stage (Holmes, Byrne, and Rowley, 2014). The question for retailers is therefore how they should design the mobile channel so that customers can use it conveniently for the entire purchasing process. Mobile channels enable the integration of purchasing processes into customers' routines, which can have positive effects on their order volume and frequency (Wang, Malthouse, and Krishnamurthi, 2015).

Ample studies deal with factors influencing use intention in relation to the mobile channel (e.g., Groß, 2015; Marriott and William, 2018; Ko, Kim, and Lee, 2009; Sohn, 2017; Yang, 2010). Implications

for mobile channel design can be derived from their findings, e.g., Marriott and William (2018) suggest that retailers should develop more stronger payment security measures and improve the usability. Ko, Kim, and Lee (2009) suggest implementing strategies related to the perceived usefulness of the mobile channel. Sohn (2017) specifies this implication by suggesting to plan communication strategies that include information about aesthetic, technical, security, and information quality of the mobile channel as quality has a positive impact on consumers perceived usefulness of the mobile channel. Another implication is sending messages to the customer about mobile coupons (Yang, 2010). These studies provide interesting implications. However, they neglect mobile shopping design in terms of app features. Groß (2015) suggests that retailers should implement features on the m-shopping service/website which consumers perceive as useful. But they do not investigate these features.

2.2.2 Literature review

Shopping apps offer customers the option of conveniently completing purchase transactions via their smartphones. Ghose and Han (2014) find that the option to make purchases within the app is a positive factor that influences the intention to download or use the app. Advertising within the app has a negative effect. Studies like this provide clues as to which features an app should contain and which are perceived by customers as less relevant or even annoying. In the following, we will look at individual features of shopping apps that can be implemented in addition to the shopping function.

Previous literature mostly focuses on individual features (e.g., Jiang and Zou, 2020; Ortlinghaus, Zielke, and Dobbelstein, 2019; Okazaki, Li, and Hirose, 2012). Because of their usage, some features refer more to the pre-purchase, and others more to the purchase stage of the customer journey. Pre-purchase stage features are more likely to be used when consumers have not yet made a decision regarding a purchase. Purchase stage features support the consumers in their final purchase. One example of a pre-purchase stage feature is augmented reality. Augmented reality represents an innovative type of technology, which allows consumers to project virtual information into the real-world (Javornik, 2016). Previous literature found that augmented reality has a positive impact on consumers' inspiration while shopping (Rauschnabel, Felix, and Hinsch, 2019). Further, it has a positive influence on user experience, which subsequently positively influences consumers' satisfaction and willingness to purchase (Poushneh and Vasquez-Parraga, 2017). Other literature concentrates on chatbots, which is a computer program that provides real-time service in e-commerce settings (Adam, Wessel, and Benlian, 2020). Chatbots can be an effective tool in persuading customers to buy compared to employees (Luo et al., 2019). In addition, anthropomorphism increases the likelihood that users will comply with a chatbot's request for service feedback (Adam, Wessel, and Benlian, 2021). Magazines

are identified in the literature as a component of retailer websites (Rowley, 2009) that can inspire consumers to buy clothing (McCormick and Livett, 2012). The integration of an online magazine into a shopping app can be useful for customers, as many customers use the smartphone particularly in the pre-purchase stage (Holmes, Byrne, and Rowley, 2014), where inspiration plays an important role in attracting customers. The availability check allows customers to check online the availability of an item in the brick-and-mortar store (Herhausen et al., 2015; Bendoly et al., 2005). As previous literature has shown, it can contribute to higher perceived information quality (Oh and Teo, 2010). With the help of QR code scanners, customers can obtain mobile information on products, promotions, etc. in the store (Zhao and Balagué, 2015). They are seen as an opportunity to link different channels (Hagberg, Sundström, and Egels-Zandén, 2016; Strähle and Girwert, 2016) and thus create an interactive shopping environment. Another app feature is the option to share product links with family and friends. This means that customers are redirected from the retailer's app directly to social networks. Most often, consumers want to know a friend's opinion about a particular item before buying it (Morris, Inkpen, and Venolia, 2014). Studies have shown that the use of social media has a positive influence on consumers' purchase intentions (e.g., Hajli, 2014; Hutter et al., 2013; Onofrei, Filieri, and Kennedy, 2022). There is little literature on the store finder feature. However, from a retailer's perspective, this is not negligible, as according to Rowley (2009), 22 out of 23 apparel retailers had already integrated a store finder into their corporate website in 2009. The store finder offers consumers the opportunity to find the nearest retail store (Hansen and Sia, 2015) if, e.g., they are in an unknown city and are looking for the nearest retail store or if a certain product is not available in the preferred retail store.

Features, which support consumers to buy a product are, e.g., click & collect and check & reserve, which provide a link between the online channel (or mobile channel) and the brick-and-mortar store. Through this linkage, they help create a cross-channel shopping experience (Ortlinghaus, Zielke, and Dobbelstein, 2019). In other words, they offer the opportunity to conduct transactions across channels (Bendoly et al., 2005). With the help of click & collect, customers buy the product in advance online and pick it up in the retail store (Gao and Su, 2017). With check & reserve, customers reserve a product online and afterwards pay and pick it up at the retail store (Jin, Li, and Cheng, 2018). Previous literature has shown that different risk perceptions have an influence on the consumers attitude toward these features (Ortlinghaus, Zielke, and Dobbelstein, 2019). Furthermore, click & collect enhances the convenience of offline shopping (Gao and Su, 2017) and can lead to higher in-store traffic and sales (Gallino and Moreno, 2014; Gao and Su, 2017). Another feature that retailers can offer within their app is loyalty cards or club memberships. The aim of loyalty cards is to increase customer loyalty

in profitable customer segments (Bolton, Kannan, and Bramlett, 2000; Meyer-Waarden, 2007). Customers vary in their loyalty card usage behavior (Liu, 2007) and there are few customers who can truly be described as loyal in terms of loyalty card usage (Allaway et al., 2006). Accordingly, the challenge is to design the loyalty card program in such a way that consumers use their loyalty card frequently as well as in the long-term. Integration into a shopping app may contribute to this. From the consumer's point of view, Kim et al. (2013) state that above all the savings potential, the entertainment factor and social aspects such as the feeling of belonging to a community are reasons for participating in a loyalty card program. These aspects offer clues to successfully designing a loyalty card program and the loyalty card feature within an app. Mobile payment also represents a feature that retailers can offer within their app. Most studies focus on the adoption of mobile payment. So far, previous literature has found that especially the perceived ease of use and the perceived usefulness are important aspects of the use intention (Kim, Mirusmonov, and Lee, 2009; Talwar et al., 2020; Wu, Liu, and Huang, 2017).

The insight into the literature shows how individual app features have been studied and are depicted. The state of research also provides indications of how individual features can be designed and which factors influence their acceptance and impact. However, there is less documentation in the literature about the empirical relevance of the individual features in practice. In the following, we therefore analyze and compare shopping apps offered in different sectors.

2.3 Shopping app features in practice

2.3.1 Research design

For this investigation, we consider retailers of the 100 top-selling e-commerce online shops in Germany in 2020 and focusing on the apparel, electronics, and furniture sectors, which are the largest categories (EHI, 2021). In addition, we include generalists that offer a cross-sector assortment, for example big players such as Amazon. These retailers might offer interesting features as it can be assumed that they have fewer financial restrictions on app development. For the study, we select only those retailers from the 100 top-selling e-commerce online shops that offer a shopping app (the selected retailers thus, are not automatically retailers with the highest sales). Through this selection, we identify 18 retailers for apparel, six retailers for electronics and five retailers for the furniture sector. In addition, we consider eight generalists.

Since the number of retailers initially identified in the electronics and furniture sector is low, we consult additional sources here. We took a look in the Google Play Store and Apple Store, searching

for the term “electronics shopping” and “furniture shopping”. Based on search results, we add two retailers in each sector. Table 1 provides an overview of the retailers that offer an app and are studied accordingly. The order corresponds to sorting according to turnover (starting with the highest). Appendix A provides an overview of all potential retailers considered for the selection.

Table 1. Overview of shopping apps to be examined in sector comparison.

Company/Sector			
Apparel	**Electronics**	**Furniture**	**Generalists**
Zalando[1]	MediaMarkt[1]	IKEA[1]	Amazon
H&M[1]	Saturn[1]	Wayfair	Otto
BonPrix	Notebooksbilliger.de	Home24[1]	Lidl[1]
About You	Cyberport[1]	HSE	Tchibo[1]
Baur	QVC	Westwing[3]	Limango
s.Oliver[1]	Rebuy	Depot[1/2]	Kaufland[1]
Breuninger[1]	Coolblue[1/2]	Porta[1/2]	Klingel
Shein	Pollin[2]		Galeria[1]
Asos			
Esprit[1]			
Witt Weiden			
Heine			
Zara[1]			
Ernstings Family[1]			
C&A[1]			
P&C[1]			
EMP[1]			
Happy Size			

Notes: [1]Multi-channel retailers. [2]These retailers are not among the top-selling retailers. We found them in the app store. [3]We consider the online shop of Westwing: WestwingNow.

For the analysis, we first analyze the shopping apps in terms of their features. Afterwards we group the features in the pre-purchase or purchase category and describe them. Furthermore, we evaluate the frequency of occurrence of the features in the individual sectors.

2.3.2 Presentation of features

We identify a total of 22 app features. These include augmented reality, a chat function, a comparison list, an inbox, an online magazine, personal product recommendations from the retailer, a product availability check, product finding tools, a QR code scanner, the option of saving favorite items, the option of sharing product links, a size finder, a store finder, visual research, check & reserve, click & collect, data preservation, an electronic receipt, an e-mail for re-availability, a loyalty program, the payment via QR code, and shipment tracking. Table 2 shows the occurrence of these features and we explain them systematically below.

Table 2. Features of shopping apps.

	Pre-purchase features													Purchase features								
	Augmented reality	Chat	Comparison list	Inbox	Online magazine	Personal product recom.	Product availability check	Product finding tools	QR code scanner	Saving favorite items	Sharing product links	Store finder	Visual search	Check & reserve	Click & collect	Data preservation	Electronic receipt	E-mail for re-availability	Loyalty program	Payment via QR code	Shipment tracking	Size finder
Apparel																						
Zalando						x		x	x	x	x					x	x	x			x	x
H&M		x		x	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x	
BonPrix					x			x	x	x		x				x	x	x			x	x
AboutYou								x		x	x					x	x	x			x	x
Baur					x			x		x	x					x	x				x	
s.Oliver						x	x	x	x	x	x	x				x	x		x		x	x
Breuninger							x	x	x	x	x	x		x	x	x	x	x	x	x	x	
Shein				x				x		x	x		x			x	x	x	x		x	x
Asos					x			x		x	x		x			x	x		x		x	x
Esprit							x	x	x	x		x			x	x	x		x			x
Witt Weiden		x		x				x		x	x					x	x				x	x
Heine		x		x				x		x	x					x	x					x
Zara		x					x	x	x	x	x	x	x	x	x	x	x	x		x	x	
Ernstings Family								x	x	x	x	x	x	x		x	x		x			
C&A							x	x		x	x	x		x	x	x	x	x				x
P&C		x				x	x	x	x	x		x		x	x	x	x	x	x		x	
EMP		x			x			x		x	x	x				x	x		x		x	x
Happy Size								x		x	x					x	x	x			x	x
Electronics																						
MediaMarkt		x			x	x	x	x	x	x	x	x		x	x	x	x		x	x	x	
Saturn		x			x	x	x	x	x	x	x	x		x	x	x	x		x	x	x	
Notebooksbilliger			x		x		x	x		x	x					x	x				x	
Cyberport			x				x	x	x	x	x	x				x	x					
QVC								x		x	x					x	x					
Rebuy								x	x	x	x					x	x					
Coolblue							x	x	x	x	x	x		x		x	x	x			x	
Pollin								x	x	x						x	x				x	
Furniture																						
IKEA	x	x					x	x	x	x	x	x			x	x	x	x	x		x	
Wayfair						x		x		x	x					x	x	x			x	
Home24	x				x			x		x	x					x	x	x	x		x	
HSE								x		x	x					x	x					
WestwingNow	x							x		x	x					x	x	x	x		x	
Porta							x	x	x	x	x	x			x	x	x				x	
Depot							x	x	x	x	x	x				x	x					
Generalists																						
Amazon			x	x		x		x	x	x	x		x			x	x		x		x	x
Otto		x				x		x		x	x					x	x		x			x
Lidl				x	x			x		x	x	x				x	x		x	x		
Tchibo					x		x	x	x	x	x	x		x		x	x		x		x	
Limango								x		x						x	x		x		x	
Kaufland				x	x			x		x	x	x				x	x		x		x	
Klingel				x	x			x		x	x					x	x	x			x	x
Galeria		x			x		x	x				x		x	x	x	x		x			

Augmented reality

Augmented reality allows consumers to access a projection of the real world and to visualize the physical environment (Mishra et al., 2021). For this projection, consumers use their smartphone camera (Heller et al., 2019). With the help of the smartphone camera, consumers can, e.g., see how a piece of furniture fits into their home or try on a piece of clothing virtually (Mishra et al., 2021; Javornik, 2016). As consumers use this feature to see the product "physically" before they make a purchase decision, this feature is being used more often in the search phase (Heller et al., 2019).

Chat

A chat helps consumers because they can ask questions. To do this, they open the chat in the app and write their questions in the text field. There are two types of chats. The first one is a chatbot based on artificial intelligence that simulates human conversations (Luo et al., 2019). Therefore, the scope of each answer is limited. The second type is a chat with an employee (see Adam, Wessel, and Benlian, 2021; Luo et al., 2019). Consumers can ask any question and the employee will take care of the request. We argue that this feature rather belongs to the pre-purchase stage of the customer journey, since most questions concern the pre-purchase stage, such as technical details, prices, the next store, or opening hours. We assume this because chatbots like the one from MediaMarkt suggest these questions when opening the chat.

Comparison list

Consumers have the option to select two or more products to compare details in a comparison list. As consumers search for specific product details in order to compare products, they have not yet made a final decision on a product, consequently this feature refers to the pre-purchase stage.

Inbox

The inbox is comparable to an e-mail inbox. Consumers receive information from the retailer. This can be information about special offers or an answer to a question that the consumer asks via e-mail. Since this feature inspires consumers with special offer messages, this feature refers to the pre-purchase stage.

Online magazine

Some retailers provide users of their app with an online magazine, which is free of charge in most cases. In the magazine, users are informed about the latest trends in the apparel sector (McCormick and Livett, 2012) or they are educated about the latest technology. As a rule, the magazine is displayed in the form of articles one below the other, so that the user only has to scroll. A different kind of

magazine is a blog, which is used to pass on information to customers (e.g., Otto). A blog offers the opportunity to interact with the customers. As the online magazine inspires consumers, it belongs to the pre-purchase stage.

Personal product recommendations

Consumers are shown products which are personalized based on their prior searches and purchases. This is done with the help of an algorithm that retailers use (Guanchen, Kim, and Jung, 2021). Many retailers have a "Recommendations for you" category in their app. But not every retailer personalizes the products displayed based on previous searches. In this case, the retailers show randomly selected products. We only consider retailers that work with personalized ads. As this feature should inspire the consumers, it belongs to the pre-purchase stage.

Product availability check

This feature allows consumers to see the availability of the desired product in the nearest (selected) store (Bendoly et al., 2005; Gallino and Moreno, 2014; Herhausen et al., 2015). Consumers can use the availability check to take a look at the product and see it in person before they buy it. With the help of this feature, they can reduce their perceived availability risk in-store (Bendoly et al., 2005). We assume that consumers have not yet made a decision, as they will want to inspect the product in person beforehand. Otherwise, they would use check & reserve or click & collect. Consequently, we argue that this feature refers to the pre-purchase stage.

Product finding tools

Product finding tools help the consumers to find their desired product. One example for product finding tools is a filter. The filter feature includes various settings for specifying the search. These can contain the color and size of the product (Jiang and Zou, 2020) as well as the category the user is searching for. The filter feature of an app also includes the option of sorting by price or by the most popular products. Another tool is the search bar. In the search bar, consumers can search for a specific product such as a sweater or a jeans. As consumers use the product finding tools to narrow their search, we assign the feature to the search phase.

QR code scanner

Consumers can scan an EAN code using the camera on their smartphone or tablet. After a successful scan, the user is shown more information about the product (Zhao and Balagué, 2015). The same applies to scanning a QR code. The QR code scanner is a type of information search technology (Alexander and Kent, 2022) and belongs to the pre-purchase stage.

Saving favorite items

Consumers have the option to save their favorite items on a list in the app. Consumers can store all products that they are interested in on the wish list. On the one hand, the advantage of this is that consumers can easily access the same products they browsed for and, on the other, that the app informs consumers when an item on their list is reduced. However, the latter is not always the case and is only possible if consumers allow push notifications. Since consumers primarily want to remember the product rather than buy it immediately, we assign this feature to the pre-purchase stage.

Sharing product links

Consumers have the option to share specific product links with their friends and family (Bai, Yao, and Dou, 2015; Parker and Kuo, 2022; Zhao and Balagué, 2015). The connection can be made via social media channels such as Instagram or Facebook or via WhatsApp. To do this, consumers must click on a specific icon and then decide which social media channel they want to use to share the product. This gives consumers the opportunity to get feedback from friends and family. Therefore, this feature is particularly useful in the pre-purchase stage.

Store finder

With the help of the store finder, consumers can determine the nearest store of the retailer (Hansen and Sia, 2015). This requires either manual entry of the zip code or a location. The other option being that the user allows the provider to access their smartphone via GPS. This makes localization possible, and the nearest stores can be displayed. Most retailers integrate a connection to Google Maps so that the users can immediately get the route displayed if they want to. As consumers are searching for something, in this case the next store, we assign this feature to the pre-purchase stage.

Visual search

Consumers have the option to search for similar products using the visual search feature. First, consumers can take a photo of the reference item. Second, consumers can upload a photo from their smartphone. In both cases, the app displays similar items as seen in the picture (Zhao and Balagué, 2015). Since consumers receive product ideas to inspire them after using the visual search, we assign this feature to the pre-purchase stage.

Check & reserve

Some of the retailers studied, are present in different channels. To connect the channels, the retailers offer different services. One of these services is check & reserve, i.e., consumers firstly reserve the product online and secondly purchase and pick it up later in the store (Hübner, Holzapfel, and Kuhn,

2016; Jin, Li, and Cheng, 2018). This feature refers to the purchase stage as consumers have already made a decision for a product.

Click & collect

The most common way to combine the online and offline channels is click & collect (Jin, Li, and Cheng, 2018; Kim, Park, and Lee, 2017) which is similar to check & reserve. Click & collect means that consumers firstly buy the product online and secondly pick it up in the store after payment (Gallino and Moreno, 2014; Gao and Su, 2017; Kim, Park, and Lee, 2017). The essential difference between click & collect and check & reserve is the point of time in which the payment is made. This feature refers to the purchase stage as consumers have already bought the product.

Data preservation

Consumers have the option of saving their data such as address and payment information in the app. The advantage of this is that consumers do not have to re-enter their personal data when they open the app again (see Hoehle and Venkatesh, 2015). This feature is especially useful in the purchase stage, as consumers do not have to re-enter their data for each purchase. Consequently, we assign this feature to the purchase stage.

Electronic receipt

With this feature, consumers have an overview about their purchases: online and in-store. The receipts for the online purchase automatically appear in the app. To ensure that store receipts are also displayed in the app, the function must be linked to a loyalty card. Consumers show their loyalty card at the checkout, which is scanned by the staff. The data is then transferred to the app. As consumers only have a receipt when they buy an item, this feature refers to the purchase stage.

E-mail for re-availability

Consumers have the option to ask for an e-mail reminder when an item that is already sold out becomes available again. In some cases, it can also be a push notification instead of an e-mail. The desire to buy the item appears to be high, as consumers want to receive a reminder. Therefore, we assume that consumers have already made a decision on this product and are only waiting for availability. Otherwise, they might use the wish list (saving favorite items). Therefore, we assign this feature to the purchase stage.

Loyalty card

Some retailers offer loyalty cards which are stored in digital form within the app. Participation is free of charge. The benefits that the customer receives vary, depending on the retailer. There is the possibility to collect points and then exchange them for rewards (Allaway et al., 2006). Furthermore, retailers offer free shipping as well as discounts for the online store and the brick-and-mortar store. The loyalty card is automatically considered for online purchases. In the stationary store, customers have to show their loyalty card on their smartphone at the checkout to benefit from the membership. As consumers usually benefit from the loyalty program when they buy a product (e.g., using a special discount or collecting points), we assign this feature to the purchase stage.

Payment via QR code

Consumers have the opportunity to pay via their smartphone or tablet in the stationary retail store (Baier and Rese, 2020). In this article, mobile payment refers to a payment feature within a retailer's app. A payment method is usually stored in the loyalty card that also applies to payment with the app. Customers simply have to open the app at the checkout in the stationary store where they pay using the loyalty card. Another option is that retailers generate a QR code in the app, which is personalized (e.g., Zara). With this code, consumers can pay in-store with their deposited payment method. In exceptional cases, the loyalty card may also include a credit card feature (e.g., Breuninger). Customers can use this to pay in installments, both online and in-store. Furthermore, retailers offer loyalty card holders the option of purchasing on account at the stationary retail store (e.g., H&M). Customers have the option of making purchases in the stationary retail store and paying 14 days later. As consumers use this feature to pay for a product, we assign this feature to the purchase stage.

Shipment tracking

Retailers offer consumers the possibility to track the shipment of their ordered products. To do this, consumers open their personal account in the app and check orders. The tracking has a different status such as "order received", "order is on its way to you", or "delivered". In some cases, consumers can also see an estimated delivery date. As consumers have already made a purchase/order, we assign this feature to the purchase stage.

Size finder

The size finder helps consumers find the item they want in the right size. Most often, retailers offer the size finder in the form of a size chart. Since consumers already search for their size, we assume that consumers will order the product. Accordingly, we assign this feature to the purchase stage.

Specific features

Some retailers have additional features in their app that are not assigned above as they are individual for the retailer. However, they are explained here because they can offer advantages to users. One example is the figure advisor of About You. The retailer offers some categories such as “curvy”, “tall”, or “petite & curved” into which consumers must classify themselves. Afterwards, the app shows some outfits that flatter the figure. Another example of such a feature is the so-called “get the look” function from P&C. P&C shows influencers' outfits on their app and displays items worn as well as similar looks below the image so that consumers can find the items instantly. About You offers a similar feature. However, consumers can shop for products from the About You fashion week. In addition, retailers HSE and QVC offer live TV programming in their apps so that consumers can watch ads from the teleshopping channel. Furthermore, HSE has a "shake it" feature. When consumers open the app, they can shake their smartphone and the app immediately directs them to the product being advertised on the teleshopping channel at that moment. Amazon offers further special features. One feature is the savings subscription feature. When users activate a savings subscription, the item is automatically delivered to their home. Users determine the time interval between deliveries themselves. Another advantage of the saver subscription is the included discount. Depending on the size of the time interval, this varies between 5-15%. Another feature is the Amazon prepaid account. Users can add money to their Amazon account. Accordingly, it is a prepaid account. Billing is done via the bank account stored in the Amazon profile. Users can then also use an Amazon account as a payment method. Amazon describes this advantage primarily in the fact that an Amazon account can be used for many purchases, such as music downloads, so that a direct debit is not made for every purchase.

2.3.3 App features in sector comparison

After describing the features, we will provide an overview of the frequency of occurrence of apps within individual sectors. Figure 3 shows the percentage of retailers in the 100 top-selling e-commerce online shops that have an app. Again, we refer to the following sectors: apparel, electronics, furniture, and generalists.

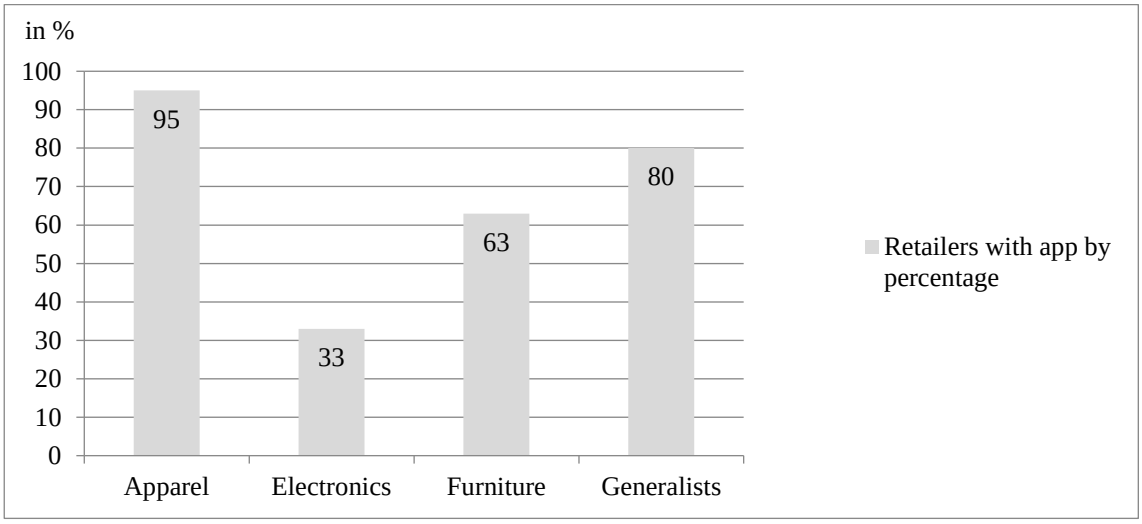

Figure 3. App comparison of the largest e-commerce retailers by sector.

The figure shows the percentage of retailers with an app, measured against the number of considered retailers across all sectors as a whole (with an exception of apps being added later from the app store). Strikingly, the apparel sector has the highest percentage of retailers offering an app (95%). The second major sector to use apps are generalists (80%). Nearly two-thirds (63%) of e-commerce retailers in the furniture sector offer a shopping app. Retailers from the electronic sector (33%) offer shopping apps least frequently, which is a curious finding, since this sector sells the electronic devices to use the apps, but is least likely to offer them itself.

In the following, we examine the importance of the app features within the individual sectors. Figures 4 and 5 provide an overview of the proportions of apps with the respective features in the individual sectors. We separate pre-purchase and purchase features into two charts for graphical reasons only.

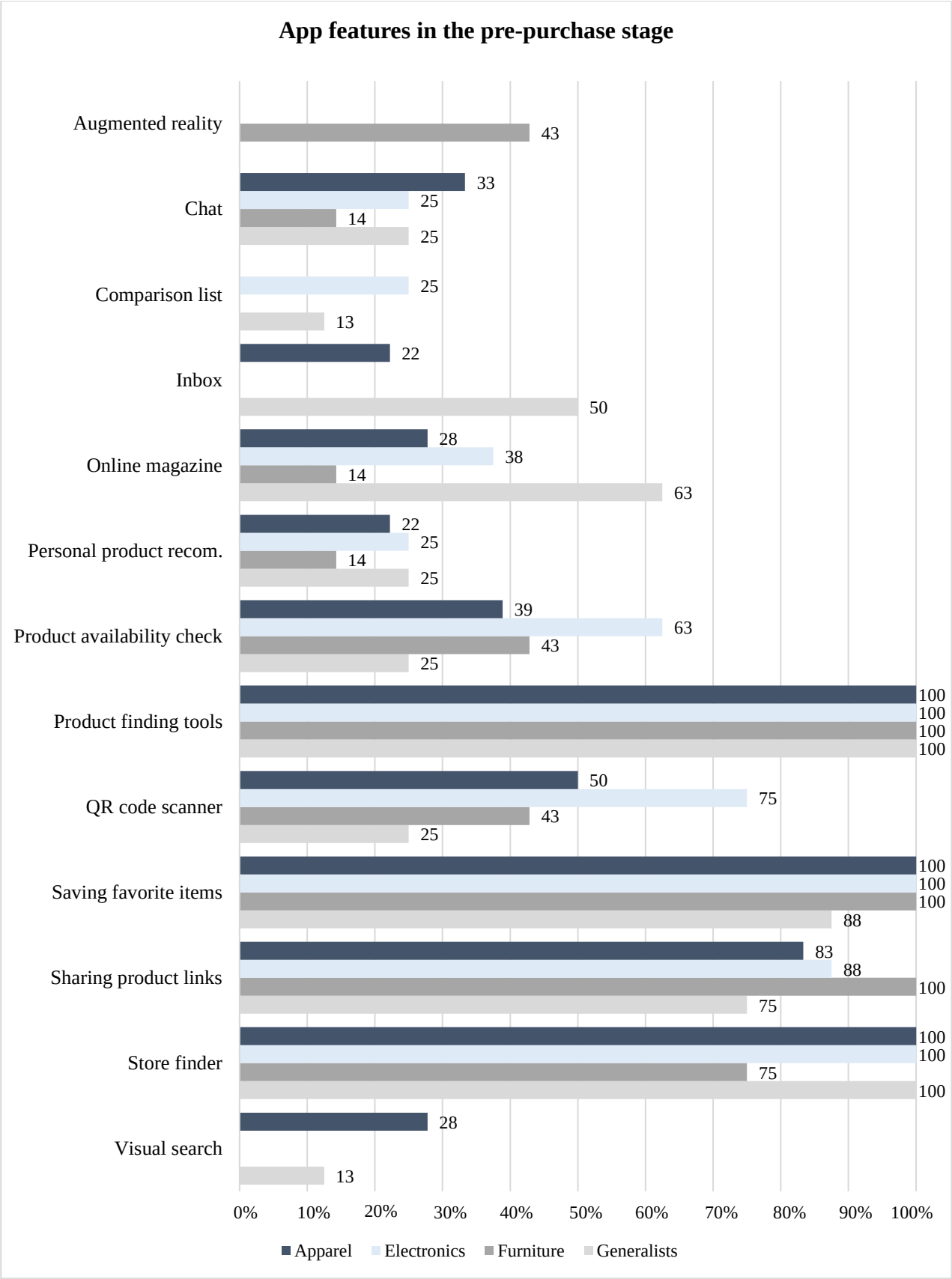

Figure 4. Sector comparison of app features dissemination in the pre-purchase stage (percentage of apps with feature).

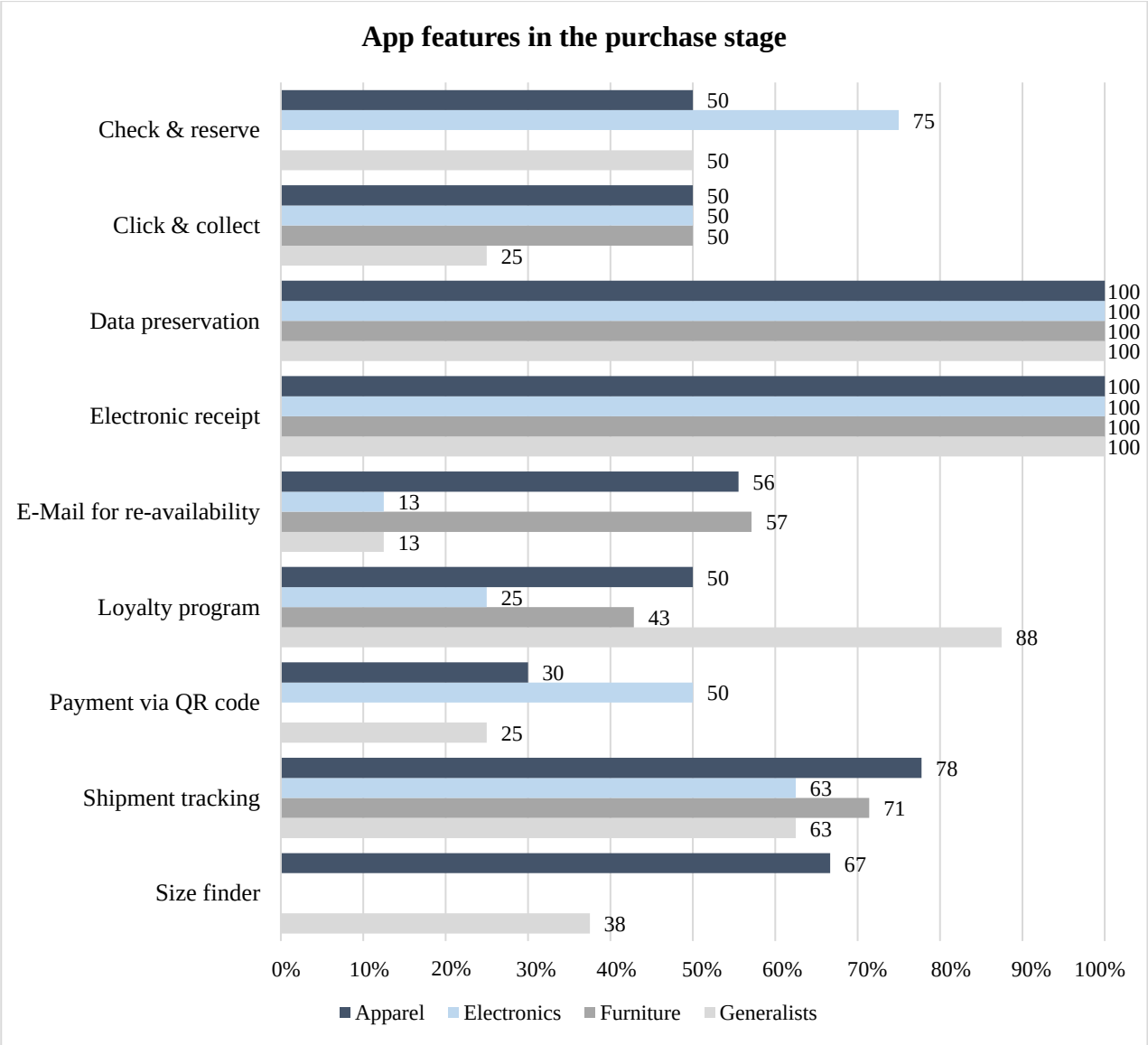

Figure 5. Sector comparison of app features dissemination in the purchase stage (percentage of apps with feature).

For the features that required a brick-and-mortar store channel, we adjusted the number of retailers and only included multi-channel retailers with a brick-and-mortar store, as it does not make sense for retailers to offer these features if they do not have a physical store. We considered ten retailers for the apparel sector, four for the electronics sector, four for the furniture sector, and four as generalists (multi-channel retailers are highlighted in Figure 1). Accordingly, the total number of retailers used for percentage calculations is adapted for the following features: Product availability check, store finder, check & reserve, click & collect, and payment via QR code.

A first look at all features of the pre-purchase stage shows that only the feature product finding tools appears in 100% of all sectors. Further, all retailers offer the ability to save favorite items, with one exception being generalists (88%). In addition, retailers offer the product link sharing feature by at

least 75% (generalists) of retailers in every sector. In the furniture sector, even every retailer offers the feature (100%). The QR code scanner occurs differently in the sectors. It gives consumers across all sectors the option of obtaining further information about a product. Electronics retailers offer this feature the most (75%), followed by apparel (50%), furniture (43%), and generalists (25%). The QR code scanner could be very important for the electronics sector since retailers carry information-intensive products. Electronic products have many technical details that consumers need to make decisions on. Consequently, it could be a useful tool to gather the necessary information. Moreover, it is interesting to note that both multi-channel retailers and pure online retailers offer this feature. This means that online retailers link from competitors' offline channel to their online channel. This is particularly useful if the respective retailer carries brands that competitors also offer in the offline channel. Such an example is the apparel retailer Zalando. The QR code scanner in the app of Zalando allows customers to scan a product in a competitor's store and see if Zalando also has the same product available. Online magazine and product availability check are offered sporadically across all sectors. The difference between the apparel (39%) and electronics sectors (63%) for the product availability check may lie in operational difficulties of multi-channel technologies for apparel. For example, many items are only available in small quantities in one size and may already be in another customer's fitting room or shopping cart at the time of the availability check or reservation. Otherwise, the availability check is of great benefit to customers, especially due to the complication of size when it comes to clothing. In general retailers do not offer the personal product recommendation feature very frequently (apparel: 22%; electronics: 25%; furniture: 14%; generalists: 25%). The same is true for the chat feature (apparel: 33%; electronics: 25%; furniture: 14%; generalists: 25%). One reason for the low supply of the chat feature could be the cost of implementation. A chat bot is based on artificial intelligence (Luo et al., 2019). Consequently, it could be very expensive to develop. In addition, some chats offer the possibility to chat with an employee (see Adam, Wessel, and Benlian, 2021; Luo et al., 2019). This is also expensive, as retailers have to pay the employee's salary. The augmented reality feature is only offered in the furniture sector and less than half (43%) of retailers have included this feature in their app. It is also noticeable that the comparison list only occurs in the electronics sector (25%) and among generalists (13%). However, Amazon does not offer the option to select multiple products. Amazon selects the products on its own as recommendations. The visual search only occurs in the apparel sector (28%) and among generalists (13%). This can be explained by the fact that product details such as memory size, speed, or screen size are more important for complex electronic products than for fashion items. As it is not always necessary to buy one particular item in the fashion sector, consumers look for similar items. Since generalists offer both electronics and apparel, both features appear in generalists.

A first look at all features of the purchase stage shows that data preservation and electronic receipt occur 100% across all sectors. Data preservation is useful for all retailers, as data is mandatory for any purchase. In some cases, it is possible to order products as a "guest." However, retailers want to make the next purchase as easy as possible for consumers, so they offer data preservation. An electronic receipt occurs 100% across all sectors as consumers make their purchase through the app. Some multi-channel retailers such as H&M, Zara, MediaMarkt, or Saturn also display the receipt of offline purchases in their app. However, this feature is usually combined with the loyalty card in order to obtain information about the purchase. With the receipt, consumers can also return the products to the store. Almost two-thirds of all retailers offer the feature shipment tracking (apparel: 78%; electronics: 63%; furniture: 71%; generalists: 63%). The offer of the e-mail for e-availability is mixed. Especially the electronics sector (13%) and generalists (13%) offer this feature less. One reason for this could be that electronics items are generally rarely sold out. During the survey, hardly any product was found that was not available. Accordingly, the feature is of less relevance for the electronics sector. 50% of multi-channel retailers in the apparel, electronics, and furniture sectors each offer click & collect. Among the generalists, 25% of retailers offer it. Check & reserve is only available in the apparel sector (50%), electronics sector (75%), and among generalists (50%). In the furniture sector, this feature is not available. This could be because furniture retailers do not have as much storage space and therefore want to ensure that consumers pick up the goods. Collection is more likely if consumers pay for the products in advance (click & collect). Further, the high occurrence of this feature in the electronics sector could also be due to the fact that electronic products are often expensive, and therefore consumers want to see them in person and try them out before they make a purchase. The loyalty card is used especially by the generalists (88%). We might assume that this is due to generalists having more financial scope for special offers such as discounts. Overall, it is mainly retailers that also operate in the stationary channel that offer loyalty cards. The payment via QR code feature occurs differently in the sectors. However, in general retailers do not offer this feature very often (apparel: 30%; electronics: 50%; furniture: 0%; generalists: 25%). A reason for the low penetration rate could be incompatibility with the POS system in the stationary retail stores, too high a financial outlay for implementation or a low level of consumer demand. The size finder only occurs in the apparel sector (67%) and by generalists (38%). This makes sense, as the size finder helps consumers to find the right size of a garment. To do this, the respective retailer must also offer clothing.

2.4 Shopping app features from the consumer perspective

The above-mentioned study focuses on which shopping app features are offered by different retailers in different sectors. In order to provide more specific implications for research and practice, it is of particular interest to also consider the consumer´s point of view. We undertook further research to explore this and deem it important to focus on which features consumers use and which features they perceive as useful. We conducted an additional survey in September 2022 to gain more insight into app feature usage and perceived usefulness. We recruited a group of 88 German-speaking participants through Clickworker. The sample includes 37.5% female, 61.4% male, and 1.1% diverse respondents with an average age of 36.5 years. Most (69.3%) of the participants are in full-time employment, with a personal net income average between 2.000 and 2.500 Euro per month. All of the respondents use shopping apps.

First, the respondents were asked which shopping apps they use (open question). Then respondents were asked which app features they use (yes/no) and how useful they perceive them to be. The perceived usefulness is measured on a seven-point Likert scale with endpoints ranging from "not useful at all" to "very useful". In order to give each respondent an idea of the respective feature, we explained the features briefly to them via a table.

Regarding the open question (which shopping apps do you use?), respondents mentioned 201 shopping apps. This means that on average, every respondent uses 2.28 apps. Figure 6 shows how the apps mentioned are distributed across the individual sectors. Shopping apps are mainly used from generalists (N=100), followed by the apparel sector (N=49), and electronic retailers (N=10). The furniture sector shows the lowest usage of apps (N=6). On the other hand, a high usage of shopping apps occurs in the generalist sector, which is primarily due to Amazon. Respondents mentioned the Otto and Lidl app occasionally. The most used apps in the apparel sector are from retailers Zalando, H&M, and About You. Respondents mentioned only MediaMarkt and Saturn in the electronics sector. In the furniture sector respondents mentioned IKEA five times and Home24 once. As the chart shows, we find the retailers from the main study (chapter 2.3 Features of shopping apps in practice) also in the usage of the mentioned shopping apps. 88% of the shopping apps mentioned in the apparel sector correspond to the retailers considered in the previous survey. In the other sectors, electronics and furniture, and for the generalists, all mentioned apps belong to the sample of apps examined in the main study. Hardly any apps from other sectors are used. Only 17.91% of the 201 apps mentioned come from sectors other than apparel, electronics, furniture, or generalists. The most frequently mentioned apps from other sectors are the REWE app (grocery) and dm app (drugstore). Overall, this

indicates that the selection of sectors and apps examined in the main study appears to be representative.

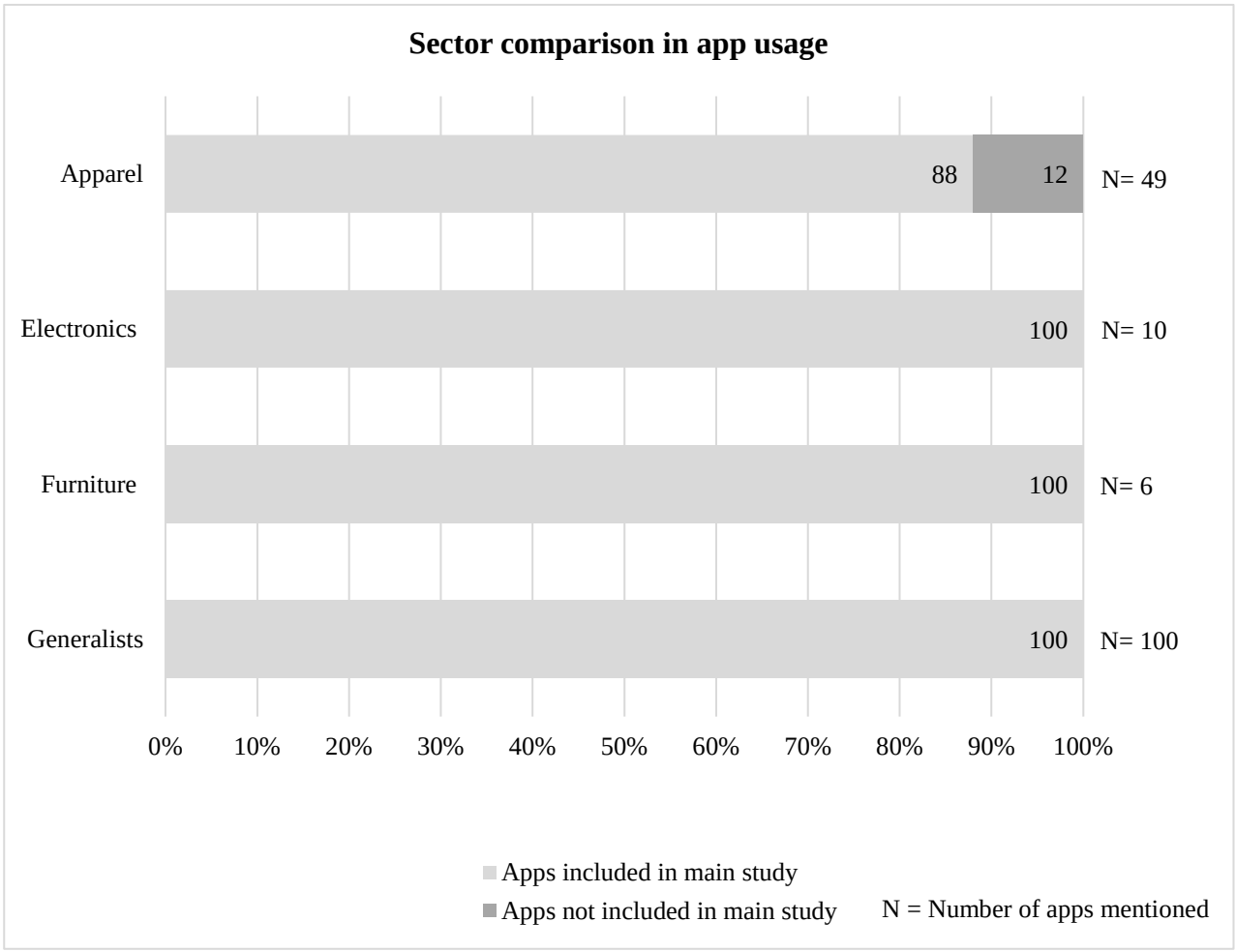

Figure 6. Sector comparison in app usage.

In the survey, we asked respondents whether they use certain app features and how useful they perceive them. As respondents often used apps from different sectors, no sector comparison regarding app feature usage is made here, as respondents may use the same feature simultaneously in several apps from different sectors. Therefore, the general use of the features is discussed regardless of the sector. Figure 7 shows the usage of app features. The majority of respondents use shipment tracking (86%), followed by data preservation (78%), and inbox (77%). Visual search (24%), payment via QR code (21%), and augmented reality (16%) are used least by respondents. Most of the other features are used by more than 50% of respondents, with the exception of the QR code scanner (47%), the comparison list (47%), the online magazine (38%), and check & reserve (31%).

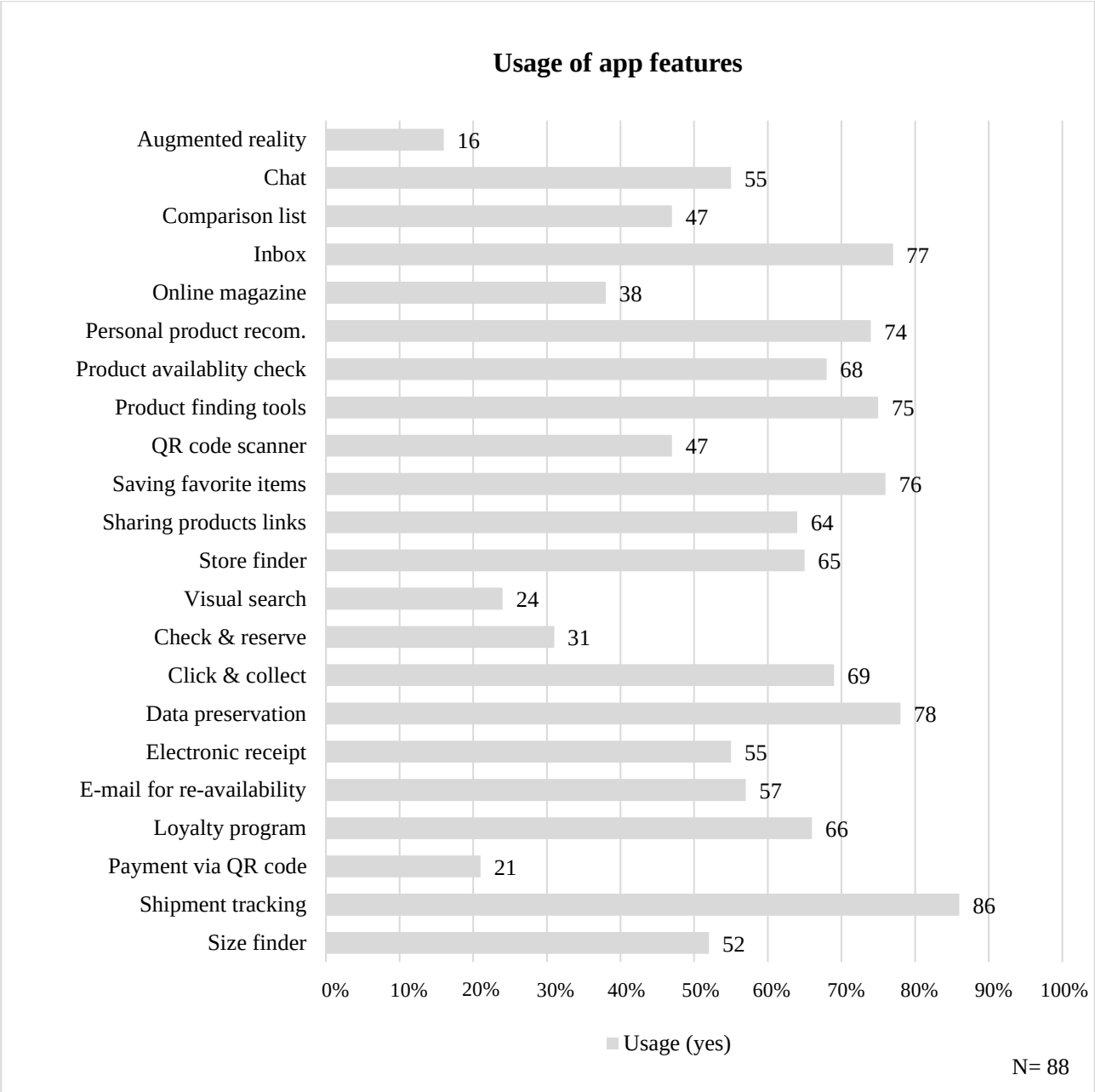

Figure 7. Usage of app features.

Furthermore, we asked respondents how useful they perceive certain app features to be. Figure 8 shows how useful the respondents perceive particular shopping app features. Consumers perceive shipment tracking (M=5.98) as most useful, followed by product finding tools (M=5.90), and saving favorite items (M=5.68). Payment via QR code (M=3.72), online magazine (M=4.09), and visual search (M=4.14) have the lowest mean scores in terms of perceived usefulness. However, no feature is perceived as useless, as means are above the scale center (3.5). Furthermore, 43.2% of respondents indicated a value of 5 or greater regarding perceived usefulness of visual search. Regarding perceived usefulness of the online magazine, 43.2%, and regarding the payment via QR code, 34.1% of the respondents indicated a value of 5 or greater.

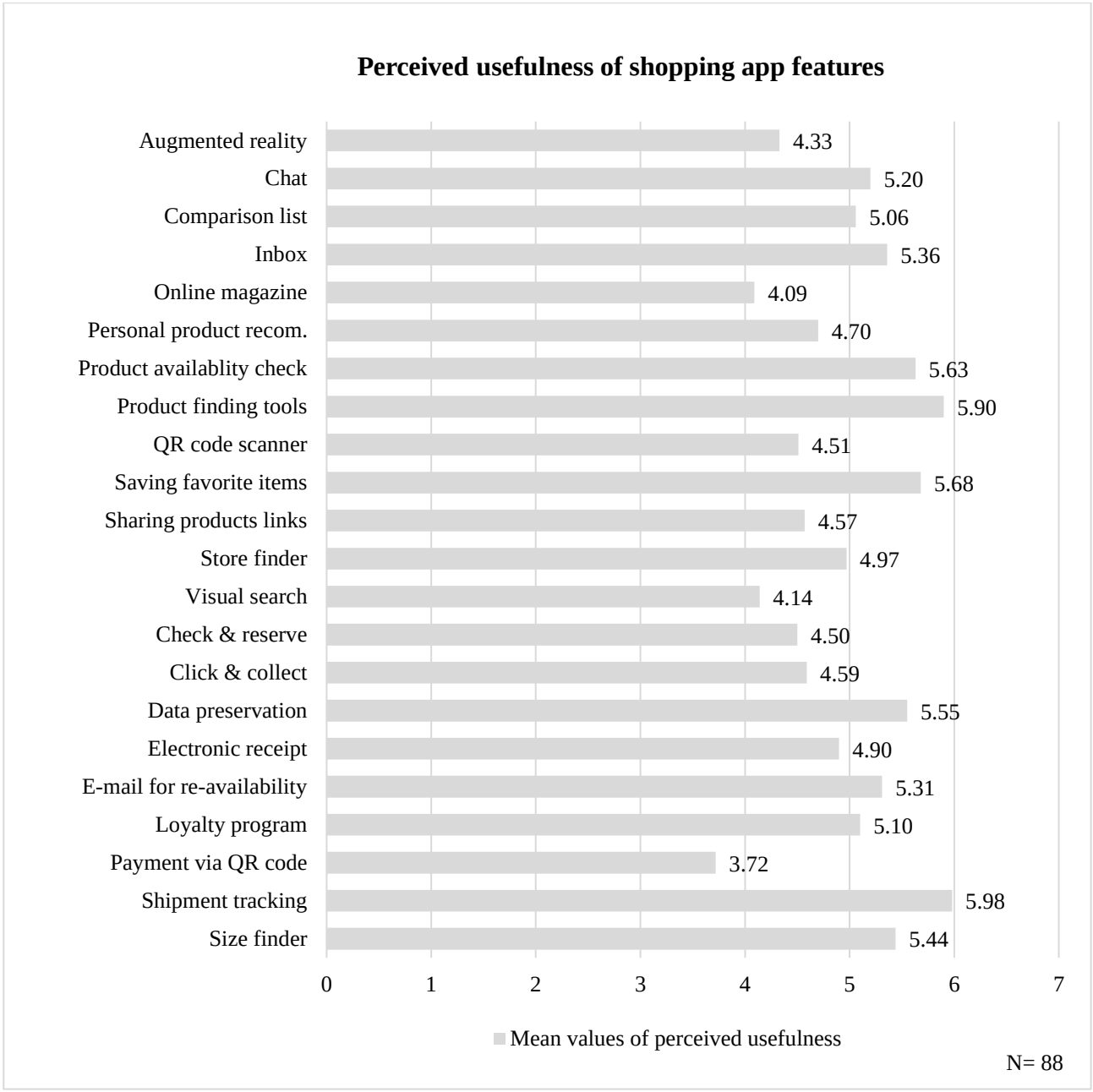

Figure 8. Perceived usefulness of shopping app features.

A comparison of Figure 7 and Figure 8 with Figure 4 and 5 in terms of the shopping app features offered, shows that the range of app features is reflected in consumers' usage behavior and perception of usefulness. When comparing the features from the retailer and consumer perspectives, we identify certain patterns. In total, we define six segments with regard to the offer, the usage, and the perception of usefulness. In the following, we report the mean values of the perception of usefulness in parentheses. The first segment includes features that all retailers offer in at least one sector and that participants use by at least two-thirds in each case. This classification includes product finding tools (M=5.90), saving favorite items (M=5.68), and data preservation (M=5.55). These features are also perceived as very useful. This is less surprising since they are standard features. The second segment

includes features that all retailers offer in at least one sector and that less than two-thirds of the participants use in each case. This division includes the features: sharing product links (M=4.57), store finder (M=4.97), and electronic receipt (M=4.90). These features are also perceived as useful. The third segment includes features that 50% or more retailers in at least one sector offer and that at least two-thirds of the participants use. The classification includes the features inbox (M=5.36), product availability check (M=5.63), click & collect (M=4.59), loyalty program (M=5.10), and shipment tracking (M=5.98). All features are perceived as useful. The fourth segment comprises features that 50% or more retailers in at least one sector offer and less than two-thirds of the respondents in each case use. This segment includes the features online magazine (M=4.09), QR code scanner (M=4.51), check & reserve (M=4.50), e-mail for re-availability (M=5.31), payment via QR code (M=3.72), and size finder (M=5.44). These features are perceived to be useful in different ways. The feature payment via QR code is perceived as the least useful and the size finder as the most useful. Nevertheless, we would argue that respondents perceive these features as useful, since all mean values are above the middle of the scale (>3.5). The fifth segment comprises features that all retailers in all sectors offer by less than 50% and that at least two-thirds of the participants use. This segment includes only one feature: personal product recommendations (M=4.70), which is perceived as useful. The sixth and final segment includes features that all retailers in all sectors offer by less than 50% and that less than two-thirds of the participants use. This segment includes the features: augmented reality (M=4.33), chat (M=5.20), comparison list (M=5.06), and visual search (M=4.14). These features are also perceived as useful. Table 3 shows an overview of all six segments.

Table 3. Overview of defined app feature segments.

Retailer/consumer perspective	**>=2/3 of consumers use the features**	**<2/3 of consumers use the features**
All retailers offer the features in at least one sector	**1** Product finding tools (5.90), saving favorite items (5.68), data preservation (5.55)	**2** sharing product links (4.57), store finder (4.97), electronic receipt (4.90)
>=50% of retailers offer the features in at least one sector	**3** inbox (5.36), product availability check (5.63), click & collect (4.59), loyalty program (5.10), shipment tracking (5.98)	**4** online magazine (4.09), QR code scanner (4.51), check & reserve (4.50), e-mail for re-availability (5.31), payment via QR code (3.72), store finder (4.97), size finder (5.44)
<50% of retailers in all sectors offer the features	**5** personal product recommendations (4.70)	**6** augmented reality (4.33), chat (5.20), comparison list (5.06), visual search (4.14)

Note: mean values of consumers' perceived usefulness are in brackets.

2.5 Summary and research outlook

This paper provides a comprehensive overview of shopping apps' features, offering new starting points for marketing practice and research. From a practitioner's perspective, this article provides an overview of the app features from the top-selling e-commerce retailers, among others. Information on the features and their availability in individual sectors gives retailers the opportunity to identify potential for improvement in their own apps. This can mean both removing features from the app because they are not sector standard as well as implementing new features. This article thus provides guidance on how to design an app. Product finding tools, saving favorite items, store finder, data preservation, and electronic receipts are particularly common. In contrast, augmented reality, chat, and personal product recommendations are rarely available in apps. The retailers need to choose carefully which features to implement, as the development of an app involves a meaningful financial investment. However, it does not mean that retailers should only concentrate on few features as the additional analysis from the consumer's point of view reflects the importance of offering a larger number of app features. Consumers perceive all app features as useful, even those that are not used or that retailers do not offer. Based on the comparison between the features offered by the retailers, the usage behavior and the consumers' perception of usefulness, we can provide further implications to retailers. Depending on the feature offered, there are different patterns of usage and perceived usefulness. Features from the first segment (often offered and often used) should definitely be implemented in a shopping app. Further, there are features that consumers use seldomly, but which retailers often offer (segment two). Although fewer consumers use these features, they are generally perceived to be useful. In consequence, it is not entirely necessary that consumers use these features, as their mere existence can contribute to the usefulness of the whole app. If consumers are aware of the advantages of the app or the extent of the various features, they might perceive the app as more useful overall. The third segment includes features that retailers offer less (50-100%), but consumers use often. These features should definitely be implemented in a shopping app as consumers use them if they are available. Further, these features have a high mean value of perceived usefulness (four of five $M>5.0$). Moreover, the shipment tracking is included in this segment, which has the highest perceived usefulness value ($M=5.98$) of all features. This feature in particular should be included in a shopping app. In addition, only retailers from the apparel sector and generalists offer the inbox. The other sectors, electronics and furniture, should also offer this feature as it is perceived as useful. The fourth segment identified, is that there are features that few consumers use and that retailers also offer less (50-100%). These features should receive more attention as consumers perceive them as useful. Consumers may not use them because they are not aware they exist. Retailers should inform the customers about these features, e.g., via advertising. The fifth segment only includes the personal

product recommendations feature. While retailers offer this feature less than 50%, more than two-thirds of consumers actually use this feature. The same recommendations apply to this feature as they do to segment three. The last segment identified features that retailers offer less than 50% and that fewer consumers use. The same recommendations for segment four apply to these features. However, retailers should think about the purpose of each feature in their sector. Augmented reality could be useful in the apparel sector as consumers can see how the item looks on their body and whether they like it or not. One retailer that has integrated this feature is Mister Spex. Consumers can try on glasses virtually. Retailers in the apparel sector should therefore consider implementing it. The comparison list may not be as useful in the apparel sector because the details are not as complex as in the electronics sector. Consumers are more likely to compare similar products based on appearance. Here, retailers could do without an implementation if necessary. Another possible pattern would be features that retailers offer frequently, that consumers do not find useful, and also use less. However, we could not see this pattern as consumers perceived all features as useful.

From a research perspective, this paper addresses the gap in contributions to shopping app features. Previous research mainly deals with general factors influencing app usage, such as hedonic and utilitarian aspects (e.g., Akdim, Casaló, and Flavián, 2022; Hepola, Leppäniemi, and Karjaluoto, 2020). Furthermore, though a few studies on selected shopping (app) features can be found (see Jiang and Zou, 2020; Ortlinghaus, Zielke, and Dobbelstein, 2019; Okazaki, Li, and Hirose, 2012), no comprehensive analysis of such features has been made within a sector comparison. This is where the paper picks up and thus provides a basis for further research. First, our examination gives information about customers' usage of specific app features. For the next step, it would be interesting to find out the reasons for use or nonuse so that retailers can respond. For example, one reason for nonuse may be that customers do not know that the app even includes a certain feature. Another reason may be that customers find the feature too complicated to use. The findings may help retailers to further develop their app so that it is used as frequently as possible by customers. Second, further research could examine the impact of specific app features on customer behavior. On the one hand, app features could act as an incentive to use or download the app, as all features are perceived as useful, even if some more so than others. On the other hand, app features could lead to an increase in customer satisfaction with the retailer, as the features support customers in their shopping process.

3 Adoption of shopping apps [6]

Abstract

Shopping apps are a highly relevant channel and an increasingly important part of omni-channel retailing, as they strengthen the customer relationship. This study analyzes the possibilities available to retailers to encourage consumers to download a shopping app and use it in the long-term. The study uses a scenario-based online experiment with a 2 × 2 × 2 between-subjects design and data from 332 participants. A second online experiment with a 2 × 3 between-subjects design and data from 200 participants supplements the main experiment. The data obtained from these experiments was analyzed using M/ANCOVA and PROCESS. Findings suggest that a rebate (monetary incentive) increases the download intention. Online and in-store app features (nonmonetary incentives) do have positive impacts on the use intention, though the in-store feature only works when it is offered in combination with the online feature. The relationships are mediated by the perceived usefulness of the shopping app. Moreover, the nonmonetary features interact with the purchase channel preference of the consumers, who react more positively toward features offered in a non-preferred channel. A supplementary study supports this finding. This research is novel as it analyzes the impact of monetary (rebate) and nonmonetary (online and in-store features) incentives on both the download and use intention of a shopping app separately. Further, it contributes to research on the topic by examining specific shopping app features. Finally, the study considers the omni-channel environment regarding consumers' channel preference.

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[6] Chapter 3 is based on the article “Shopping App Features: Influencing the Download and Use Intention” published in the *International Journal of Retail & Distribution Management*, Vol. 50 No. 8/9, pp. 1015-1038. doi:10.1108/IJRDM-10-2021-0488.

3.1 Introduction

In times of omni-channel-retailing, more and more companies are launching mobile (shopping) applications (“app” or “apps” hereafter) to engage customers (Boyd, Kannan, and Slotegraaf, 2019). Shopping apps are defined as mobile apps which are edited and branded by a specific retailer (Bellmann et al., 2011) and serve as an additional sales channel alongside the brick-and-mortar channel and traditional e-commerce (Peng, Chen, and Wen, 2014; Taylor and Levin, 2014). The core element of a shopping app is usually a shop function that is similar to the online store (Bellmann et al., 2011; Kim et al., 2017). However, shopping apps can also include a number of additional features (Kim, Yoon, and Han, 2016), e.g., Hennes & Mauritz (H&M) offers an online magazine, a QR code and barcode scanner, a loyalty program and a store finder. Retailers use shopping apps to get in touch with their customers, to strengthen the customer relationship (see Peng, Chen, and Wen, 2014; Taylor and Levin, 2014), to communicate personally with the consumer (Andrews et al., 2016; Natarajan, Balasubramanian, and Kasilingam, 2017; Park and Lee, 2017; Shankar et al., 2010), and to track data from consumers' smartphones, e.g., location-based information (Andrews et al., 2016; Berman, 2016). These mobile apps thus offer retailers several benefits. Therefore, it is not surprising that the number of mobile apps is growing rapidly (Peng, Chen, and Wen, 2014).

Most of the recent literature focuses on the intention to use mobile apps (e.g., Hew et al., 2015; Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Shen, 2015). According to Kim, Yoon, and Han (2016), the usage of a specific app may depend on its features. Consequently, it is highly important to examine which features have an impact on consumers' perceived usefulness of the app and thereby influence use intentions, as suggested by the Technology Acceptance Model (TAM) (Davis, Bagozzi, and Warshaw, 1989). However, there is little research analyzing influencing factors of the download intention. This topic is eminently relevant as it is not possible to use a mobile app without downloading it first (Peng, Chen, and Wen, 2014; Wang, 2017). With our study, we want to close the research gap regarding retailers' possibilities, in form of sales promotions, to encourage consumers to download a shopping app and subsequently use it in the long-term. We examine the retailer's possibility of advertising the shopping app on the online shop website, as this increases the likelihood that consumers adopt mobile apps (Taylor and Levin, 2014).

As previous literature has shown, sales promotions can be subdivided into monetary and nonmonetary promotions (Buil, De Chernatony, and Montaner, 2013; Büttner, Florack, and Göritz, 2015; Palazon and Delgado-Ballester, 2009). Similarly, we distinguish between monetary and nonmonetary incentives to download and use a shopping app. To explore the effects of monetary incentive we use a rebate that has a short-term effect on consumers' behavior (see Yi and Yoo, 2011). For nonmonetary

incentives we examine the effects of advertising shopping app features which do not provide direct monetary benefits (Büttner, Florack, and Göritz, 2015). Retailers use nonmonetary incentives to develop a stronger relationship with their customers (Yi and Yoo, 2011). Consequently, they may have a long-term effect on consumers' behavior as the features are a part of the shopping app. We consider these incentive types in order to determine whether a discount is necessary to encourage consumers to a download or whether app features themselves are the decisive benefit that translates into downloads. Thus, our study aims to reveal which type of incentive is most effective for increasing the intention to download (short-term) and subsequent use (long-term). We focus on three types of incentives: rebate (monetary), promotion of an online feature (nonmonetary, online magazine), and promotion of an in-store feature (nonmonetary, scan and shop function). Furthermore, channel preferences may moderate the impact of nonmonetary incentives on the perceived usefulness of the app, as consumers can use these incentives in the online or offline channel.

Hence, our core contribution is to examine the effect of monetary and nonmonetary (app features) incentives on the intention to download and to use a shopping app. Particularly, we want to provide a better explanation of what makes consumers download shopping apps and subsequently use them in long-term. Further, this paper contributes to the existing research by extending the TAM and examining which features have an impact on consumers' perceived usefulness of the app. Finally, we consider the omni-channel environment by analyzing moderating effects of consumers' channel preference for purchase. Our study seeks to answer the following questions:

- How do different types of incentives (monetary and nonmonetary, the latter in form of in-store and online-features) influence consumers' intention to download and use shopping apps?
- Does the perceived usefulness of the shopping app moderate the effects of the rebate and mediate the effect of the nonmonetary incentives on the download and use intention?
- Does consumers' channel preference have a moderating impact on the relationship between the nonmonetary incentives and the perceived usefulness of the shopping app?

3.2 Theoretical background

There is a remarkable growth of research on mobile apps (Wang, 2017). Most studies in this field are based on the TAM by Davis, Bagozzi, and Warshaw (1989) or the Unified Theory of Acceptance and Use of Technology2 (UTAUT2) by Venkatesh, Thong, and Xu (2012). The TAM allows an explanation of user adoption intention of new technologies. While the literature sometimes criticizes the parsimony of the TAM (e.g., Benbasat and Barki, 2007), it does permit the consideration of additional influencing factors (Hong, Thong, and Tam, 2006) such as shopping app features in our research

context. Consequently, we think it is a reasonable basic theory for building our research model. In the original TAM, perceived usefulness has a positive effect on behavioral intention (Davis, Bagozzi, and Warshaw, 1989). Previous studies support this relationship in the context of mobile shopping in general (Groß, 2015; Khalifa and Shen, 2008; Ko, Kim, and Lee, 2009; Saprikis et al., 2018; Yang, 2012) and mobile apps in particular (Hubert et al., 2017; Kim, Yoon, and Han, 2016; Mehra, Paul, and Kaurav, 2021; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Roy, 2017; Stocchi, Michaelidou, and Micevski, 2019). Some studies build on the UTAUT or extend the TAM by factors such as perceived enjoyment (Groß, 2015; Ko, Kim, and Lee, 2009; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Roy, 2017; Saprikis et al., 2018), social aspects (Chopdar et al., 2018; Kim, Yoon, and Han, 2016; Hew et al., 2015; Vahdat et al., 2021), or perceived risk (Chopdar et al., 2018; Marriott and William, 2018; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018). A few studies examine factors impacting perceived usefulness, such as social influence (Roy, 2017), quality aspects (Roy, 2017; Sohn, 2017), perceived risk (Hubert et al., 2017), trust (Saprikis et al., 2018), app type (Shen, 2015), or perceived ease of use (Hubert et al., 2017; Mehra, Paul, and Kaurav, 2021; Roy, 2017; Saprikis et al., 2018).

Overall, most of the existing studies focus on app usage (see also Tang, 2019), while research on the download of an app, especially in the shopping context, is limited. Wang (2017) provides a literature review on determinants of mobile app downloads and concludes that a better explanation of the determinants of consumers download intention is needed. More specific investigations examine how some mobile app characteristics increase app demand, e.g., file size, in-app advertisements, app description length, number of screenshots, in-app purchase (Ghose and Han, 2014), or the aesthetic design of an app regarding color, complexity, and symmetry (Wang and Li, 2017). Jain and Viswanathan (2015) conducted a qualitative study and found that app features and the design of apps could have an impact on the usage of mobile apps. Stocchi, Michaelidou, and Micevski (2019) found a positive influence of app characteristics on the perceived usefulness. However, they did not examine shopping apps neither specific app characteristics in form of app features. In consequence, there is an overall lack of empirical research regarding shopping app features and their impact on the download and use intention. Table 4 provides an overview of relevant studies on the topic of mobile shopping and mobile shopping apps.

There are several researchers investigating perceived usefulness as an important influencing factor of the intention to use a mobile app (see table 4), while less research focuses on the download. Furthermore, previous literature identifies generic influencing factors and does usually not include particular features of a shopping app. This leads to the question which features have an impact on consumers'

perceived usefulness of the app. There is currently of dearth of research on the relationship between such incentives and the download and use intention of a shopping app.

Table 4. Research on the acceptance of mobile shopping and mobile apps.

Study	Data collection	Base model	Fundamental antecedents	Outcome variable(s)
Context of mobile shopping				
Khalifa and Shen (2008)	N=40	TAM TPB	Perceived usefulness, perceived ease of use, self-efficacy, subjective norm	Intention to adopt
Ko, Kim, and Lee (2009)	N=511, Korea	TAM	Perceived usefulness, perceived ease of use, enjoyment, instant connectivity	Perceived value, adoption intention
Yang (2012)	N=400	TPB	Perceived usefulness, perceived enjoyment, subjective norm, perceived behavioral control	Attitude toward mobile shopping, intention to use
Groß (2015)	N=125, Germany	TAM	Perceived usefulness, perceived ease of use, perceived enjoyment, trust	Attitude toward mobile shopping, behavioral intention
Sohn (2017)	N=798, Germany	TAM	Mobile online store quality (technical, information, aesthetic, security)	Usefulness of mobile online stores for information search/purchasing
Marriott and William (2018)	N=435, UK	Not specified	Risk, trust	Intention to use
Saprikis et al. (2018)	N=473, Greece	TAM DOI UTAUT	Perceived usefulness, perceived ease of use, trust, relationship drivers, innovativeness, skilfulness, enjoyment, anxiety	Behavioral intention, perceived usefulness (mediator)
Context of mobile (shopping) apps				
Hubert et al. (2017)	N=410, UK	TAM	Perceived usefulness, perceived ease of use, instant connectivity, contextual value, hedonic motivation, habit, financial risk, performance risk, security risk, mobile shopping application type	Usage intention, usage behavior, experience response, cross-category usage, perceived usefulness (mediator)
Hew et al. (2015)	N=288, Malaysia	UTAUT2	Performance expectancy, effort expectancy, price value, facilitating conditions, habit, social influence, hedonic motivation	Behavioral intention to use mobile apps
Shen (2015)	N=234; N=242	TAM TRA Signaling theory and other	Perceived usefulness, app type, regulatory focus framing, reputation	Attitude toward the app, intention to use the app, perceived usefulness

to be continued

Study	Data collection	Base model	Fundamental antecedents	Outcome variable(s)
Kim, Yoon, and Han (2016)	N=257	TAM	Perceived informative usefulness, perceived entertaining usefulness, perceived social usefulness, perceived ease of use, user review, perceived cost-effectiveness	Attitude toward app usage, behavioral intention to use mobile apps
Natarajan, Balasubramanian, and Kasilingam (2017)	N=935, India	TAM DOI	Perceived usefulness, perceived ease of use, perceived enjoyment, perceived risk, personal innovativeness	Satisfaction, intention to use, price sensitivity
Roy (2017)	N=268; N=281, India	TAM TAM3	Perceived usefulness, perceived ease of use, perceived enjoyment, subjective norm, image, job relevance, output quality, result demonstrability and antecedents of perceived ease of use	Behavioral intention, perceived usefulness (mediator)
Chopdar et al. (2018)	N=145, USA; N=221, India	UTAUT2	Performance expectancy, effort expectancy, hedonic motivation, price value, habit, social influence, facilitating conditions, privacy risk, security	Behavioral intention, use behavior
Natarajan, Balasubramanian, and Kasilingam (2018)	N=675	TAM DOI	Perceived usefulness, perceived ease of use, perceived enjoyment, perceived risk, personal innovativeness, satisfaction	Intention to use
Mehra, Paul, and Kaurav (2021)	N=789, India	TAM DOI	Perceived usefulness, perceived ease of use, perceived enjoyment, relative advantage, compatibility	Behavioral intention to adopt mobile apps, perceived usefulness (mediator)
Vahdat et al. (2021)	N=777, Iran	TAM	Perceived usefulness, perceived ease of use, social influence, peer influence	Attitude toward mobile app use, intention to purchase
Context of app features				
Ghose and Han (2014)	N=800 apps	Not specified	Different mobile apps characteristics (e.g., file size, app version, app developer, in-app purchase option)	App demand
Jain and Viswanathan (2015)	N=142, India	Not specified	E.g., engagement with the app (features, design, socializing etc.)	Post use evaluation of app by individual
Wang an Li (2017)	N=21.243	Not specified	Aesthetic design of icons (e.g., colorfulness or brightness)	App downloads
Stocchi, Michaelidou, and Micevski (2019)	N=335, UK	TAM	Perceived usefulness, perceived ease of use, privacy of app, security of app, design characteristics of app, ubiquity app compatibility	Usage intention, perceived usefulness (mediator)

3.3 Research hypotheses

3.3.1 The effect of a rebate as a monetary incentive

Monetary promotions are a common and effective instrument to attract consumers (Alvarez-Alvarez and Vázquez-Casielles, 2005; Darke and Chung, 2005). According to previous research (e.g., Ataman, van Heerde, and Mela, 2010; Yi and Yoo, 2011; Yoo, Donthu, and Lee, 2000), monetary promotions may have a positive effect on consumers' behavior, especially in the short-term. Therefore, we conclude that a rebate has a positive impact on the download intention of a shopping app, as the download is a one-time occurrence. As argued above, perceived usefulness also has a positive influence on the behavioral intention, which we consider as download intention here. A rebate is not a functional part of a shopping app, therefore it does not influence the usefulness of the app. However, the perceived usefulness can generally increase the impact of a rebate on the download intention. If the app was not found useful, a discount would have little chance of persuading a consumer to download the respective app, as the app would still not promise much benefit. However, if the app is found useful, a discount can be a good way to get a consumer to download it, as it creates a rewarding short-term motivation to download the app. Thus, we hypothesize:

H1: a) If a retailer promotes a shopping app with a rebate, consumers' download intention will be higher than without a rebate. b) The perceived usefulness of the shopping app positively moderates this relationship.

3.3.2 The effect of an online feature (online magazine) as a nonmonetary incentive

Different types of (app) features or services can support consumers in making a purchase decision (Kim et al., 2013). Services can be divided into online and in-store services (Gao and Su, 2018), depending on where consumers conduct their product search. Consumers primarily use online features online in the pre-purchase stage, and then they can purchase the product in a brick-and-mortar store. They can use online services regardless of their location with an Internet-enabled device, e.g., a smartphone (Gao and Su, 2018). Hence, consumers can use these features wherever they want (Chang, 2015). In addition, retailers also offer online services on their websites, too (Kim et al., 2017). One example of such a service is an online magazine, which is a common feature of shopping apps (e.g., H&M). The main function of an (online) fashion magazine is informing consumers about the latest fashion trends (McCormick and Livett, 2012). Similar to e-mail marketing (Merisavo and Raulas, 2004), the content of a magazine can include information about products or promotions.
There are various studies investigating the effects of magazines on consumer perceptions and behavior. Magazines have a significant positive impact on consumers' attitude toward the brand (Colliander

and Dahlén, 2011; Müller et al., 2008; Merisavo and Raulas, 2004), consumers' purchase intention (Colliander and Dahlén, 2011), and the recommendation rate (Müller et al., 2008; Merisavo and Raulas, 2004). As magazines have a positive impact on retailer outcomes, the online magazine can be a powerful example of an online feature integrated in a shopping app.

We conclude that an online feature such as an online magazine should have a positive effect on the intention to use a retailer's shopping app, as it is a part of it. Further, the advertisement of an online feature can have a positive effect on consumers' download intention, as there is congruence between the incentive and the promoted shopping app as both of them belong to the online channel (Blom, Lange, and Hess, 2021a; Buil, De Chernatony, and Montaner, 2013). In addition, according to the TAM, consumers only use technologies if they consider them as useful. According to Kim, Yoon, and Han (2016) perceived usefulness of information has a positive impact on app usage. Since an online magazine's primary function is informing consumers (McCormick and Livett, 2012), we argue that it has a positive impact on the perceived usefulness and consequently on the intention to use. As it is not possible to use a shopping app without downloading it first (Peng, Chen, and Wen, 2014; Wang, 2017) the online feature has a positive effect on both the download intention and intention to use through perceived usefulness. Thus, we hypothesize:

H2: a) If a retailer promotes a shopping app with an online feature, the consumers' download intention will be higher than without an online feature. b) The perceived usefulness mediates this relationship.

H3: a) If a retailer promotes a shopping app with an online feature, the consumers' intention to use will be higher than without an online feature. b) The perceived usefulness mediates this relationship.

We further assume that the impact of an online feature like an online magazine on the perceived usefulness of a shopping app compared to no online magazine depends on channel preferences. Shopping apps are a part of the online channel (Bellmann et al., 2011) and online features such as online magazines are often also offered on retailers' websites (Kim et al., 2017). Online customers might therefore consider such features in the shopping app context to be less useful, as these customers already know similar services from the website. For consumers who prefer the offline channel for purchasing, the online magazine as an online feature is a new function (van Heerde, Dinner, and Neslin, 2019). An online magazine can then provide an additional benefit of inspiration (McCormick and Livett, 2012) and thus support offline consumers in making a purchase decision. Consequently, these consumers perceive an online feature integrated in a shopping app more useful.

We hypothesize:

H4: The impact of an online feature on the perceived usefulness of a shopping app is stronger for consumers with offline channel preference than for consumers with online channel preference.

3.3.3 The effect of an in-store feature (scan and shop) as a nonmonetary incentive

At their core, shopping apps are an online service. However, shopping apps can also offer in-store services, which means that consumers go to a brick-and-mortar store to use them (Gao and Su, 2018). Consumers use these features in the brick-and-mortar store in the pre-purchase stage, and afterwards they can buy the product online or in-store. One example of an in-store service or feature integrated in a shopping app is a QR code and barcode scanner. One important app feature relying on QR codes is the scan and shop function. For example, if a consumer visits a H&M brick-and-mortar store where an item is not available in the right size, the consumer can scan the barcode with H&M's shopping app to order the desired product. In this way, QR codes combine the offline and online channel (Hagberg, Sundström, and Egels-Zandén, 2016; Okazaki, Li, and Hirose, 2012). Such a function enables retailers to offer consumers a convenient way to switch channels without switching to the competition (Strähle and Girwert, 2016). Many retailers recognized this as an opportunity and have integrated a QR code and barcode scanner into their shopping apps (e.g., H&M, Esprit, or Zalando).

QR codes in advertising have already been the subject of research in the past (e.g., Cata, Patel, and Sakaguchi, 2013; Jung, Somerstein, and Kwon, 2012). They are a frequently used tool in mobile marketing (Narang, Jain, and Roy, 2012). However, there is no research investigating whether QR code scanner can act as an incentive to download and to use a shopping app. Based on the explained benefits, we argue that consumers see an advantage in using a QR code and barcode scanner to support their in-store shopping experience and thus want to use a shopping app that incorporates this in-store feature. A few studies find a positive effect of QR codes on consumers' purchase intention (e.g., Narang, Jain, and Roy, 2012; Trivedi, Teichert, and Hardeck, 2020). Analogously, we assume a positive impact of the in-store feature scan and shop function on the intention to download and to use a shopping app. In this context, we also consider the perceived usefulness as a mediator, as consumers only use technologies if they find them useful (according to the TAM). Considering that a download is a prerequisite to using an app (Peng, Chen, and Wen, 2014; Wang, 2017), we hypothesize:

H5: a) If a retailer promotes a shopping app with an in-store feature, the consumers' download intention will be higher than without an in-store feature. b) The perceived usefulness of the shopping app mediates this relationship.

H6: a) If a retailer promotes a shopping app with an in-store feature, the consumers' intention to use will be higher than without an in-store feature. b) The perceived usefulness of the shopping app mediates this relationship.

According to Strähle and Girwert (2016), a scan and shop function combines the offline with the online channel. It increases the attractiveness of offline shopping for customers preferring the online channel for purchasing because of more convenient information search, availability of more colors and sizes, and home delivery. With the help of the scan and shop function, consumers scan selected products in the brick-and-mortar store (offline channel) to view the desired product in the app (online channel). Consequently, the scan and shop function makes it easier for online consumers to use their preferred channel for purchase in an offline environment. Conversely, consumers who prefer the offline channel for purchasing will view the scan and shop function as less useful as it forces them to switch from their preferred channel to their non-preferred channel. Thus, we hypothesize:

H7: The impact of an in-store feature on the perceived usefulness of a shopping app is higher for consumers with online channel preference than for consumers with offline channel preference.

According to Narang, Jain, and Roy (2012), a QR code scanner should be combined with other marketing tools to increase the purchase intention. The scan and shop function acts as an in-store feature that links the offline environment with the online channel and the online magazine acts as an online feature that can provide stimulation also for offline purchases. Both features together provide an omni-channel experience where online and offline channels are integrated from different starting points into the customer journey. This is in line with recent omni-channel consumer behavior, where consumers want to use more than one channel within their shopping process (Kim, Park, and Lee, 2017). Further, Ahn, Ryu, and Han (2004) report for a shopping mall context that online and offline features together generate greater effects on consumer behavior than they do separately. Consequently, we suggest that customers value such an omni-channel experience. We hypothesize that the scan and shop function positively interacts with the online magazine regarding the consumers' intention to download and to use a shopping app:

H8: a) If a retailer promotes a shopping app with an in-store feature, the effect of this feature on the consumers' download intention will be higher for apps that include an online feature (and the other way around). b) The perceived usefulness of the shopping app mediates this relationship.

H9: a) If a retailer promotes a shopping app with an in-store feature, the effect of this feature on the consumers' intention to use will be higher than for apps that also include an online feature (and the other way around). b) The perceived usefulness of the shopping app mediates this relationship.

3.3.4 The effect of perceived usefulness

Referring to the Technology Acceptance Model, previous literature has shown in detail that perceived usefulness has a positive influence on the behavioral intention (e.g., Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2018; Roy, 2017; Stocchi, Michaelidou, and Micevski, 2019). Consequently, we assume that perceived usefulness has a positive effect on the download intention and that the download intention has a positive effect on the intention to use, as the use of a shopping app requires a download (Peng, Chen, and Wen, 2014; Wang, 2017). As these aspects are not the focus of our study, we do not hypothesize these relations separately, though we test them in the entire model. Figure 9 summarizes the research model.

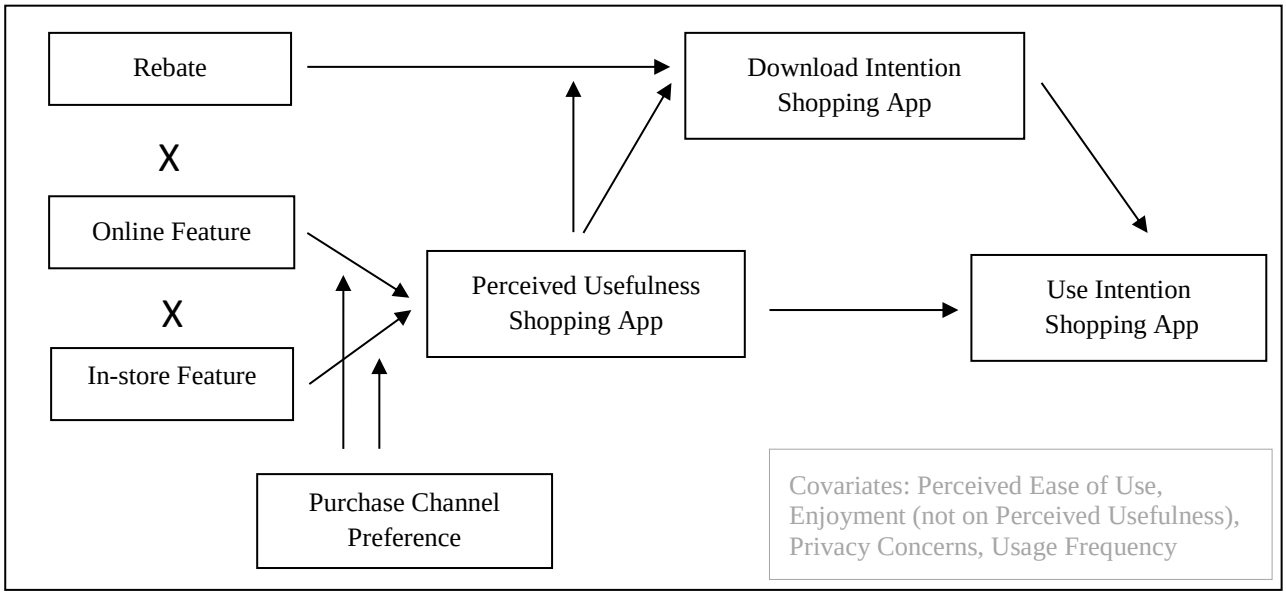

Figure 9. Research model.

3.4 Method

3.4.1 Data collection and sample

We conducted a scenario-based online experiment with a 2 × 2 × 2 (rebate × online magazine × scan and shop function: absent vs. present) between-subjects design, resulting in eight treatment groups, shown in appendix B. The participants were assigned to the groups randomly. The scenario approach is common practice in consumer behavior research (e.g., De Vries and Zhang, 2020; Hofenk et al.,

2019; Schneider and Zielke, 2021) as it allows manipulations of independent variables and consequently determining cause-effects on the dependent constructs. The scenario approach allows an examination under controlled conditions (Khan, 2011) and is easier to implement than a field experiment. The amount of the discount in the scenarios is 10%, as this is a common value (Büttner, Florack, and Göritz, 2015).

All participants were asked to imagine that they are searching for a new sweater on a website of a familiar fashion retailer. The participants were then shown a pop-up advertisement for the retailer's shopping app. Depending on the scenario, the retailer promotes different benefits to encourage downloading the shopping app. Afterwards, respondents filled out the questionnaire.

After pre-testing, we collected the data in May 2019 by distributing the online link to the questionnaire via social media and private contacts of European university students. The online survey yielded 332 valid questionnaires (respondents who correctly answered the manipulation check). The average age of respondents is 29 years and 60.2% are female and 39.8% are male. The representation of younger age groups is larger than in the general population, but acceptable, as the age group between 18 and 34 is the largest group among smartphones users (Deloitte, 2020). Cell sizes range between 30 and 54 (depending on the scenario) and allow a conservative testing of the hypotheses.

3.4.2 Measures

For most of the constructs, we used Likert-type items evaluated on seven-point numerical scales with endpoints ranging from totally disagree to totally agree. The scale measuring perceived usefulness is based on Hubert et al. (2017) and Natarajan, Balasubramanian, and Kasilingam (2017). The intention to download and the intention to use the shopping app were measured with single items according to Herhausen et al. (2015), with endpoints ranging from very unlikely to very likely. These two variables reflect concrete behaviors. Consequently, according to Rossiter (2012) single item-scales are suitable. Moreover, we included three items from Emrich, Paul, and Rudolph (2015) for a realism check. For channel preference, we used a semantic differential with the endpoints completely online and completely offline, adopted from Emrich, Paul, and Rudolph (2015) and Shim et al. (2001). For the manipulation check, we asked respondents to indicate which incentives were promoted in the ad (multiple choice). Based on previous research, we considered various covariates that may influence the outcome variables: perceived ease of use (Kim, Yoon, and Han, 2016, based on Davis, Bagozzi, and Warshaw, 1989), privacy concerns (Bleier and Eisenbeiss, 2015), app enjoyment (Nysveen, Pedersen, and Thorbjørnsen, 2005), and shopping app's usage frequency (Davis, 1989). Appendix C included the complete item list. For data analysis, we first used SPSS to perform a three-way MANCOVA to test the main effects of the independent variables and possible interactions between them. Second, we

used PROCESS (Hayes, 2018) to test the proposed mediation and moderation hypotheses regarding the perceived usefulness and channel preference.

3.5 Results

3.5.1 Testing of hypotheses

3.5.1.1 Main and interaction effects of monetary and nonmonetary incentives

Initial analyses determine internal consistency for all constructs (Cronbach's alpha > .70). A factor analysis further reveals loadings above .70. Hence, the constructs indicate adequate reliability (Loewenthal, 2001). In addition, a realism check shows that the respondents perceived the scenarios as mostly realistic since the mean value (M=5.71) differs significantly from the scale center (4, p<.001).

The MANCOVA results reveal a significant total model for the download intention (F(11,312)=22.393, p<.001) and the intention to use (F(11,312)=20.361, p<.001). The proposed model explains amounts of variance in the download intention (R^2=.421) and the intention to use (R^2=.397).

For the rebate, results show that it has a positive effect on consumers' download intention (H1a: F(1,312)=24.304, p<.001; $M_{with\text{-}rebate}$=4.03, SD=1.93 > $M_{w/o\text{-}rebate}$=3.20, SD=1.75). This supports H1a. In contrast to our expectations, the MANCOVA also shows a significant effect of the rebate on the use intention (F(1,324)=8.657, p=.003; $M_{with\text{-}rebate}$=3.72, SD=1.97 > $M_{w/o\text{-}rebate}$ =3.10, SD=1.76).

For the online feature (online magazine), we find marginally significant positive main effects on the download intention (H2a: F(1,312)=2.824, p=.094; $M_{with\text{-}online\text{-}feature}$=3.65, SD=1.99 > $M_{w/o\text{-}online\text{-}feature}$ =3.54, SD=1.80) and the intention to use (H3a: F(1,312)=2.961, p=.086; $M_{with\text{-}online\text{-}feature}$=3.48, SD=2.02 > $M_{w/o\text{-}online\text{-}feature}$ =3.33, SD=1.78). This supports H2a and H3a. The main effects hypothesized in H5a and H6a are not significant. There is no significant impact of the in-store feature on the intention to download (H5a: F(1,312)=.009, p=.926) and the intention to use (H6a: F(1,312)=.017, p=.896). Appendix D shows all main effects graphically. Regarding the interaction between the online and in-store feature, there is no significant effect on the download intention (H8a: F(1,312)=2.400, p=.122), rejecting H8a. However, the interaction effect on the intention to use is significant (H9a: F(1,312)=4.175, p=.042). Figure 10 shows that consumers' intention to use the shopping app is highest when the app offers both features. When a retailer promotes the online feature, the effect on the intention to use is positive when an in-store feature is also being promoted. This effect is reversed without promotion of the in-store feature. This supports H9a. The graph of the interaction effect on

the intention to use shows a disordinal interaction. Consequently, the main effect of the online feature must be interpreted with caution.

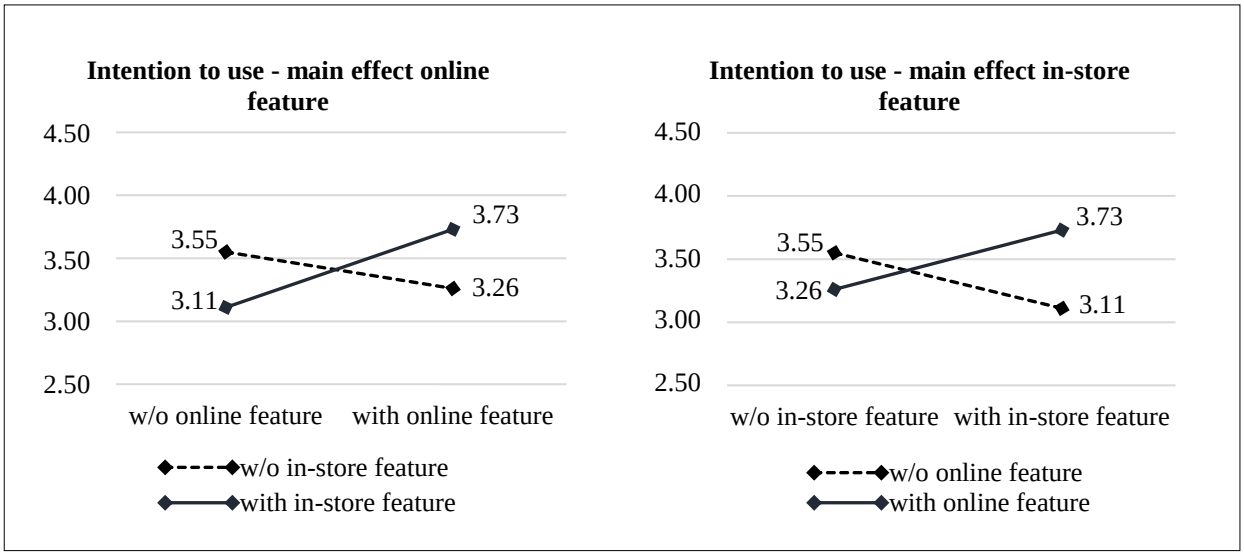

Figure 10: Interaction between an online and in-store feature on the intention to use.

3.5.1.2 Mediation and moderation effects of perceived usefulness and channel preference

To test the hypothesized mediation and moderation effects regarding perceived usefulness and channel preference, we used Hayes' SPSS macro PROCESS with 5,000 bootstrapping subsamples (model 1 for moderations, model 4 for single mediations, and model 8 for moderated mediation). For the moderation of the perceived usefulness on the effect of the rebate on the download intention, we do not find a significant result (H1b: β=-.001; p=.985), rejecting H1b. However, we find support for H2b and H3b. The perceived usefulness mediates both the relationship between the online feature and the download intention (partially standardized indirect effect: β=.082; 90% CI: .0146 to .1539) and the online feature and the intention to use (partially standardized indirect effect: β=.087; 95 % CI: .0044 to .1784). We support the mediation hypothesis, despite the total effects are not significant (download: β=.121; p=.161; use: β=.137; p=.120) as prior literature has discussed that a significant total effect is not necessary for a mediation effect (see Warner, 2013). The mediating effect of the perceived usefulness is not significant with regard to the in-store feature, neither for the relationship between the in-store feature and the download intention (partially standardized indirect effect: β=.010; 95% CI: -.0757 to .0876), nor for the relationship between the in-store feature and the intention to use (partially standardized indirect effect: β=.011; 95% CI: -.0777 to .0955). Hence, H5b and H6b are rejected. However, the effect of the interaction between the online and in-store feature on the download intention is significantly mediated by the perceived usefulness (index moderated mediation: β=.352; 95% CI: .0453 to .6655). In addition, the effect of this interaction on the intention to use

is significantly mediated by the perceived usefulness (index moderated mediation: β=.372; 95% CI: .0593 to .6915). Hence, H8b and H9b are supported. Table 5 shows all results of mediation analyses with total, direct, and indirect effects.

Table 5. Results of mediation effects.

Single mediations									
H	**Path**	**Total effect**	**p-value**	**Direct effect**	**p-value**	**Indirect effect**	**Bootstrap CI**		**R^2**
H2b	OF→PU→DI	.121	.161	.039	.610	.082	.0146[a]	.1539[a]	.428
H3b	OF→PU→IU	.137	.120	.049	.521	.088	.0044	.1784	.408
H5b	ISF→PU→DI	-.002	.982	-.012	.875	.010	-.0757	.0876	.428
H6b	ISF→PU→IU	-.011	.900	-.022	.776	.011	-.0777	.0955	.408
Moderated mediations									
H	**Path**	**Moderator**	**Effect[b]**	**Bootstrap CI**		**Index**	**Bootstrap CI**		**R^2**
H8b	OF×ISF→PU→DI	w/o ISF	-.016	-.2338	.2113	.352	.0453	.6655	.558
		with ISF	.336	.1253	.5573				
H9b	OF×ISF→PU→UI	w/o ISF	-.017	-.2415	.2187	.372	.0593	.6915	.557
		with ISF	.356	.1398	.5903				

Notes: all CI = 95% expect [a] = CI: 90%, [b] = conditional indirect effects, DI=download intention, ISF=in-store feature, OF=online feature, UI=intention to use, coefficients for single mediations are standardized.

Regarding the moderation, we find a marginally significant effect of the interaction (β=.180; p=.062) between the online feature and the channel preference on the perceived usefulness. Figure 11 shows that the online feature increases perceived usefulness only for consumers who prefer the offline channel, which supports H4. The opposite is true for the interaction between the in-store feature and the channel preference (β=-.189; p=.047). Figure 12 shows that only consumers who prefer the online channel find a shopping app that includes an in-store feature more useful than an app without this feature. This supports H7.

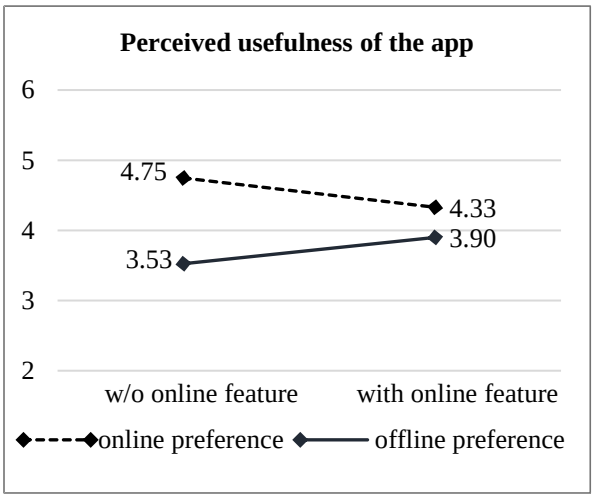

Figure 11. Interaction between an online feature and consumers' channel preference on the perceived usefulness.

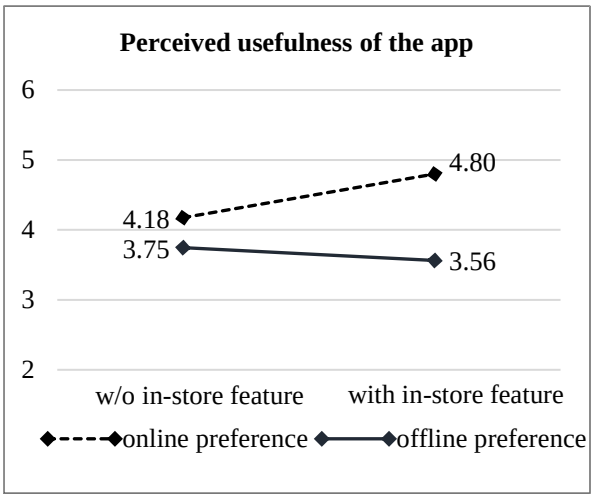

Figure 12 Interaction between an in-store feature and consumers' channel preference on the perceived usefulness.

For a more precise estimate of the interaction between app features and consumers' channel preference, we use the Johnson-Neyman technique. The Johnson-Neyman technique is an alternative procedure to ANCOVA and is suitable for continuous moderators. It "identifies areas in the range of the moderator variable where the effect of the focal predictor on the outcome is statistically significant and not significant" (Hayes and Matthes, 2009, pp. 924-925). Figure 13 shows that consumers with a channel preference score above 4.26, i.e., consumers with an offline channel preference, find an app with an online feature more useful than one without an online feature (grey area). The interaction effect for consumers with an online channel preference is not significant.

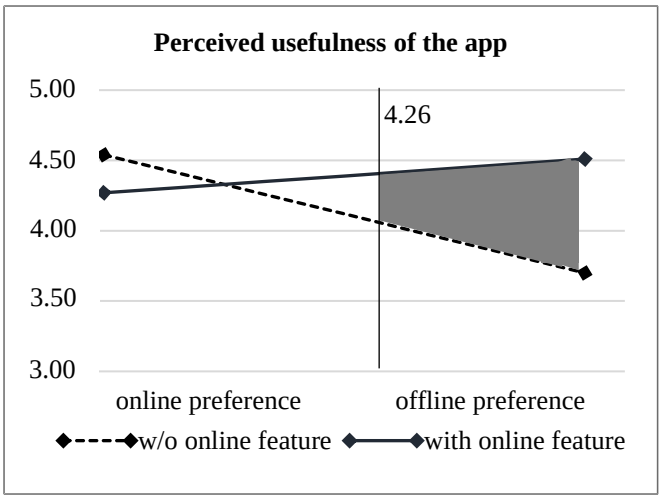

Figure 13. Interaction between an online feature and consumers' channel preference on the perceived usefulness.

Regarding the interaction effect between the in-store feature and consumers' channel preference, there are no statistically significant transition points within the observed range of the moderator (see table 6). However, values above 5.5 are marginally significant, indicating that consumers with an offline channel preference perceive an app with an in-store feature less useful than without this feature. In addition, the decreasing p-value in the low scores indicates that consumers with a preference for the online channel find an app with an in-store feature more useful than without this feature. Furthermore, the estimates show a positive effect of the in-store feature on perceived usefulness of the app for online customers and a negative effect for offline customers. However, the effects are not significant or only marginally significant.

Table 6. Results of Johnson-Neyman technique for interaction effect of the in-store feature and consumers' channel preference.

Channel preference	Effect	se	t	p-value	LLCI	ULCI
1.0000	.4803	.2960	1.6228	.1056	-.1020	1.0627
1.3000	.4222	.2715	1.5549	.1210	-.1120	.9565
1.6000	.3641	.2480	1.4682	.1430	-.1238	.8520
1.9000	.3060	.2256	1.3563	.1760	-.1379	.7499
2.2000	.2479	.2048	1.2103	.2271	-.1551	.6509
2.5000	.1898	.1861	1.0197	.3086	-.1764	.5560
2.8000	.1317	.1702	.7737	.4397	-.2032	.4667
3.1000	.0736	.1580	.4660	.6415	-.2372	.3844
3.4000	.0155	.1502	.1033	.9178	-.2801	.3111
3.7000	-.0426	.1477	-.2882	.7734	-.3332	.2481
4.0000	-.1007	.1507	-.6679	.5047	-.3972	.1959
4.3000	-.1588	.1589	-.9991	.3185	-.4715	.1539
4.6000	-.2169	.1716	-1.2641	.2071	-.5544	.1207
4.9000	-.2750	.1878	-1.4645	.1441	-.6444	.0944
5.2000	-.3331	.2067	-1.6115	.1081	-.7397	.0736
5.5000	-.3912	.2276	-1.7184	.0867	-.8391	.0567
5.8000	-.4493	.2501	-1.7962	.0734	-.9414	.0428
6.1000	-.5074	.2738	-1.8533	.0648	-1.0460	.0312
6.4000	-.5655	.2983	-1.8958	.0589	-1.1523	.0214
6.7000	-.6236	.3235	-1.9277	.0548	-1.2600	.0129
7.0000	-.6817	.3492	-1.9521	.0518	-1.3687	.0054

Table 7 summarizes the results of hypotheses testing and indicates that almost all hypotheses related to the online feature are supported and most hypotheses related to the in-store features are rejected.

Table 7. Results of hypotheses testing.

Hypotheses	Relationship	Evaluation
H1a	Rebate → download intention	Supported
H1b	Rebate × perceived usefulness → download intention	Rejected
H2a	Online feature → download intention	Supported
H2b	Online feature → perceived usefulness → download intention	Supported
H3a	Online feature → intention to use	Supported
H3b	Online feature → perceived usefulness → intention to use	Supported
H4	Online feature × channel preference → perceived usefulness	Supported
H5a	In-store feature → download intention	Rejected
H5b	In-store feature → perceived usefulness → download intention	Rejected
H6a	In-store feature → intention to use	Rejected
H6b	In-store feature → perceived usefulness → intention to use	Rejected
H7	In-store feature × channel preference → perceived usefulness	Supported
H8a	Online feature × in-store feature → download intention	Rejected
H8b	Online feature × in-store feature → perceived usefulness → download intention	Supported
H9a	Online feature × in-store feature → intention to use	Supported
H9b	Online feature × in-store feature → perceived usefulness → intention to use	Supported

3.5.2 Additional analyses

We also analyzed the relationships between the perceived usefulness, the download intention and the use intention. We did not hypothesize the relationships between perceived usefulness and consumer behaviors, as they have been extensively proofed in prior research (e.g., Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2018; Roy, 2017; Stocchi, Michaelidou, and Micevski, 2019). The perceived usefulness has a positive direct impact on the intention to use (β=.186; p<.001), but also a completely standardized indirect effect via the download intention (β=.344; 95% CI: .2603 to .4284), indicating partial mediation. The total effect is also significantly positive (β=.626; p<.001).

Furthermore, we examine the interaction effect of both features on the perceived usefulness. The main effects of the features on the perceived usefulness are not significant, neither for the online feature (F(1,318)=2.645, p=.105) nor for the in-store feature (F(1,318)=.043, p=.837), However, we found a significant interaction between the online and in-store feature (F(1,318)=4.944, p=.027). Figure 14 shows this interaction, indicating that an in-store feature only increases the perceived usefulness when it is combined with an online feature and vice versa.

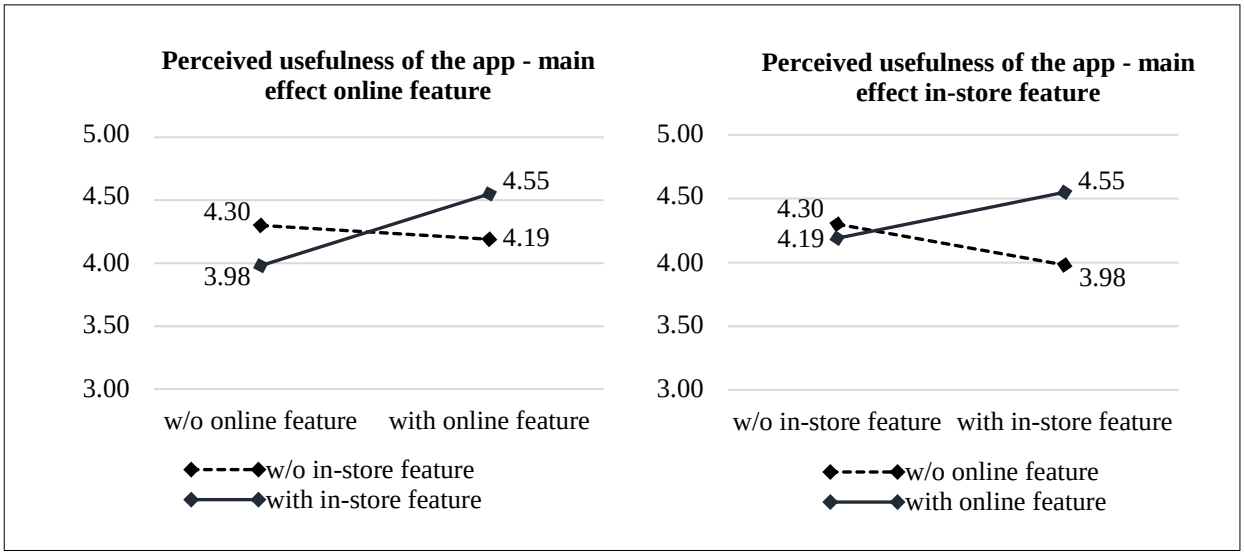

Figure 14. Interaction between an online and in-store feature on perceived usefulness.

3.6 Follow-up study

The main study found that perceived usefulness plays an important mediating role in our research model. Furthermore, the observed interaction effects between features and channel preference and between online and in-store features on the perceived usefulness provide interesting insights. We therefore conducted a follow-up study to validate these findings. We investigate whether targeted advertising of different features in consumers' preferred sales channels leads to different perceptions

of the usefulness of the shopping app. Such advertising could be a strategy for retailers to promote their shopping apps.

3.6.1 Research design and sample description

In the follow-up study, we used the same research design as in the main study with a few adjustments. We substituted the online feature online magazine by the online feature availability check. This feature enables consumers to check the availability of products in a physical store online (Gao and Su, 2018; Herhausen et al., 2015), i.e., consumers use the feature online through the shopping app in the pre-purchase stage before switching to the brick-and-mortar store for purchasing. It is further a common feature in shopping apps (e.g., Esprit, H&M, or Mango). For the in-store feature, we used the scan and shop function, that consumers' use in-store before switching to the online channel. Consequently, customers use the availability check and the scan and shop function in exactly opposite situations. We conducted a scenario-based online experiment with 2 (channel preference) × 3 (online feature, in-store feature, both) between-subjects design. In the scenario (see appendix E), the participants first selected one out of six multi-channel retailers where they like to purchase. Then, we asked respondents for their channel preference and depending on their answer, we asked them to imagine going to the physical store or visiting the online shop of the selected retailer where they see an ad. Next, we displayed the advertisement promoting the different features (randomly selected). Afterwards, respondents filled the questionnaire with the same questions regarding perceived usefulness of the retailer's app and covariates (see appendix C). We extended covariates by attitude toward the retailers' app (Bergkvist and Rossiter, 2007) and loyalty toward the retailer (Yi and Jeon, 2003). We analyzed data using ANCOVA with LSD post-hoc tests.

After pre-testing, we used the same procedure for data collection as in the main study. The online survey yielded 200 valid questionnaires. The average age of respondents is 29 years and 59.5% are female and 40.5% are male. Cell sizes[7] range between 10 and 65 (depending on the scenario; see appendix F). We integrated manipulation checks, which we measured on a seven-point Likert scale ranging from totally disagree to totally agree.

[7] The different group sizes result from the channel preferences: 35 Participants have an online preference and 163 an offline channel preference.

3.6.2 Results

Cronbach's alpha is greater than the critical threshold of .70 for all constructs, indicating internal consistency. Factor analysis also shows loadings above .70, indicating adequate reliability (Loewenthal, 2001) (appendix C). The manipulation checks show significant differences between the groups ($p<.05$), indicating successful manipulation. A realism check indicated that the participants perceived the described scenarios as mostly realistic since the mean value ($M=5.58$) differs significantly from the scale center (4, $p<.001$).

Results show that feature types have a marginally significant impact on consumers' perceived usefulness of a shopping app for both consumers with online channel preference ($F(2,27)=2.816$, $p=.077$) and with offline channel preference ($F(2,155)=2.575$, $p=.079$). Post-hoc tests show that participants with an online channel preference perceive a shopping app with both features ($M=5.12$) more useful than an app with a single feature ($M_{online\text{-}feature}=4.29$, $p=.032$; $M_{in\text{-}store\text{-}feature}=4.37$, $p=.074$). Participants with an offline channel preference only perceive a shopping app with both features significantly more useful compared to an app with an in-store feature ($M_{both}=3.81$; $M_{online\text{-}feature}=3.48$, $p=.137$; $M_{in\text{-}store\text{-}feature}=3.35$, $p=.030$). Regarding the interaction between feature type and channel preference, we did not observe significant results. However, mean values indicate at least that consumers with an online channel preference perceive a shopping app with an in-store feature ($M=4.37$) more useful than with an online feature ($M=4.29$). Conversely, consumers with an offline channel preference perceive a shopping app with an online feature ($M=3.48$) more useful than with an in-store feature ($M=3.35$). Furthermore, it can be seen that consumers with an online channel preference perceive a shopping app to be more useful overall than consumers with an offline channel preference, as the results of the main study already showed. Figure 15 shows the results of consumers' preferences graphically.

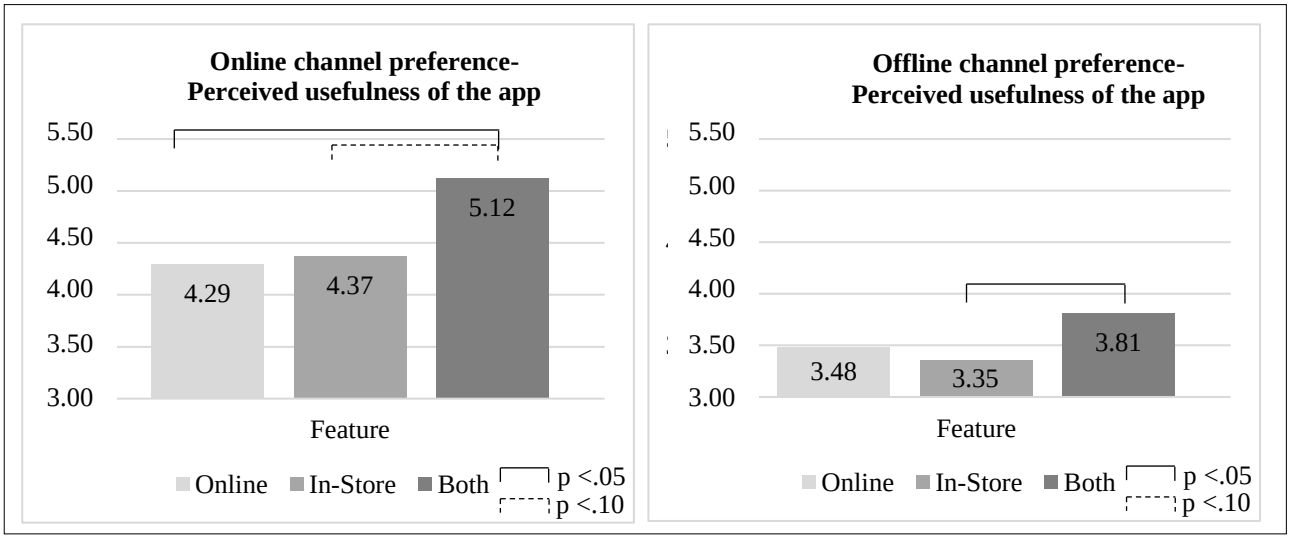

Figure 15. Results of follow-up study.

3.7 Discussion

Using an experimental approach, this study aims to investigate effects of monetary (in the form of a rebate) and nonmonetary (in the form of an online feature and an in-store feature) incentives on consumers' download intention and intention to use a shopping app. The results indicate that a rebate positively influences the download intention, which is in line with prior research (Ataman, van Heerde, and Mela, 2010; Yi and Yoo, 2011; Yoo, Donthu, and Lee, 2000). Contrary to our expectations, the interaction effect between the rebate and the perceived usefulness on the download intention is not significant, indicating that consumers respond to the rebate irrespective of the usefulness of app features. An additional analysis shows that the rebate has a positive impact on the intention to use. These results indicate that the mere availability of an app (after downloading) stimulates its usage, irrespective of the usefulness. As prior research has shown that a monetary incentive has mainly a short-term effect (see Yi and Yoo, 2011), it remains questionable whether consumers' intentions will translate to long-term usage. It is conceivable that consumers only use the app in the long-term if rebates are regularly offered via the app.

In contrast to our expectations, only the online feature has a main effect on the download intention and the intention to use. However, the importance of the in-store feature in the form of a scan and shop function may have increased during the COVID-19 pandemic as consumers become more familiar with this function. Restaurants, museums etc. used the QR code technology for registration. This has made the use of QR codes for shopping a realistic option for consumers in the future. Further, the results show a significant interaction effect between both features on the intention to use. This result supports Narang, Jain, and Roy's (2012) advice to combine the QR code scanner with further tools. The relationships are mediated by the perceived usefulness. Hence, if a shopping app offers a combination of features that allows consumers to switch between channels in any direction and experience a seamless shopping experience, consumers perceive the app useful and use it in the long-term. This result is supported by the follow-up study as consumers perceive a shopping app with both features as more useful than one with only a single feature.

Furthermore, single nonmonetary features have effects for customer segments with certain channel preferences. The in-store feature allows customers to switch to the online channel while being in-store. Results show that consumers preferring the online channel for purchasing, perceive a shopping app with this in-store feature more useful. However, the Johnson-Neyman statistic shows that there are no statistically significant points within the observed range of the moderator. There could be several reasons for this result. First, the effect of the in-store feature on the perceived usefulness of the app is generally weak. This is also reflected in the main effect, which is not significant. Second,

the sample sizes of the individual points are too small to provide significant results. However, the cumulative interaction effect is significant, which could be due to the fact that there are large differences between the estimates for consumers with online and offline channel preference.

The opposite effect exists for the online feature that provides additional inspiration for offline purchases (but not necessarily for online purchases, as the online magazine is usually also integrated in the regular website). Results show that consumers preferring the offline channel for purchasing perceive a shopping app with an online feature more useful, as it offers an online feature that supports their offline purchases. The Johnson-Neyman technique supports this assumption in more detail. The interaction effect is not significant for consumers with a preference for the online channel as the online function does not provide any additional benefit, since they can also use the online function on the website. Hence, supporting our assumption, consumers react positively to features offered in a non-preferred channel that support the shopping processes in their preferred channel. Our follow-up study supports these results as a tendency, however, the interaction between the channel preference and the features was not significant.

3.8 Management implications

Results show that a rebate is indeed conducive for stimulating downloads, which is in line with prior research (e.g., Alvarez-Alvarez and Vázquez-Casielles, 2005). Therefore, a rebate could be a good instrument for retailers to motivate consumers to adopt an additional mobile channel as a first step. However, as the rebate only increases the download intention without affecting the perceived usefulness, retailers would do well to consider other, nonmonetary incentives in their long-term strategy that are perceived as useful and thus also increase usage of the shopping app. The download is only the first step (Peng, Chen, and Wen, 2014; Wang, 2017). The promotion of features within the app after the download via push-messages might be a good instrument to make the long-term app usage more attractive for the consumer. The results further indicate that an online magazine as an online feature can be a useful feature on its own, while the scan and shop function as an in-store feature should be offered in combination with the online feature. Retailers should therefore offer packages of online and in-store features that support channel switching in any direction. They should further promote these features more specifically to the relevant target customers. Consumers favoring the offline channel perceive a shopping app with an online feature more useful than consumers favoring the online channel do. Hence, the retailer can promote the online magazine to offline customers (e.g., in-store flyers). As consumers who prefer the online channel perceive a shopping app with an in-store feature more useful than consumers who prefer the offline channel, retailers should promote the scan and shop function in their online shops or newsletters. As a side effect, this may also bring online

customers to the stores (with great opportunities for cross- and upselling). When customers with strong preferences for the online channel visit a store, the scan and shop function is also a chance for retailers to keep these customers in their own channels and to prevent competitive showrooming, i.e., that consumers gather information about a product from a retailer in a brick-and-mortar store but purchase it online at a competitive retailer (Gensler, Neslin, and Verhoef, 2017).

3.9 Theoretical contribution

From a theoretical point of view, our study extends the existing literature in several ways. Firstly, the literature review has shown that prior research focused on generic influencing factors on the perceived usefulness of a shopping app (e.g., Hubert et al., 2017; Roy, 2017; Stocchi, Michaelidou, and Micevski, 2019). Accordingly, we extended the technology acceptance model by two specific factors in the shopping app context. We shed light on the effects of these specific features, with direct implications for the app design. Secondly, prior research has mostly addressed the adoption of apps, usually without differentiating between the download intention and intention to use. Such a differentiated view is important as stimulating a download is only a first step (Peng, Chen, and Wen, 2014; Wang, 2017) in creating positive effects on customer loyalty through app usage. Thirdly, our results show that research would gain much by not analyzing the impact of app features in isolation, as the combined effect of an app package differs from the sum of direct effects of single features. The results particularly highlight that a package of app features should create a seamless shopping experience across channels from any starting point in the customer's shopping journey. Fourthly, this research highlights the importance of considering channel preferences when analyzing effects of shopping app features. It shows that customers react more positively toward features offered in a non-preferred channel which support purchases in preferred channels.

3.10 Limitations and future research

This research has some limitations that offer opportunities for further research. Firstly, our scenarios focus on the apparel industry. A cross-industry analysis could test the generalizability of our results, as it is possible that the usefulness of specific features differs between industries. Secondly, our results have shown that a rebate has a positive effect on consumers' use intention. Since it is questionable whether a rebate really has a long-term effect on consumer behavior, future research could conduct further studies to test this effect in terms of validity. Thirdly, we analyze only three nonmonetary incentives. Future research could integrate additional features such as social media elements. Fourthly, we only considered consumers' purchase channel preference for moderation analyses. As customers often switch channels during their customer journey, future research could differentiate

between pre-purchase and purchase channel preference. Fifthly, future research could shed more light on the moderating role of personal characteristics and demographics, such as innovativeness or gender. Retailers can use such information to personalize promotions related to particular app features. Sixthly, we conducted a scenario-based experiment. Further research could examine the robustness of our finding in a real-life setting. Finally, cell sizes in the follow-up study only allow an interpretation of tendencies.

4 Consequences of app feature usage[8]

Abstract

Shopping apps support consumers in their shopping process at different stages of the customer journey. They can contain various features, such as an online magazine, shipment tracking, or a QR code scanner. Consumers have the possibility to send product links to friends, chat with retailers' staff, participate in loyalty programs, find a physical store nearby, or pay within the app. Consequently, app features represent several touchpoints within the customer journey. Shopping apps are an attractive way for retailers to engage with their customers and increase customer satisfaction and loyalty. Several studies mainly focus on the intention to use mobile apps, while our study investigates the potential outcomes. It further considers the app design by analyzing how three app feature groups (pre-purchase, transaction, cross-channel) influence app and retailer satisfaction. Moreover, we consider consumers' channel preference at different stages of the customer journey. To validate our findings, we conducted the study in three different retail sectors. Results show that nearly all feature groups have a positive impact on customer satisfaction with the app and retailer respectively in different sectors. However, consumers' channel preference has a moderating impact on the relationship between app features and customer satisfaction. Our findings provide implications on how to design and advertise shopping apps.

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[8] Chapter 4 is based on the article "Shopping App Features: Their Impact on Customer Satisfaction and Loyalty" published in *The International Review of Retail, Distribution and Consumer Research*, Vol. 32 No. 4, pp. 423-449. doi:10.1080/09593969.2022.2109189.

4.1 Introduction

The range of mobile applications (hereafter “apps”) and their use are increasing (Boyd, Kannan, and Slotegraaf, 2019; De Haan et al., 2018; Herhausen et al., 2019; Verhoef et al., 2017). This poses challenges for retailers, as they have to develop apps to meet customer expectations and thereby create satisfaction and loyalty. Designing apps with features that customers perceive as useful is a challenge, as 91% of downloaded shopping apps are no longer used after 30 days (Statista, 2020). Retailers have to address this issue in the app design process.

Shopping apps are defined as mobile apps that are edited and branded by a specific retailer (Bellmann et al., 2011) and serve as an additional sales channel alongside the brick-and-mortar channel and traditional e-commerce (Peng, Chen, and Wen, 2014; Taylor and Levin, 2014). Their quick and convenient use is advantageous for consumers (Kim and Baek, 2017) and shopping app features support consumers during their shopping process. With such features, consumers have the option to find a physical store nearby (Fang, 2019), chat with retailers' staff (Roggeveen and Sethuram, 2020), pay within the app (Grewal, Roggeveen, and Nordfält, 2017), or send a product link to family and friends (Fuentes and Svingstedt, 2017; Zhao and Balagué, 2015). Previous literature has mainly focused on the intention to use mobile app (e.g., Hew et al., 2015; Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Shen, 2015), while less studies concentrate on app use outcomes, such as customer satisfaction and loyalty (e.g., Omar et al., 2021). However, research emphasizes the importance of customer loyalty (e.g., Herhausen et al., 2019; Omar et al., 2021; Reichheld and Schefter, 2000) as loyal customers spread positive word of mouth about the retailer, purchase repeatedly and are willing to pay higher prices (Bhattacherjee, 2001; Zeithaml, Berry, and Parasuraman, 1996).

Few studies have addressed the relationship between customer satisfaction and customer loyalty in the mobile app context (e.g., Baek, 2013; Chang, 2015; Natarajan, Balasubramanian, and Kasilingam, 2017). But what satisfies mobile app users so that they subsequently become loyal? Shopping app features that consumers perceive as useful should be important factors. These features can (1) support the pre-purchase stage, e.g., product finding tools (filter) or chats with the staff, (2) support the purchase stage, e.g., data preservation or shipment tracking and (3) enable channel switching, e.g., multichannel technologies such as click & collect, check & reserve, product availability check, or QR code scanner. Companies have the opportunity to design their app the way they prefer or rather in the way their customers prefer (Taylor and Levin, 2014). “Application design is the degree to which a user perceives that a mobile application is generally designed well” (Hoehle and Venkatesh, 2015, p. 447).

According to Zhao and Balagué (2015), many existing apps are not well designed. The question that consequently arises is which mobile app features make customers satisfied so that they use the app in the long-term and become loyal. In this study, we address this question by analyzing various app features and their influence on customer satisfaction. Further, we consider that consumers can have different channel preferences for the pre-purchase and the purchase stage (Frambach, Roest, and Krishnan, 2007). Since shopping app features provide different support for online and physical store purchases, consumers' channel preference might play a role in this context. In particular, we examine the following research questions:

- Are shopping app users more satisfied and loyal toward the retailer than nonusers?
- Do different feature groups have a positive impact on customer satisfaction with the app and with the retailer?
- Does the consumers' channel preference moderate the impact of different feature groups on customer satisfaction with the app?

With our study, we contribute to existing literature in several ways. As a first step, we examine whether app users are more satisfied with the retailer and are more loyal toward the retailer than nonusers are. As a second step, we classify different app features into systematic groups and analyze their influence on customer satisfaction with both the app and the retailer. Finally, we consider consumers' channel preference, as features support consumers' online and offline activities differently.

4.2 Theoretical background and hypotheses

4.2.1 Customer satisfaction and loyalty in the app context

Customer satisfaction is defined as “the consumer's fulfillment response. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment […]” (Oliver, 1997, p. 13). Customer satisfaction is important as prior literature identified customer satisfaction as a key determinant of customer loyalty (e.g., Atulkar and Kesari, 2017; Harris and Goode, 2004; Olsen, 2007; Picón-Berjoyo, Ruiz-Moreno, and Castro, 2016; Santouridis and Trivellas, 2010; Shankar, Smith, and Rangaswamy, 2002; Wallace, Giese, and Johnson, 2004; Yang and Peterson, 2004). Wallace, Giese, and Johnson (2004, p. 251) define customer loyalty as “the customer's attitudinal and behavioral preference for the retailer when compared with available competitive alternatives”. Customer loyalty is important for retailers since loyal customers spread positive word of mouth about the retailer, make repeat purchases and are willing to pay higher prices (Bhattacherjee, 2001; Zeithaml, Berry, and Parasuraman, 1996). In other words, loyal customers increase retailer's success (Lin and Wang, 2006; Reichheld and Schefter, 2000). Therefore,

retailers are interested in a long-term relationship with their customers (Meyer-Waarden, 2007). The relationship between satisfaction and loyalty has also been observed in a mobile application context, although literature on this topic is sparse (e.g., Baek, 2013; Chang, 2015; Molinillo et al., 2022). In particular, the literature has not compared how app users and nonusers differ in their satisfaction with and their loyalty toward the retailer. However, this examination is highly relevant as it can underline the importance of offering shopping apps for retailers. If app users and nonusers do not differ in their satisfaction and loyalty, retailers can do without the costly development of an app. If, as we assume, users and nonusers do differ, retailers should recognize the relevance of shopping apps and invest in developing an app with features that can satisfy customers. Few studies compare app users and non-users. Kim et al. (2017) show that shopping app users are more experienced with online shopping and smartphone usage than non-shopping app users. Further literature found that app adopters have a higher average spending (Kim, Wang, and Malthouse, 2015; Liu et al., 2019) and purchase frequency (Lim, Xie, and Haruvy, 2021; Liu et al., 2019), which are related to behavioral loyalty (Yi and Jeon, 2003). While this previous research focuses on observed behavior, we focus on psychological consequences of app usage such as satisfaction and attitudinal loyalty. Bellman et al. (2011) determine that customers change their attitude toward the brand favorably after app adoption. Wallace, Giese, and Johnson (2004) found that customer satisfaction and loyalty are higher for multi-channel users than for single channel users. Similar results were also shown in a study by Kumar and Venkatesan (2005) as they found that multi-channel shoppers have a higher likelihood of being active with the retailer than single-channel shoppers. Furthermore, Herhausen et al. (2019) show that more touchpoints within the customer journey increase customer satisfaction and loyalty. Shopping apps represent an additional touchpoint in the customer journey and additionally, they support using of or switching between different channels of a retailer (Wagner, Schramm-Klein, and Steinmann, 2020). Thus, shopping apps have the ability to retain customers due to their flexibility and convenience (Liu et al., 2019). Features such as a QR code scanner ensure that consumers stay with the same retailer, since they direct them to the retailers' online shop (Trivedi, Teichert, and Hardeck, 2020) to get further relevant information for their shopping (see Zhao and Balagué, 2015). Their usage can thus also positively influence customer satisfaction while shopping (Hossain, Zhou, and Rahman, 2018). Furthermore, the icon of the app on consumers' smartphone is an additional touchpoint as consumers look at their smartphones several times a day (Garg and Telang, 2013) and the icon of the shopping app usually includes the retailer name or logo (Bellman et al., 2011). Thus, the consumer is constantly in contact with the retailer. More touchpoints lead to higher satisfaction and loyalty (Herhausen et al., 2019). Furthermore, apps enable a personal communication between the consumer and the retailer via push notifications. The retailer can send information about e.g., recent promotions or new items

(Shankar et al., 2010; Yang and Kim, 2012). This form of communication has a positive impact on customer's positive word of mouth (Kim, Yoon, and Han, 2016), which is an indicator of loyalty (Yi and Jeon, 2003). Hence, the app offers advantages in the shopping process and serves as an additional touchpoint. Therefore, an app has the potential to increase customer satisfaction and loyalty. However, as satisfaction and loyalty can then in turn also increase app usage, the relationship might be more circular and not only one-directional. By this we mean that consumers first exhibit a certain level of loyalty in order to adopt the app in the first place. But the subsequent use leads to a further increase in loyalty, due to the specific benefits. Overall, we assume that app users are more satisfied and loyal than nonusers. Thus, we hypothesize:

H1: App users are more satisfied toward the retailer than nonusers.
H2: App users are more loyal with the retailer than nonusers.

4.2.2 The impact of shopping app features on customer satisfaction

Previous literature deals primarily with the intention to use mobile apps (e.g., Natarajan, Balasubramanian, and Kasilingam, 2017; Roy, 2017; Peng, Chen, and Wen, 2014). Influencing factors of app usage are, e.g., perceived usefulness (Natarajan, Balasubramanian, and Kasilingam, 2017; Roy, 2017), perceived enjoyment (Natarajan, Balasubramanian, and Kasilingam, 2017), or perceived app value (Peng, Chen, and Wen, 2014). Some studies examine the outcomes of using mobile apps, such as satisfaction (Baek, 2013; Chang, 2015; Iyer, Davari, and Mukherjee, 2018; Sakar and Khare, 2018), intention to repurchase (Baek, 2013; Iyer, Davari, and Mukherjee, 2018; Sakar and Khare, 2018), or positive word of mouth (Sakar and Khare, 2018). However, existing research primarily examines the whole app (e.g., Baier and Rese, 2020). There is hardly any study that differentiates app features (e.g., Zhao and Balagué, 2015). One of the few existing studies considering potential app features in a different context was conducted by Baier and Rese (2020). They investigated the impact of various technologies of a multi-channel retailer on customer shopping satisfaction (e.g., click & collect, in-store returns, product testing, or magical mirrors). However, the authors consider shopping apps as a specific technology and not as a channel in which retailers can implement technologies. Furthermore, the authors take physical store technologies, such as events or beacons into account. Consequently, the study has a broader view on technologies and features respectively. Zhao and Balagué (2015) differentiate app features according to companies' business goals such as product innovation or communication. They divide the features from the retailer's point of view and neglect the consumer's perspective. Furthermore, their study does not focus on the shopping context. Roggeveen and Sethuraman (2020) wrote a commentary on 40 retail technologies and categorize them in ten

areas. This is a broad approach and many of the 40 technologies are usually not implemented in a shopping app. Also, the paper is not empirical. However, we consider its differentiation between the pre-purchase and the purchase stage for grouping single app features for our study.

Due to limited budgets, retailers have to focus on the features that customers value most (Baier and Rese, 2020). Not every investment in technologies or features guarantees the expected rate of return (Demko-Rihter and Ter Halle, 2015). The mere availability of features does not necessarily lead to their use by customers (Ter Halle and Weber, 2014), especially since customers may be overloaded by the shopping opportunities which shopping apps can provide (Fuentes and Svingstedt, 2017). Therefore, it is important to understand which features or feature groups positively influence customer satisfaction. The research on shopping app design or rather shopping app features has just emerged (Li et al., 2020). The literature uses different terms for (app) technologies, e.g., multi-channel technologies (Ortlinghaus, Zielke, and Dobbelstein, 2019), physical store technologies (Baier and Rese, 2020), online and offline features (Ahn, Ryu, and Han, 2004; Gao and Su, 2018), in-store technologies (Roggeveen and Sethuraman, 2020), social features (Boyd, Kannan, and Slotegraaf, 2019; Zhao and Balagué, 2015), personal or transaction features (Boyd, Kannan, and Slotegraaf, 2019). In our study, we focus on three groups of app features with regard to different stages of the customer journey and channel switching between these stages: pre-purchase features, transaction features, and cross-channel features.

Pre-purchase features are features that primarily support the pre-purchase stage online. These features inspire customers (e.g., online magazine, personal recommendations, beauty mirror), support their connection to other people (e.g., chat, sharing product links), help them to find products easily (e.g., product finding tools, saving favorite items,), or to be up-to-date (e.g., inbox). Consumers are able to use these features everywhere (Chang, 2015; Kim, Lin, and Sung, 2013; Roy, 2017), since they merely require an internet connection. All features have in common that they help customers to make the decision about a product. When customers use these features, they are still undecided.

Transaction features primarily support the purchase stage online. These features enable consumers to purchase products, which is in line with the definition by Boyd, Kannan, and Slotegraaf (2019). Consumers have the ability to buy products conveniently as their data is stored (Hoehle and Venkatesh, 2015), they are able to track the shipment, to participate in the loyalty program, and to get information when the desired product will be available again online (e.g., e-mail with re-availability notification). These features have in common that they function when customers have already made the decision to purchase.

Cross-channel features support channel switching in the pre-purchase, the purchase, and the after sales stage. The difference between cross-channel features and pre-purchase or rather transaction features is that the physical store is involved. Cross-channel features support switching between the online and physical store channel (Wallace, Giese, and Johnson, 2004), e.g., consumers can scan products in the physical store to obtain information about the products online (QR code scanner; offline to online) (Zhao and Balagué, 2015) or consumers have the option to return a product in the physical store with the electronical receipt within the app (online to offline). Furthermore, consumers can use multi-channel technologies to check the availability of products in-store and reserve a product (check & reserve) or pay it in advance (click & collect) before picking it up from the store. During the COVID-19 pandemic, consumers also had the possibility to make an appointment online for shopping in-store (click & meet). In-store, consumers can pay with their digital loyalty card. Moreover, consumers can find the online receipts and the receipts from an offline purchase in the app (electronical receipt). To find the next store, consumers can use the store finder. Consumers can further scan a product in-store and the app shows similar products online (visual search). These features have in common that the online and offline channel are integrated. As they all involve the offline channel, they should be more relevant for customers using this channel.

Until now, literature that examines app features and their influence on customer behavior is sparse (e.g., Baier and Rese, 2020; McLean and Wilson, 2019). Although, features provide chances to increase customer satisfaction (Baier and Rese, 2020). Since there are various potential features, it is important for retailers to find out how the three main types of features (pre-purchase, transaction, and cross-channel) increase customer satisfaction. As previous literature has shown that perceived usefulness has a positive impact on customer satisfaction (Chang, 2015; Natarajan, Balasubramanian, and Kasilingam, 2017; Sarkar and Khare, 2018), we consequently consider the perceived usefulness of shopping app features as independent variables and influencing factors.

Consumers have various shopping motives or goals such as information seeking, search convenience, or service requirements (Verhoef, Neslin, and Vroomen, 2007; Heitz-Spahn, 2013). Shopping app features can meet consumers' shopping motives through their capabilities and thus contribute to overall satisfaction with the retailer. This is because the fulfilment of shopping motives can lead to increased satisfaction (Christodoulides and Michaelidou, 2011). Similarly, previous literature has shown that shopping goal-congruent marketing activities (here promotions) have a positive impact on consumers' attitude (Blom, Lange, and Hess, 2021a) and satisfaction (Blom, Lange, and Hess, 2021b). We conclude for our study that the congruence of app feature usefulness and consumers' shopping goals leads to higher satisfaction with the app and the retailer.

As the app carries the app features that contribute to the consumers' shopping goals and retailer satisfaction, the satisfaction with the app should mediate the impact of features on retailer satisfaction. Similar to research analyzing the impact of product features on customer satisfaction (e.g., Wang, Lu, and Tan, 2018), app features could be meaningful drivers of customer satisfaction with a shopping app. Accordingly, Gala, Ghomi, and Wachter (2017) show empirically that the app design has a positive impact on customer satisfaction with the app. We therefore assume that app features positively influence customer satisfaction with the app as they are a part of the app and support consumers in different stages of the shopping process. Satisfaction with the app in turn leads to satisfaction with the retailer, as the app is another touchpoint (Wagner, Schramm-Klein, and Steinmann, 2020) and the use of more touchpoints leads to higher satisfaction (Herhausen et al., 2019). Consequently, we assume a mediation effect from the app features via customer satisfaction with the app on customer satisfaction with the retailer. Hence, we hypothesize:

H3: The perceived usefulness of a) pre-purchase, b) transaction, and c) cross-channel features has a positive impact on customer satisfaction with the app.

H4: Customer satisfaction with the app has a positive impact on customer satisfaction with the retailer.

H5: The customer satisfaction with the app mediates the relationship between the perceived usefulness of a) pre-purchase, b) transaction, and c) cross-channel features and customer satisfaction with the retailer.

4.2.3 Consideration of consumers' channel preference

Retail customers may differ in their preferred channels for the pre-purchase and purchase stage of the shopping process (see Balasubramanian, Raghunathan, and Mahajan, 2005; Frambach, Roest, and Krishnan, 2007). This results in different customer segments, such as pure online shoppers (see Herhausen et al., 2019), mostly offline shoppers (see De Keyser, Schepers, and Konuş, 2015; Herhausen et al., 2019; Konuş, Verhoef, and Neslin, 2008), webroomers (see Verhoef, Neslin, and Vroomen, 2007; Verhoef, Kannan, and Inman, 2015) or showroomers (see Rapp et al., 2015; Schneider and Zielke, 2020).

To take into account that customers have different orientations regarding their channel preference for the pre-purchase and purchase stage, we assume moderating effects from consumers' channel preference on the relationship between the app features and customer satisfaction. Pre-purchase features support consumers in their pre-purchase stage online, which is useful for pure online shopper who

prefer the online channel to search for and to purchase products (Herhausen et al., 2019) or for webroomer, who start their shopping process in the online channel to gather information about products (Verhoef, Kannan, and Inman, 2015). The searching features inspire the customers and offer, e.g., searching tools, so that the customers receive the information they need. These features are less attractive for consumers who prefer searching for products in the brick-and-mortar store such as showroomer (Rapp et al., 2015) and mostly offline shopper. These consumers go to the physical store to evaluate and search products (Konuş, Verhoef, and Neslin, 2008). Consequently, we assume that the higher the consumers' online pre-purchase channel preference is, the more satisfied they are with an app that integrates useful pre-purchase features. Transaction features support the purchase stage mostly online. These features are useful for consumers who purchase their products online, such as pure online shopper and showroomer. Data is stored and consumers can track the shipment. These features are less attractive for consumers who prefer the physical store for purchasing products, such as mostly offline shopper and webroomer. Hence, we expect that the higher the consumers' online purchase channel preference is, the more satisfied they are with an app that integrates useful transaction features. Cross-channel features support channel switching (Wallace, Giese, and Johnson, 2004). These features are useful for consumers, who switch between the channels while shopping or use both channels. This is especially true for webroomer. They can reserve a product online and pick it up and pay for it in-store (check & reserve) or check the product availability in-store online. In addition, these features are more useful for mostly offline shopper as the cross-channel features help them shop as well. With the help of the QR code scanner, they can find out if the product is available in the right size in the store, and with the help of the store finder, they can find the nearest brick-and-mortar store. The QR code scanner is also useful for showroomer in the pre-purchase stage as the QR code scanner directs them to the online channel. For pure online shopper these features are less attractive as they do not go into the physical store for shopping (see Herhausen et al., 2019). Consequently, we assume that the higher the consumers' offline pre-purchase/purchase channel preference is, the more satisfied they are with an app that integrates cross-channel features. In summary, we hypothesize:

H6: Consumers' online pre-purchase channel preference positively moderates the effect of the searching features on satisfaction with the app.

H7: Consumers' online purchase channel preference positively moderates the effect of the transaction features on satisfaction with the app.

H8: Consumers' offline pre-purchase channel preference positively moderates the effect of cross-channel features on satisfaction with the app.

H9: Consumers' offline purchase channel preference positively moderates the effect of cross-channel features on satisfaction with the app.

Figure 16 illustrates the research model for the impact of app features (H3 to H9).

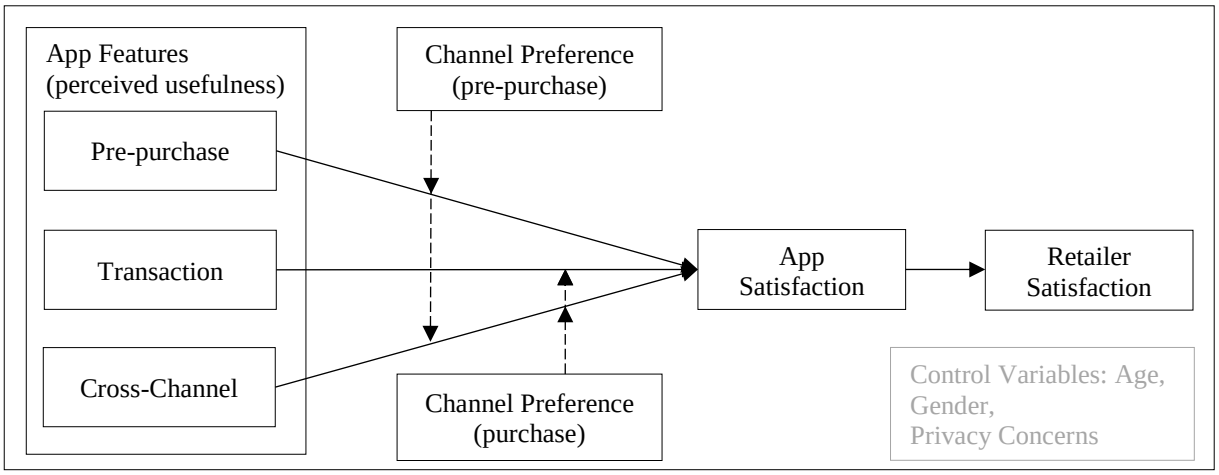

Figure 16. Conceptual framework.

4.3 Empirical study 1

4.3.1 Data collection and sample

We conducted an online survey study to test our framework. In the study, we asked respondents about their usage and perception of one selected shopping app from a large global multi-channel apparel retailer. We only considered customers who have purchased an item within the last six months (filter question). To be sure that all respondents have at least some basic knowledge about the app features and are able to evaluate their usefulness, we first presented a video about the apparel retailer's app, where we explained all the features. Then, respondents evaluated the perceived usefulness of the single features. We further asked respondents about their usage of and satisfaction with the app, the satisfaction with the retailer, the loyalty toward the retailer, their channel preference, several control variables (e.g., privacy concerns), and demographics.

We collected data from a commercial online panel three times (in three waves) from October 2020 to January 2021 in a European country. After data correction, the final sample for H1 and H2 contains 309 respondents (66.34% female, 33.33% male, and 0.32% diverse). The sample includes 200 app users and 109 nonusers. App users are those respondents who indicated in all three data collection waves that they have used the app. The nonusers did not use the app in all three data collection waves. This ensured that we did not consider random one-time uses for classifying users. To counteract possible causality problems with regard to app usage and loyalty, we only considered subjects who have

previously shopped at the retailer under study, i.e., all respondents are customers of the retailer, so that the app could be potentially useful for them. The approach is similar to Yi and Jeon (2003). For the analysis regarding H3 to H9 we only considered the app users from the first wave with 361 respondents (73.96% female and 26.04% male) at an average age of 32 years (for further information see appendix G). We did this to avoid possible biases resulting from data collections in the previous waves.

4.3.2 Measurement

We measured satisfaction with the app/retailer with three items on a seven-point Likert scale ranging from totally disagree to totally agree adopted from Wangenheim and Bayon (2007a). In order to measure customer loyalty, we used four items based on Yi and Jeon (2003) which were also surveyed on a seven-point Likert scale ranging from totally disagree to totally agree. In order to measure channel preference in the pre-purchase and purchase stage, we used two single-items measured on a seven-point semantic differential with endpoints completely online and completely offline, adopted from Emrich, Paul, and Rudolph (2015) and Shim et al. (2001). In order to determine the perceived usefulness of the shopping app features, we asked the respondents on single seven-point Likert scale items how useful they perceive the respective features with endpoints ranging from not useful at all to very useful. We measured several control variables with single items according to Verhoef, Neslin, and Vroomen (2007) and asked the respondents how important particular channel attributes are for them. As feature groups (pre-purchase, transaction, cross-channel) are the independent variables in our model, we summarize respective features in formative constructs. Table 8 shows the assignment of the single features to the three feature groups. The two right-hand columns can be ignored for study 1, they are only relevant for the study 2 and will be explained later.

4.3.3 Method

To test the hypotheses H1 and H2, we used propensity score matching (PSM) with RStudio to counter self-selection effects (Rosenbaum and Rubin, 1985) and to eliminate systematic differences between the groups of users and nonusers (Rubin and Stuart, 2006). PSM is the most commonly used matching method (King and Nielsen, 2019). As covariates for the binary regression we considered privacy concerns (e.g., Baier and Rese, 2020), risk perceptions (touch and feel) (e.g., Thakur and Srivastava, 2015), distance to the next physical store (e.g., Herhausen et al., 2019), gender (e.g., Fang, 2017), and social interaction (e.g., Koenigstorfer and Groeppel-Klein, 2012).

Table 8. Assignment of app features.

Feature	Definition	Availability		
		A	C	E
Pre-Purchase				
Beauty mirror	A tool which enables consumers to try out clothes/cosmetics virtually with the help of a smartphone camera		X	
Chat	Enables interactions with personnel via online chat	X		X
Inbox	An electronic folder in which consumers receive information about promotions or answers from online support		X	
Online magazine	Editorial content about latest trends	X	X	
Personal product recomm.	Ads with personal recommendations based on prior searches		X	X
Product finding tools	Tools used to find products (e.g., filter)	X	X	X
Saving favorite items	Saves products for later decisions	X	X	X
Sharing product links	Sharing product links with friends and family via social media	X	X	X
Transaction				
Data preservation	A tool that saves login, address, and payment data	X	X	X
E-mail for re-availability	An e-mail that informs consumers when a desired item is available again online	X		
Loyalty program	Consumers' participation in loyalty programs	X	X	X
Shipment tracking	Tracking shipment after online purchases		X	X
Cross-channel				
Check & reserve	Consumers reserve products online and pick them up and pay in-store		X	
Click & collect	Consumers buy the products online and pick them up in-store		X	X
Click & meet	A tool used to make an appointment for shopping in-store		X	X
Electronic receipt	List of the purchased products online and in-store	X		X
QR code scanner	An optical scanning device that scans QR codes or product barcodes with a camera to receive more information about the product	X	X	X
Payment via QR code	Payment with loyalty card	X		X
Product availability check	A tool used to check the in-store availability of an item online		X	X
Store finder	A tool that helps the consumer to find the next physical store online in the app	X	X	X
Visual search	A tool used to find similar products within the app by taking a picture of an item	X		

Notes: A=Apparel, C=Cosmetics, E=Electronics, X indicates the occurrence of the feature in the app.

We used nearest neighbor method with a caliper of .05[9]. Nearest neighbor method is common method (e.g., Garnefeld et al., 2019; Wangenheim and Bayón, 2007b). However, bad matched could be created (Olmos and Govindasamy, 2015). To minimize bad matches, we consider a caliper that defines a tolerance zone for how different the twins of the two groups may be (Wangenheim and Bayón, 2007b). Further, we decided for the method without replacement and 1:1 (default) matching as the treatment group is larger than the control group (Olmos and Govindasamy, 2015).

[9] R package: MatchIt.

To test the hypotheses H3 to H5, we focused on the app users and applied structural equation modelling (SEM) with smartPLS, as the constructs of the app features have formative indicators (Hair et al., 2014b). We further tested H6 to H9 using moderation analysis (model 1) with Hayes' SPSS macro PROCESS (see Hayes, 2018). For the analysis we used 5,000 bootstrap samples. We used age, gender, and privacy concerns (Verhoef, Neslin, and Vroomen, 2007) as control variables.

4.3.4 Results

4.3.4.1 Model evaluation

For the evaluation of the structural equation model, we considered several criteria. Weights and indicator loadings for the three app feature groups are reported in appendix H. All indicators meet the common guidelines (Hair et al., 2014a). The maximum variance inflation factor (VIF) value for formative measurements is 2.07 and consequently below the suggested threshold of 5.00, indicating no multicollinearity (Hair, Ringle, and Sarstedt, 2011). Moreover, we conducted a confirmatory tetrad analysis (CTA) to test the measurement model's mode ex post. The null hypothesis of the test states that the construct is reflective. Consequently, if the null hypothesis is rejected the construct should be measured in a formative model (Hair, Ringle, and Sarstedt, 2011). Appendix I shows the results of the CTA and supports our assumption to measure our model formative as we found significant tests. For reflective constructs that are part of the PLS model (satisfaction with the app and retailer), we consider convergent validity with indicator reliability and the average variance extracted (AVE). The indicator loadings are higher than .88 and indicate a good indicator reliability (Hair et al., 2014a). The values for AVE are higher than .50. The heterotrait-monotrait ratio (HTMT) is lower than the suggested threshold of .85 by Henseler, Ringle, and Sarstedt (2015). Further, the 95% bootstrapping confidence interval does not include 1 for the construct combination, which indicates discriminant validity (Hair et al., 2014a). The internal consistency is confirmed as the value for composite reliability is above .70 (Hair et al., 2014a). In addition, the loyalty construct, which is not part of the PLS model but needed to test H1, shows good internal consistency (Cronbach's alpha=.936). Appendix J summarizes the evaluation criteria for reflective constructs. In addition, as suggested by Hair, Ringle, and Sarstedt (2011), we tested data for heterogeneity by using Finite Mixture Partial Least Squares (FIMIX-PLS). Results show that there are no clear segments in the data and sample sizes are too small for a segment-specific PLS-analysis with more than two segments (see Matthews et al., 2016) (see appendix K). Therefore, we assume that there is no substantial level of unobserved heterogeneity and use aggregate data.

4.3.4.2 Testing of hypotheses

We used propensity score matching (PSM) to compare satisfaction and loyalty between users and nonusers of the app (H1 and H2). Table 9 shows the covariates considered in the logistic regression. All covariates except the distance to the next physical store have a (marginally) significant impact on consumers app use. Nevertheless, we consider all theoretically relevant covariates according to the recommendation by Rubin and Thomas (1996).

Table 9. Estimates of logistic regression for the independent variable app usage.

Predictor	Estimate (standard error)	Wald	p-value
Intercept	1.397 (.958)	2.127	.145
Gender	-.903 (.269)	11.252	.001
Privacy concerns	.181 (.104)	3.031	.082
Purchase risk	-.309 (.130)	5.596	.018
Social interaction	.341 (.068)	25.016	.000
Distance	-.039 (.958)	.062	.528

To find the optimal caliper, we first calculate the caliper with regard to the Silverman rule (Silverman, 1986), which has also been used in previous literature (Wangenheim and Bayón, 2007b). According to this rule, the tolerance zone is .05[10]. Secondly, we perform the PSM four times with different calipers (appendix L). The results show again that the best caliper is .05 as with this caliper the percentage reduction in bias (PRB) by Rosenbaum and Rubin (1985) is highest, which is an indicator for matching quality (Wangenheim and Bayón, 2007b). The average PRB for the significant relevant covariates (except distance) is 84%. Table 10 presents the results of the matching. After the matching, none of the covariates has an impact on consumers app use. We further calculated the PRB for covariates (Rosenbaum and Rubin, 1985), which indicates a successful matching with a bias reduction greater than .71 for the initially significant relationships. In total, we find a statistical twin for 76.14% of the non-treatment cases[11], which is a good quota (Wangenheim and Bayón, 2007b).

[10] Silverman rule: $c = 1.06 * \sigma * n^{-1/5} \rightarrow 1.06 * 0.17422871 * 309^{-1/5} = 0.05$.

c = maximum difference in propensity scores.

σ = standard deviation of propensity scores.

n = sample size.

[11] Here we consider the non-treatment group as the sample size includes more non-app users than users.

Table 10. Results of matching.

Before matching				**After matching**			**PRB**[12]
Nonusers N=109	App users N=200	p-value	Predictor c=.05	Nonusers N=83	App users N=83	p-value	M=.84
1.44	1.28	.001	Gender	1.33	1.34	.870	.94
5.67	5.98	.074	Privacy concerns	6.02	5.93	.660	.71
6.00	5.90	.012	Purchase risk	5.95	5.93	.887	.80
3.39	4.54	.000	Social interaction	3.80	3.93	.655	.89
3.66	3.46	.515	Distance	3.39	3.51	.714	.40

Note: c=caliper (tolerance measurement for distance in matching); PRB: percentage reduction in bias for a covariate.

Figure 17 illustrates the successful matching. Before matching, the lengths of bars are very different. After the matching, the bars have nearly the exact same length, indicating that the two groups of app users and nonusers are very similar.

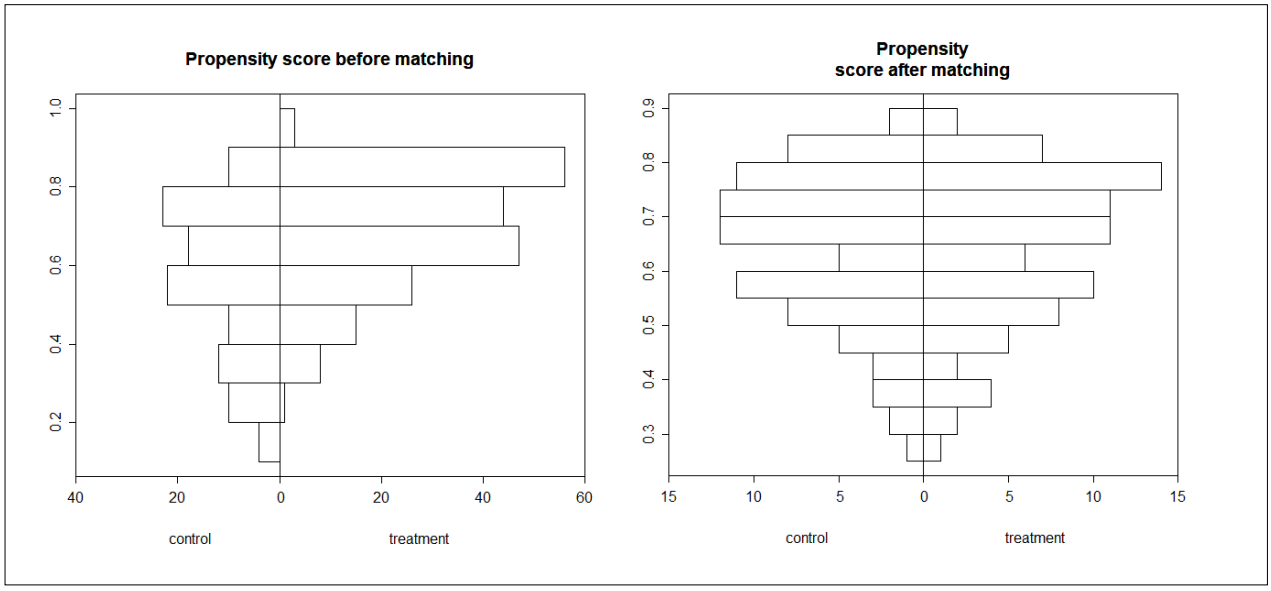

Figure 17. Illustration of matching results.

To test the robustness of the matching we conducted the propensity score matching three times. This makes sense as the algorithm randomly selects participants from the control and the treatment group. Consequently, it is possible that the agreement from one run to the next results in different groups with varying degrees of agreement (Olmos and Govindasamy, 2015). The repeated conduction of the matching results in the same matching outcomes.

After successful matching, we tested the hypotheses H1 and H2 using ANOVA. Results show that app users are more satisfied with the retailer than nonusers ($F(1,164)=11.622$; $p=.001$; $M_{app\text{-}users}=5.65$

[12] To calculate PRB, the following formula was used, analogous to Rosenbaum and Rubin (1985, p. 36):
$PRB = 1 - |(b_M/b_1)|$
b_M= mean difference between control group and treatment group before matching
b_1 = mean difference between control group and treatment group after matching.

> $M_{nonusers}$=5.06). Hence, H1 is supported. Regarding H2, results show that app users are more loyal toward the retailer than nonusers ($F(1,164)=17.497$; $p<.001$; $M_{app\text{-}users}=5.27 > M_{nonusers}=4.45$). In consequence, H2 is supported.

For evaluation of the structural equation model, we consider the coefficient of determination (R^2), the cross-validated redundancy (Q^2), and the Standardized Root Mean Square Residual (SRMR) (see appendix M). The R^2 for customer satisfaction with the app is .343 and R^2 for customer satisfaction with the retailer is .521, indicating weak to moderate predictive accuracy (Hair, Ringle, and Sarstedt, 2011). The value for Q^2 is .165 for app satisfaction and .298 for retailer satisfaction and consequently larger than zero (Hair et al., 2014b), indicating the model's predictive relevance for these variables (Hair et al., 2014b). The SRMR is .059, indicating a good model fit (Henseler, Ringle, and Sarstedt, 2016).

SmartPLS uses standardized coefficients (Hair et al., 2017). Consequently, the following reported coefficients are standardized. Results of the PLS model show that both the pre-purchase (β=.150; p=.027) and transaction (β=.383; p<.001) features have a positive impact on the satisfaction with the app. Cross-channel (β=.054; p=.412) features do not have a significant impact on customer satisfaction with the app. Consequently, results confirm H3a and H3b, but not H3c. Further, we find support for H4. Customer app satisfaction has a positive impact on customer satisfaction with the retailer (β=.665; p<.001). For testing the possible mediation of app satisfaction, we take the total, the direct, and the indirect effect into account. The observation of the total effects shows that the pre-purchase features (β=.174; p=.012) have a positive impact on customer satisfaction with the retailer. Pre-purchase features do not have a significant direct effect (β=.075; p=.215) on the satisfaction with the retailer, but a significant indirect effect (β=.100; p=.028) via app satisfaction, indicating a full mediation. Results are similar for the transaction features. The total effect is significant (β=.228; p=.002). There is no significant direct effect (β=-.027; p=.653) on the satisfaction with the retailer, but an indirect effect (β=.255; p<.001) via app satisfaction. For the cross-channel features the total effect is not significant (β=.121; p=.154). We cannot find a direct effect (β=.085; p=.214) on customer satisfaction with the retailer, nor an indirect effect (β=.036; p=.403) via app satisfaction. In consequence, results confirm H5a and H5b, but not H5c. Following the recommendation by Peng and Lai (2012), we checked and proved the robustness of our findings using multiple regression analysis and mediation analyses in SPSS as an alternative method of data analysis. The results are the same.

We analyzed moderation effects using PROCESS[13]. Regarding H6, we can find a significant interaction between the pre-purchase features and consumers' pre-purchase channel preference on customer satisfaction with the app (β=.064; p=.014). The higher the pre-purchase offline channel preference, the stronger is the impact of the pre-purchase features on the satisfaction with the app ($\beta_{16thpercentile}$=.118; p=.094; $\beta_{85thpercentile}$=.378; p<.001). As we measured channel preference on a semantic differential with lower values indicating higher online preference, this means that a higher online preference in pre-purchase stage weakens the effect of pre-purchase features. As we assumed an effect in the opposite direction, this result does not support H6. The results also do not support H7, as we cannot find a significant interaction between the transaction features and consumers' purchase channel preference on customer satisfaction with the app (β=.032; p=.252). Regarding H8, we observe a significant interaction between cross-channel features and consumers' pre-purchase channel preference on app satisfaction (β=.102; p<.001). The higher the consumers' offline pre-purchase channel preference is, the stronger the impact of cross-channel features on customer satisfaction with the app is ($\beta_{16thpercentile}$=.041; p=.499; $\beta_{85thpercentile}$=.448; p<.001). For respondents with a strong online pre-purchase channel preference, the effect of cross-channel features even diminishes. In consequence, results confirm H8. Further, we can find a significant interaction effect between cross-channel features and consumers' purchase channel preference on app satisfaction (β=.079; p<.001). The higher the consumers' offline purchase channel preference is, the stronger the impact of cross-channel features on customer satisfaction with the app is ($\beta_{16thpercentile}$=.092; p=.133; $\beta_{85thpercentile}$=.410; p<.001). Again, the effect of cross-channel features diminishes for respondents with a high online purchase channel preference. Hence, the results also confirm H9. Appendix N shows all results of moderation effects.

4.4 Empirical study 2

4.4.1 Data collection and sample

To generalize the results from study one, we repeated this study in two additional retail sectors: cosmetics and electronics. We slightly modified the design by randomly assigning the respondents to a retailer and tested hypotheses based on data from app users and nonusers. We only considered customers who regularly search or purchase from the retailer. We collected data in May and June 2021 during a five-week period. Students participating in a European research seminar distributed the questionnaires via their family and social networks. The final sample for the cosmetic sector contains 279 respondents (68.10% female, 31.89% male) with an average age of 32 and for the electronics sector

[13] When analyzing interaction effects between app features and channel preference, we controlled for the other app feature groups.

the sample contains 307 respondents (57.98% female, 41.69% male, 0.33% diverse) with an average age of 32. Further information about the samples shows appendix G.

4.4.2 Model evaluation

Weights and indicator loadings are reported in appendix H. Almost all indicators meet the common guidelines (Hair et al., 2014a). We also included the few indicators that do not meet the guidelines, as we could not find differences in results after testing the SEM with and without them. Further, according to Hair et al. (2014a) the elimination of formative indicators should be an exception. Moreover, we reran the CTA. We found significant tests in all feature groups except the pre-purchase feature group in electronics (Appendix I). However, there was one marginally significant result. As a reflective measurement is content-related not meaningful, we use the formative measurement for our analysis. The reflective constructs meet the common guidelines (see appendix J). Moreover, we tested for heterogeneity and could not find a substantial level of unobserved heterogeneity (see appendix K).

4.4.3 Results

To evaluate the structural equation model, we again consider R^2, Q^2, and SRMR (see appendix M). The R^2 values for the structural model are weaker than in study 1 (between .227 and .318). The cross-validated redundancy (Q^2) is larger than zero for all endogenous constructs in both sectors. The SRMR indicates a good model fit with values lower than .08 (Hair, Ringle, and Sarstedt, 2011).

The results of the structural equation model show many similarities, but also some differences between retail sectors. While the results for the cosmetics app are very similar to the results for the apparel app analyzed in study 1, the results for the electronics app differ in several aspects. In contrast to apparel and cosmetics, cross-channel features have a positive impact on customer satisfaction with the electronics app (β=.218; p=.002). Hence, this result confirms H3c. Further, customer satisfaction with the electronics app mediates the relationship between cross-channel features and customer satisfaction with the retailer (total: β=.132; p=.081; indirect: β=.082; p=.008; direct: β=.050; p=.497). In consequence, the results also confirm H5c. In contrast to the apparel app, we cannot find support for the interaction between the cross-channel features and consumers' channel purchase preference on customer satisfaction with the electronics app (β=.051; p=.258). Hence, H9 is rejected. Table 11 presents all results in detail. Table 12 summarizes the confirmation or rejection of hypotheses for all three apps (sectors). Appendix N shows all results of moderation effects in detail.

Table 11. Results of SEM and moderation analysis.

H	Path	Apparel	Cosmetics	Electronics
H3a)	Pre-purchase → AppSat	.150**	.323***	.286***
H3b)	Transaction → AppSat	.383***	.225***	.142**
H3c)	Cross-channel → AppSat	.054	.101	.218***
H4	AppSat → RetSat	.665***	.454***	.376***
H5a)	Pre-purchase → RetSat (total)	.174***	.111	.138*
	Pre-purchase → AppSat → RetSat	.100**	.147***	.108***
	Pre-purchase → RetSat (direct)	.075	-.035	.030
H5b)	Transaction → RetSat (total)	.228***	.134	.176**
	Transaction → AppSat → RetSat	.255***	.102***	.053**
	Transaction → RetSat (direct)	-.027	.031	.122
H5c)	Cross-channel → RetSat (total)	.121	.207***	.132*
	Cross-channel → AppSat → RetSat	.036	.046	.082***
	Cross-channel → RetSat (direct)	.085	.161**	.050
H6	Pre-purchase × OnPre-pPref → AppSat	.064**	.072**	.096**
H7	Transaction × OnPurchPref → AppSat	.032	-.003	.059
H8	Cross-channel × OffPre-pPref → AppSat	.102***	.152***	.131***
H9	Cross-channel × OffPurchPref → AppSat	.079***	.113***	.051

Notes: AppSat = satisfaction with the app; OffPre-pPref = consumers' offline pre-purchase channel preference; OffPurchPref = consumers' offline purchase channel preference; OnPurchPref = consumers' online purchase channel preference; OnPre-pPref = consumers' online pre-purchase channel preference; RetSat = satisfaction with the retailer; ***p < .001; **p < .05; *p < .10.

Table 12. Results of hypotheses testing.

H	Path	Apparel	Cosmetics	Electronics
H1	App-user > nonuser → Loyalty	Supported	Not surveyed	Not surveyed
H2	App-user > nonuser → RetSat	Supported	Not surveyed	Not surveyed
H3a)	Pre-purchase → AppSat	Supported	Supported	Supported
H3b)	Transaction → AppSat	Supported	Supported	Supported
H3c)	Cross-channel → AppSat	Rejected	Rejected	Supported
H4	AppSat → RetSat	Supported	Supported	Supported
H5a)	Pre-purchase → AppSat → RetSat	Supported	Supported	Supported
H5b)	Transaction → AppSat → RetSat	Supported	Supported	Supported
H5c)	Cross-channel → AppSat → RetSat	Rejected	Rejected	Supported
H6	Pre-purchase × OnPre-pPref → AppSat	Rejected	Rejected	Rejected
H7	Transaction × OnPurchPref → AppSat	Rejected	Rejected	Rejected
H8	Cross-channel × OffPre-pPref → AppSat	Supported	Supported	Supported
H9	Cross-channel × OffPurchPref → AppSat	Supported	Supported	Rejected

Notes: AppSat = satisfaction with the app; OffPre-pPref = consumers' offline pre-purchase channel preference; OffPurchPref = consumers' offline purchase channel preference; OnPurchPref = consumers' online purchase channel preference; OnPre-pPref = consumers' online pre-purchase channel preference; RetSat = satisfaction with the retailer.

Once again, we checked the results in SPSS for robustness. All results are the same.

4.5 General discussion

This study supports the assumption that app users are more satisfied and more loyal toward the retailer than nonusers. Further, we show that the perceived usefulness of app features influences satisfaction with the app and with the retailer. All feature groups have a positive impact on customer satisfaction with the app. Pre-purchase features are important in all sectors as they have a direct effect on customer satisfaction. However, the perceived usefulness of pre-purchase features depends on consumers' pre-purchase channel preference. The perceived usefulness of these features is more relevant for consumers with offline pre-purchase channel preference than for consumers with online pre-purchase channel preference. This effect suggests that the video embedded in the questionnaire acted as an advertisement that increased awareness of the features for consumers with a stronger offline orientation. This results in higher consumer satisfaction because the pre-purchase features additionally support offline-oriented consumers in their product search. Online-oriented consumers already know most of the features from the website (Kim et al., 2017), so that the effect on satisfaction is smaller.

Transaction features have a positive impact on customer satisfaction irrespective of consumers' purchase channel preference. These results are in contrast to our expectations. Transaction features seem important for both consumer groups. Consumers who prefer to buy online need these features to complete their purchase, while consumers who prefer to buy offline seem to value these features regardless of whether they would also make a purchase through the app. They seem to appreciate that the features exist and that they could use them. In addition, the transaction feature data preservation is necessary in order to use other features such as click & collect, which is relevant for consumers with an offline preference. This holds in all three retail sectors.

Cross-channel features are especially important for electronics. They have a direct effect on customer satisfaction with the app and an indirect effect on retailer satisfaction. The reason could be that electronic products are more utilitarian (Blom, Lange, and Hess, 2021b) and information-intensive. Consumers often search for a lot of information before they buy an electronic product (Frasquet, Mollá, and Ruiz, 2015). Cross-channel features support the buying process in two cases. In the first case, consumers first search for information on the internet. After getting enough information, they want to touch and see the product in the shop. In this case, multi-channel technologies simplify the buying process as the customers only need to pick up the product in the shop. In the second case, consumers first want to go to a shop to touch and see the product. If customers need more information, they have the option to use the QR code scanner or visual search to get more information. Hence, such technologies might be more relevant for information-intensive products, such as electronics compared to apparel or cosmetics.

For the apparel and cosmetics app, the importance of cross-channel features depends on consumers' channel preference, while cross-channel features have no main effect in these sectors. Consumers' offline pre-purchase and purchase channel preferences strengthen the impact of cross-channel features on customer satisfaction. For consumers with strong online (and weak offline) channel preference, the effect of cross-channel features is small or even non-significant. An explanation might be that cross-channel features are less relevant for customers who do not consider to search and/or purchase in a physical store. This is in line with prior research on channel-based shopper segmentation. Among other segments, literature identified pure online shoppers (e.g., Frasquet, Mollá, and Ruiz, 2015; Herhausen et al., 2019), who rarely use the offline channel for shopping particular product groups.

In summary, shopping apps seem to be more interesting for consumers who prefer to shop in-store. Based on our findings, we can establish that pre-purchase and cross-channel features are more strongly related to app and retailer satisfaction for this customer segment. An explanation might be that shopping apps are an additional shopping channel for consumers who prefer offline stores. For consumers who prefer the online channel, shopping apps might merely be a substitute for the internet channel, as they can use many features on the website as well. This might lead to cannibalization effects of channels, which occur when channels - here website and app - are very similar in their attributes (Liu et al., 2019). Consequently, consumers with an offline channel preference value the pre-purchase and cross-channel features of shopping apps more than consumers with an online channel preference.

4.6 Managerial implications

The results show that app users are more satisfied and loyal than nonusers. Consequently, retailers should invest in app design and advertise their app to promote the particular features and their usefulness. For example, retailers have the option of showing a short video in the app store, where consumers can see the benefits of the app before downloading it. Regarding consumers' channel preference, retailers should promote the app particularly in the offline channel as the offline channel preference strengthens the effect of the perceived usefulness of pre-purchase and cross-channel app features on customer satisfaction. For example, retailers can deploy beauty mirrors in their stores to allow consumers to try products virtually in-store. Sales staff can explain to consumers that they can also use a beauty mirror app feature at home. Another option would be to advertise the beauty mirror app feature close to the in-store mirrors.

Further, retailers should try to increase app attractiveness by investing in a comprehensive range of app features, which is contrary to previous literature (Baier and Rese, 2020). A comprehensive app design optimally supports consumers in their shopping process. Customers have many more opportunities to choose what suits them when there is a comprehensive range of features. Thus, the app is more likely to meet a variety of consumer needs. Retailers can further inform consumers with offline channel preference about additional cross-channel features via push messages. For example, when consumers search for the next physical store in the app, the retailer can send a push message with information about the availability check feature. Furthermore, a comprehensive range of app features is important to stand out from the mass. As the results of Kim et al. (2017) show, shopping app users generally have more apps installed, but spend less time on each app. Consequently, retailers need to make their app more attractive to customers compared to competing retailer apps. This is particularly important for retailers with a strong offline customer base. Investing in cross-channel features is especially important for retailers selling utilitarian products that require intensive information search. In summary, we can say that it is not enough to have an app that just offers an option to purchase. In this case, retailers would pass chances to increase customer satisfaction and thereby loyalty.

4.7 Theoretical implications

Our study extends the existing literature in multiple ways. Firstly, we show that app users are more satisfied and have a stronger attitudinal loyalty toward the retailer than nonusers. Previous research has found this relationship only for behavioral loyalty and in a different context. Liu et al. (2019), e.g., did not consider the impact on attitudinal loyalty and studied the effect for only one retailer in the non-prescription drugs and cosmetics sector. We considered three benchmark apps from different sectors, following a recommendation by Liu et al. (2019) for further research. Furthermore, we classified app-users based on their continuous usage over different time periods. Previous literature often examines customer behavior directly after adoption and refers to participants who have used the app once as app users (Kim, Wang, and Malthouse, 2015; Liu et al., 2019; Wang, Malthouse, and Krishnamurthi, 2015). This approach can cause biases, as customers often use an app more often in the beginning after downloading when the app is new for them and they want to try out different features. This behavior settles down over time until a continuous or even no usage results (Kim, Wang, and Malthouse, 2015). To address this problem, we only refer to participants who have used the app several times over a certain period as app users. Secondly, we classified app features into three feature groups that reflect their use in different stages of the customer journey and channel switching between these stages. Previous literature has mostly considered the whole app as a technology (e.g., Baier and Rese, 2020), while we consider the comprehensive range of app features in a mobile app context.

Thirdly, we confirm the positive effect of app features on customer satisfaction across retail sectors, but we also observed differences in effects of cross-channel features. This aspect is important as the relevance of app features differs across industries and products. Apparel and cosmetics tend to be more hedonic products while electronics tend to be more utilitarian products that involve more goal-directed search, as the study by Blom, Lange, and Hess (2021b) shows. Consequently, app features vary in their importance depending on the product category. Fourthly, we consider consumers' channel preference in the pre-purchase and purchase stage. The consideration of consumers' channel preference is important as it depends on the situation (Balasubramanian, Raghunathan, and Mahajan, 2005), in this study being at the stage of the purchase process. Previous literature often does not distinguish between consumers' channel preference at the pre-purchase and the purchase stage (e.g., Ortlinghaus, Zielke, and Dobbelstein, 2019; Rathee and Rajain 2019; Yu, Sun, and Guo, 2019). Our study extends literature by considering the different customer journey stages for analyzing app features and channel preferences as prior research is sparse (e.g., Boardman and McCormick, 2017; Shim et al., 2001).

4.8 Limitations and future research

Our study has some limitations and offers opportunities for further research. First, the participants selected themselves into the treatment groups. Like previously conducted quasi-experimental studies (Garnefeld et al., 2019; Kim et al., 2017; Lim, Xie, and Haruvy, 2021; Liu et al., 2019; Wang, Malthouse, and Krishnamurthi, 2015), we used PSM to control such effects. The PSM method cannot completely solve the problem (Liu et al., 2019), but the performance of our matching was quite good (bias reduction greater than .71). However, future research can check further influencing factors regarding the comparison of app users and nonusers and include them in the binary regression if necessary. Another point is the causality problem between app usage and customer satisfaction and loyalty. We have presented our arguments in the theory section and also existing literature suggests this causal relationship (Kim, Wang, and Malthouse, 2015; Lim, Xie, and Haruvy, 2021; Liu et al., 2019). However, we also acknowledge that the relationship is not only one-directional. We therefore only hypothesized differences between the two groups of users and nonusers. Nevertheless, future research can analyze causal effects of app features on satisfaction and loyalty in longitudinal. Second, we analyzed one specific app in each of the three retail sectors. Future studies can examine multiple apps in the same sector to validate the results. Third, we operationalized feature groups as formative constructs to cover the variety of specific features offered in the app. This brings with it the challenge of considering all features for the formation of the constructs. Further research could supplement our

analysis by using reflective measures. Such measures would increase comparability of feature perception between apps. In addition, the allocation of individual features could be discussed, e.g., the visual search. This does not have to be used exclusively in-store. However, we have assigned it to the cross-channel features because the frequency of use seems to be highest here and the use is comparable to the use of the QR code scanner. Alternatively, it would have been possible to assign them to the pre-purchase features. However, the examination confirmed our allocation, as both weights (non-significant) and loadings are worse for assignment to pre-purchase features. Future research could also analyze how customers categorize app features and assign them to different feature groups. Fourth, in our study, cross-channel features include online-to-offline and offline-to-online features. An individual consideration could provide additional insights. Fifth, we do not distinguish between online and mobile channel preference. Further research could examine differences between online and mobile channel preference to investigate differences in browser and app use. Sixth, we included different product groups and assumed in our discussion that these groups differ in their utilitarian and hedonic orientation. Future research could more precisely control and analyze the role of utilitarian and hedonic products or individual shopping orientations. Finally, the survey was executed during the COVID-19 pandemic. This may have led to biases regarding the perceived usefulness of some features. Future research can validate the results after the crisis.

5 General conclusion

5.1 Summary of results and discussion

This dissertation focuses on app features and their influence on consumers' app download, usage, and satisfaction. Shopping apps are a convenient way of shopping. Their mobility allows consumers to shop from anywhere (Chang, 2015; Kim, Lin, and Sung, 2013; Roy, 2017). Furthermore, shopping app features make shopping even easier for consumers, as there is a suitable feature for almost every situation that supports consumers in their shopping, such as the online magazine when searching for the latest trends, the QR code scanner when searching for specific products or the electronic receipt when returning goods. However, literature that has addressed the design of apps in terms of features is sparse, even though the features might significantly influence whether customers adopt the mobile channel. Further, apps have an immense potential to positively influence the retailer-customer relationship in terms of satisfied and loyal customers. There is a lack of a comprehensive overview as well as empirical examinations. The literature to date is mainly concerned either with individual (app) features (see Jiang and Zou, 2020; Ortlinghaus, Zielke, and Dobbelstein, 2019; Okazaki, Li, and Hirose, 2012) or with general influencing factors such as enjoyment on consumers' behavioral intention (see Groß, 2015; Ko, Kim, and Lee, 2009; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Roy, 2017; Saprikis et al., 2018). Because of the above-mentioned reasons, shopping apps have a high relevance for research and practice. The aim of this work was to provide a comprehensive overview of app features across various retail sectors and to empirically investigate their influence on consumers' app download, usage, and satisfaction. Accordingly, the following research question was formulated for this thesis:

Which app features exist and how do they influence consumers' app download, usage, and satisfaction in multi-channel shopping?

To answer the overall research question, this dissertation encompasses three independent research projects. Each of the individual research projects contributes to answering the overall research question. The first project provides a comprehensive overview of various app features in different sectors. Thus, the project contributes to answering the first part of the overall research question. The second research project focuses on the influence of online and in-store features on the download and use intention. The second project investigates the influence of different app feature groups, namely pre-purchase, transaction, and cross-channel, on customer satisfaction and loyalty. Accordingly, research

projects 1 and 2 contribute to answering the second part of the overall research question. In the following, the individual projects are briefly summarized, their results and implications are presented, and their contribution to answering the overall research question is explained.

Pre-study

The pre-study gives an overview of different app features in the shopping context of retailers from three specific sectors as well as cross-sector retailers. This project addresses the research gap regarding the lack of an overview of existing app features used in practice and by consumers. The aim was to provide a detailed overview and a detailed description of the individual features. To this end, the pre-study presented an overview of research on the individual features at first, followed by a sector comparison to gain insight into which features retailers offer across sectors and which features are sector-specific. The comparison refers to both the general presence of app features and their occurrence in individual sectors. In addition, the study examined consumer perspective regarding their perceived usefulness and usage of specific app features. Accordingly, the project posed the following research questions:

(1) Which features of shopping apps are used in practice, and to what extent does their use differ between different sectors?
(2) Which app features do consumers use and which do they perceive as useful?

To date, the investigation of app features is sparse (e.g., Zhao and Balagué, 2015). The few existing studies only deal with individual features (see Jiang and Zou, 2020; Ortlinghaus, Zielke, and Dobbelstein, 2019; Okazaki, Li, and Hirose, 2012). So far, there are hardly any studies regarding specific app features in the mobile shopping context. The results show that shopping apps are represented to varying degrees in different sectors. Shopping apps are most frequently found in the apparel sector. When exploring the apps individually, the study represented a total of 22 app features. Of these, 13 features were assigned to the pre-purchase stage and nine features were assigned to the purchase stage. The features occurred with varying frequency. The results show that retailers offer the product finding tools and saving the favorite item feature most often in the category of pre-purchase stage features. In the category of the purchase stage features retailers offer the data preservation and electronic receipt feature most often. Features, which retailers offer less in the pre-purchase stage are the comparison list and the visual search. The features, which retailers offer less in the purchase stage are the payment via QR code and the size finder (question 1). The additional analysis of the consumer perspective reveals six segments regarding retailers' offer, consumers' usage, and consumers' perceived usefulness (question 2).

The pre-study enables retailers to gain a deeper view of app design options. The results provide retailers the opportunity to assess their own position. This applies both to retailers who have not yet integrated an app and to retailers who already offer an app as a sales channel. Apparel retailers without an app should develop an app as soon as possible in order to remain competitive in the market. Furniture retailers without an app should seize the opportunity to be among the pioneers in mobile app shopping and exploit a competitive advantage to outpace the competition. Retailers that already offer a shopping app should make sure that they remain competitive. By having an overview, they can compare themselves with other retailers, possibly even larger ones, to see how these retailers have designed their app. The comparison can be both intra-sector and cross-sector. Among other things, this provides retailers with inspiration on how they can improve their own app. In addition, the investigation of the consumers' perspective shows the need for action from the consumer's point of view. Depending on whether features are used more or less, retailers should pay more or less attention to them. In any case, retailers should not underestimate consumer perception and offer a wide range of features.

The essential contribution of the pre-study is the detailed examination of shopping app features in practice. This was accomplished through an evaluation of shopping apps from top-selling retailers and an analysis how they are used and perceived as useful from the consumers' perspective. Furthermore, the project shows further research gaps with regard to missing empirical work.

This project contributes to answering the overall research question by providing a status quo of occurrence of app features. Consequently, this project mainly answers the first part of the overall research question regarding the existence of app features. It provides an overview of which app features exist, describes them in detail, and gives insights into the consumers' perspective.

Research project 1

While the pre-study was conceptual and descriptive, the first research project provides empirical evidence. This project deals with the promotion of downloading and using a shopping app through monetary and nonmonetary incentives. Thereby, the app features (online magazine, product availability check, and scan and shop function) represent the nonmonetary incentives. This project addresses three research gaps. First, research does usually not differentiate between the download and use intention of shopping apps. The main concentration lies on the intention to use (e.g., Hew et al., 2015; Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Shen, 2015). Second, until now, no research has investigated the influence of the perceived usefulness of

specific app features on the download and use intention. Third, previous literature disregards consumers' channel preference in the shopping process. This generates the following research questions:

(3) How do different types of incentives (monetary and nonmonetary, the latter in form of in-store - and online features) influence consumers' intention to download and use shopping apps?

(4) Does the perceived usefulness of the shopping app moderate the effects of the rebate and mediate the effect of the nonmonetary incentives on the download and use intention?

(5) Does consumers' channel preference have a moderating impact on the relationship between the nonmonetary incentives and the perceived usefulness of the shopping app?

Two experimental studies with between-subjects design were conducted. The results of the first study suggest that a rebate (monetary incentive) increases the download intention. Online- (online magazine; product availability check) and in-store app features (scan and shop function) are both nonmonetary incentives and have positive impacts on the use intention. However, the in-store feature only works when it is offered in combination with the online feature (question 3). The relationships are mediated by the perceived usefulness of the shopping app. However, the perceived usefulness does not moderate the effect from the rebate on the download intention (question 4). Moreover, the nonmonetary features interact with the channel preference of consumers, who react more positively toward features offered in a non-preferred channel. This means that consumers with an online purchase channel preference prefer the in-store feature, as the feature guides consumers to their preferred purchase channel. Offline consumers prefer the online feature, as it helps them to prepare their in-store purchase. The online feature online magazine, for example, can serve as a source of inspiration. This way, consumers can go to the store well informed and buy the products. The follow-up study supports these findings. Both consumer types, online and in-store consumers, perceive a shopping app with both features as more useful compared to a single feature. Further, the results imply that consumers with an online channel preference prefer a shopping app with an in-store feature compared to an app with an online feature. The reverse is true for consumers with an offline channel preference (question 5).

The most important implication for retailers is that shopping app features are an outstanding instrument to encourage consumers to use the shopping app in the long-term. Shopping app features work best when retailers consider consumers' purchase channel preference. This means that retailers should focus on in-store features when advertising online and online features when advertising in-store. A rebate is an excellent instrument to encourage consumers to download a shopping app. However, the

download is only the first step (Peng, Chen, and Wen, 2014; Wang, 2017). Consequently, the long-term usage is crucial.

The first research project contributes to the existing literature by analyzing specific app features in a multi-channel context. It differentiates between the download intention and use intention, as these are two distinct behavioral intentions. Download intention is a one-time event, while use intention has a long-term character. Furthermore, this research highlights the importance of considering consumers' channel preference, as the perceived usefulness of various app features depends on it.

This research project contributes to answering the overall research question by investigating the influence of specific app features. Here, research project 1 can build on findings of the pre-study regarding the selection of specific app features. Research project 1 uses representative app features for the apparel sector, namely an online magazine and the product availability check as an online feature and a scan and shop function (similar to QR code scanner) as an in-store feature for investigation. It examines their impact on consumer behavior in multi-channel retailing. Consequently, this project focuses on the second part of the overall research question regarding consumer behavior in the multi-channel context. Results show that the impact of online and offline features is strongest when they are offered together. Further, the perceived usefulness of the single features depends on the consumers' channel preference.

Research project 2

While the first research project focuses on the adoption of shopping apps, the second research project concentrates on the outcomes of app usage such as customer satisfaction and loyalty. Previous literature primarily examines influencing factors such as hedonic motivation (Hew et al., 2015), perceived enjoyment (Natarajan, Balasubramanian, and Kasilingam, 2017, 2018), or perceived usefulness (Kim, Yoon, and Han, 2016) on usage of mobile apps; and thus neglects the outcomes of the app usage. This study addresses the mentioned research gap by analyzing the influence of app features on customer satisfaction and loyalty. At first, there is a lack of research regarding the question if app users and nonusers differ in their satisfaction and loyalty. Second, research neglects the influence of app features on customer satisfaction and loyalty to explain the expected greater satisfaction and loyalty of app users. Previous literature considers the impact of features on customers' shopping satisfaction in a broader context including nonmobile features (Baier and Rese, 2020). Finally, there is a need to consider consumers' channel preference for pre-purchase and purchase as these preferences could differ. Previous literature mainly examines consumers' channel preference without such differentiation (e.g., Ortlinghaus, Zielke, and Dobbelstein, 2019; Yu, Sun, and Guo, 2019) and consequently

there is a need to fill this research gap. For these reasons, project 2 focuses on the following research questions:

(6) Are shopping app users more satisfied and loyal toward the retailer than nonusers?

(7) Do different feature groups have a positive impact on customer satisfaction with the app and with the retailer?

(8) Does the consumers' channel preference moderate the impact of different features groups on customer satisfaction with the app?

Results show that app users are more satisfied with the retailer and more loyal toward the retailer than nonusers (question 6). Further, this project suggested three app feature groups: (1) pre-purchase, (2) transaction, and (3) cross-channel features. The perceived usefulness of all app feature groups influences the satisfaction with the app and with the retailer. Not every feature group has a direct effect on customer satisfaction in all sectors, namely apparel, cosmetics, and electronics (question 7). However, in combination with the consumers' channel preference, positive impacts for all feature groups were observed. There are different effects regarding the consumers' channel preference. Pre-purchase features are more relevant for consumers with offline pre-purchase channel preference than for consumers with online pre-purchase preference. Further, the consumers' offline pre-purchase and purchase channel preferences strengthen the impact of cross-channel features on customer satisfaction (question 8). The results related to the QR code scanner and consumers' channel preference appear to be contradictory, as in project 1 consumers' online purchase channel preference reinforced the effect between the QR code scanner (vs. no QR code scanner) and perceived usefulness of the app. In project 2, consumers' offline purchase channel preference strengthened the effect between the perceived usefulness of the QR code scanner (part of the cross-channel features) and consumers' satisfaction with the app. One reason for the seemingly different results might be the measurement. Project 1 looks at the QR code scanner in isolation. Project 2 looks at the QR code scanner as a bundle with other features. Hence, consumers in the first project can only judge the app based on the QR code scanner. In the second project, the QR code scanner works together with other features, as the entire app was presented. This means the QR code scanner as a standalone feature is not suitable as an advertisement for consumers with an offline channel preference to perceive the app useful. However, in combination with the other cross-channel features, the usefulness perception can contribute to the long-term increase in satisfaction, as consumers with an offline channel preference visit the brick-and-mortar store for shopping and the QR code scanner supports the shopping in-store. Another explanation might be that consumers' channel preference moderates different relationships in each project. In the first project, the QR code scanner seems to be a good tool to target consumers with a preference for the online

channel, as it does not exist on the website and seems to be interesting when they are in the store one day to return to their referred channel. In this specific situation, the QR code scanner might be useful and accordingly, consumer preference for the online channel reinforces the influence of a QR code scanner on the app's perceived usefulness in general. The second project measured the influence of the perceived usefulness of the QR code scanner and various other features on consumer satisfaction with the app. With respect to this relationship, consumers' online channel preference does not amplify this effect because these consumers do not necessarily expect features they can use in the offline channel because their main channel preference is online. Consequently, channel switching is less interesting for them, and thus cross-channel features less relevant compared to other features included in the app. Accordingly, consumers' online channel preference does not reinforce the effect on consumers' app satisfaction. To promote the entire app and reinforce the perceived usefulness of an app, the QR code scanner is a good tool, but to reinforce satisfaction with the app, it is a better tool for consumers who use the stationary sales channel.

This project extends previous knowledge by exploring three app feature groups: (1) pre-purchase, (2) transaction, and (3) cross-channel features. Further, it contributes by considering a comprehensive range of app features. A total of 21 features were considered. Moreover, the project confirmations positive effects of app features on customer satisfaction across three retail sectors. Finally, this study considers consumers' channel preference in the pre-purchase and purchase stage and consequently extends previous literature as until now most research has investigated only one dimension of consumers' channel preference (e.g., Ortlinghaus, Zielke, and Dobbelstein, 2019; Yu, Sun, and Guo, 2019).

Research project 2 answers the overall research question by examining a comprehensive range of app features and their impact on satisfaction and loyalty. Here research project 2 builds on findings of research project 1 as results have shown that a combination of app features should be considered instead of single features. The results show that firstly, app users are more satisfied with and more loyal toward the retailer than nonusers and secondly, that three app feature groups have a positive impact on customer satisfaction with the app and the retailer. However, retailers have to take consumers' channel preference into account as the influence depends on it. This answers the second part of the overall research question regarding consumer attitude in the multi-channel context.

5.2 Managerial outlook

Each of the three research projects provides specific management implications derived from the studies. In addition, general practice-related implications can be formulated that relate to the work as a whole. First, recent literature primarily concerns generic, overarching factors influencing customer behavior (e.g., Hubert et al., 2017; Roy, 2017; Stocchi, Michaelidou, and Micevski, 2019). This dissertation deals with specific design elements in the form of app features, such as saving favorite items, beauty mirror, inbox or shipment tracking. The results show that there is already a wide range of app features (pre-study) that can have a positive influence on app acceptance (1. project), customer satisfaction, and loyalty (2. project). Accordingly, retailers should invest in the adequate design of their app. To decide which features are the most important, they can and should look at competitors. As the pre-study has shown, there are sometimes major differences in the app features offered, both at sector and retailer level. In addition, retailers should continuously check if their app features are up to date, as the range of app features can change over time. This could be due to the fact that the retail sector is changing in terms of digitalization (Hagberg, Sundström, and Egels-Zandén, 2016). Consumers are becoming more familiar with the digital world, especially Generation Z, most of whom are now old enough to earn and spend their own money and have grown up with smartphones (Southgate, 2017). Familiar smartphone use could also lead to increasing features being known. One example of an extension in the shopping app context is mobile payment. As the pre-study has shown, there is still room for improvement here as mobile payment continues to become more popular (Pal et al., 2020) with new technologies such as Apple Payment. If shopping apps integrate this feature, shopping will become an even easier task. Furthermore, as project 1 has shown, retailers should combine app features so that consumers perceive the app as more useful. In the example of mobile payment, retailers can offer this feature in combination with the loyalty card. Then, consumers only have to show their loyalty card in the app and the payment is made automatically. This saves customers from having to open another app or their wallet.

In addition, multi-channel retailers have an advantage against pure online retailers as they can offer cross-channel features, which have a positive effect on consumers' app und retailer satisfaction (2. project). Nevertheless, pure online retailers should also think about implementing cross-channel features to benefit from their positive impact on app and retailer satisfaction. This could be for example, the QR code scanner or the visual search. Both features allow consumers to search for products from competing retailers in their own app. The pre-study has already explained this feature in the context of Zalando. In conclusion, this work offers significant potential to contribute to the app's success.

Second, retailers should promote their app and in particular their app features. As project 1 has shown, app features can have a positive impact on consumers' download intention. This is important for retailers, as the download is the first step to use the app (Peng, Chen, and Wen, 2014; Wang, 2017). Further, the pre-study has shown that consumers perceive all features as useful and project 2 has shown that the perceived usefulness of app features has a positive impact on consumers' satisfaction regarding the app and the retailer. Consequently, it is important that consumers know the features. To do so, retailers can promote their app, e.g., in-store, on the website, or as a short explanation video in the app store.

Third, retailers should consider consumers' channel preference as it has an impact on the effect between app features and consumers' perceived usefulness of the app (project 1), and on the effect between consumers' perceived usefulness of app features on consumers' satisfaction with the app (project 2). As the results of project 1 have shown, consumers perceive the app more useful when app features are offered that are linked with their non-preferred purchase channel. The same is true for the pre-purchase features and the pre-purchase channel preference in project 2. Retailers can consider these channel preferences by adequate advertising of the features in form of, e.g., push-messages. Retailers can identify consumer channel preference using specific app features, such as electronic purchase receipts in the app, as receipts for in-store purchases are also stored in the app. In addition, if consumers use cross-channel features such as click & collect or checking product availability, this is an indication of offline purchase channel preference. If consumers do not use a cross-channel feature, this is an indication of an online channel preference. Consequently, retailers can use this behavior as an indication of purchase channel preference and promote their features accordingly. However, they have to consider the context of advertisement as the effect of the same feature can be moderated differently by consumers' channel preference depending on the context. This approach has already been discussed above.

All in all, retailers should offer a wide range of shopping app features and promote them in a way that consumers will notice. In addition, retailers should consider consumers' channel preference and promote the features in a targeted manner.

5.3 Theoretical contribution

In addition to the specific implications of each research project, this work also provides valuable implications for research as a whole. Unlike previous research, a very comprehensive look at the design of shopping apps in terms of features was taken. To do this, various research projects examined several sectors in order to be able to make sector-specific retailer recommendations. Previous research

has tended to focus on individual features and not on the app context (see Jiang and Zou, 2020; Ortlinghaus, Zielke, and Dobbelstein, 2019; Okazaki, Li, and Hirose, 2012). Therefore, the consideration of shopping app features represents only an insufficiently investigated area in research so far. At this point, this work makes a significant contribution to existing research as the literature regarding the description of app features is sparse (e.g., Zhao and Balagué, 2015). The pre-study provides a comprehensive overview with detailed explanations of each feature and descriptive studies of what they offer. The features explained in this paper were subsequently empirically tested for their influence on customers' app download, usage, and satisfaction (project 1 and 2). In contrast to previous literature (e.g., Hew et al., 2015; Kim, Yoon, and Han, 2016; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Shen, 2015), research project 1 subdivided customer use intention into download and use intention. Furthermore, research project 1 extends the technology acceptance model as prior research focuses on generic influencing factors (e.g., Groß, 2015; Ko, Kim, and Lee, 2009; Natarajan, Balasubramanian, and Kasilingam, 2017, 2018; Roy, 2017; Saprikis et al., 2018). This research project concentrates on specific influencing factors on consumers' perceived usefulness in terms of app features. In this way, the project can formulate concrete recommendations for action. Since the first project focuses on three features that can be assigned to a higher-level group, the subsequent research project systematically categorized numerous features (project 2). Prior research uses different terms for (app) technologies, e.g., multi-channel technologies (Ortlinghaus, Zielke, and Dobbelstein, 2019), physical store technologies (Baier and Rese, 2020), online and offline features (Ahn, Ryu, and Han, 2004; Gao and Su, 2018), in-store technologies (Roggeveen and Sethuraman, 2020), social features (Boyd, Kannan, and Slotegraaf, 2019; Zhao and Balagué, 2015), and personal or transaction features (Boyd, Kannan, and Slotegraaf, 2019). This project considers an extensive range of app features, brings them together, and makes a new classification with regard to different channels and the purchase stages in the customer journey. Research project 2 extends previous literature by focusing on three groups of app features with regard to different stages of the customer journey and channel switching between these stages. Moreover, it investigates the impact of individual app feature groups on customer satisfaction and loyalty. In this context, the research project 2 contributes to existing research as it considers consumers attitudinal and thus the psychological perspective of loyalty. Previous literature concentrates on the behavioral perspective of loyalty (e.g., Kim, Wang, and Malthouse, 2015; Liu et al., 2019; Wang, Malthouse, and Krishnamurthi, 2015), however brand or retailer loyalty consists of both perspectives (Day, 1969) and studies regarding the attitudinal loyalty are sparse (e.g., Yi and Jeon, 2003). Therefore, this project concentrates on the attitudinal perspective. Furthermore, the attitudinal loyalty influences the behavioral loyalty (Bandyopadhyay and Martell, 2007). Consequently, this project considers the psychological process before behavioral loyalty. In

summary, the empirical studies make it clear that it is relevant for retailers to take a closer look at the individual features of shopping apps, as they have an influence on customer behavioral intentions and satisfaction.

Furthermore, this work highlights the importance of considering consumers' channel preference. As research projects 1 and 2 have shown, depending on channel preference, the effects between individual features and consumer behavior are strengthened or weakened. Therefore, it is of particular importance to address the channel preference. The first research project considers only purchase channel preference, as was also the case in previous research (e.g., Ortlinghaus, Zielke, and Dobbelstein, 2019; Yu, Sun, and Guo, 2019). Especially the second research project contributes to existing research as it divides channel preference into pre-purchase and purchase channel preference and thus addresses the lack of research regarding different channel preferences in the individual stages of the customer journey. The results show that the effects between the feature groups and the satisfaction with the app differ depending on channel preference. Thus, this reinforces the relevance of distinguishing between channel preferences in different stages of the customer journey.

5.4 Limitations and future research

In addition to the aforementioned limitations of the individual research projects, this work has some general limitations that require further research. First, not all industries were considered in each research project. In the pre-study, the cosmetics sector was not included because there were too few apps to compare them with each other. In the first project, only the apparel sector was taken into account, as most apps pertained to this sector. A sector comparison was extremely difficult due to the restrictive possibilities of scenario design. The same applies to the number of features. Hence, only three features were considered. In project 2, the furniture sector is missing because an exploratory study showed that only a few consumers use an app from the furniture sector. Due to this, further research should pick up the gaps in each and analyze them further. Second, our studies are based on scenario-based experiments or quasi-experimental designs. Consequently, there is a lack of studies in a real environment. Further research could work in collaboration with a multi-channel retailer and analyze company data, e.g., how purchases change after a promotion of certain app features within the app. Third, we consider consumers' perceived usefulness of the shopping app features in both main studies (project 1 and 2), rather than consumers' usage. The reason for this is that the pre-study has shown that most consumers do not use all existing feature. However, they perceive them as useful. Therefore, it is suitable to consider consumers' perceived usefulness of the features. Furthermore, we argue that the perceived usefulness is an adequate independent variable as consumers could perceive something as useful without using it, but consumers usually do not use something without perceiving

it as useful. Nevertheless, it would also be interesting to investigate the influence of consumers' usage of app features. Fourth, the overview and consideration of app features, primarily in the pre-study and research project 2, is a snapshot. Apps are constantly evolving and accordingly, it is possible that some considered features from the respective apps have been removed or new ones have been added in the meantime. Consequently, further research should regularly check how up-to-date the features are and, if necessary, include new features or remove old features in further research. However, the formation of the categories in research project 2 provides further research the opportunity to build upon them. Fifth, qualitative research can examine the reasons for usage or no usage of specific app features. As all features are mostly perceived as useful, there might be other reasons than perceived uselessness for lack of usage. One reason might be that consumers do not know how to use the features or that the situations in which they could use the features are quite rare. Finally, this work considers the pre-purchase and purchase stage of the customer journey. Future research could investigate the role of shopping apps and their features in the after sales phase of the customer journey. In summary, although this dissertation explores many exciting connections and provides interesting and relevant insights, there is still much exciting space for further research.

5.5 Conclusion

The world is becoming more digital, which means that consumer behavior is also changing. Consumers are not only using their smartphones for calling and texting, but they are also increasingly using them for an expanding number of activities, such as checking the weather, transferring money via their online banking app, and also shopping. As a result, more and more consumers are becoming multi-channel shoppers instead of only shopping offline or predominantly online as before. To respond to this change in consumer behavior, shopping apps offer a great way to address the challenges of managing different channels. Most importantly, they offer threatened brick-and-mortar retailers the opportunity to strengthen their local business. Cross-channel app features allow consumers to take advantage of both channels. Consequently, shopping apps do not necessarily cannibalize the brick-and-mortar store channel, as it is first and foremost a complementary shopping channel. Cross-channel features can be, e.g., the QR code scanner or the visual search. This way, consumers can see and touch the products on site (touch & feel), but at the same time obtain the information they need online. In the future, there will be new features that support the consumer during their shopping process. For example, a chat function in the shop would be conceivable if no sales staff are available. In this way, the consumer would have the opportunity to receive expert information even without sales staff on site. Known but still seldomly implemented features such as augmented reality will also increase. This is because the use of shopping apps will increase as more reasons that used to argue against their

use are becoming less important. For example, the latest smartphones have an increasing storage space. In addition, consumers are signing mobile communications contracts with increasingly large data volumes. Furthermore, children are now growing up with smartphones, so concerns about data protection are also likely to become less important. Moreover, customers increasingly desire the integration of different channels within the customer journey. These are all reasons why it can be assumed that shopping apps will continue to gain in importance in the future.

In summary, shopping apps and especially their design in the form of app features are currently underestimated and it remains exciting to see what new creative features retailers come up with to support their customers in their shopping process.

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Appendix

Pre-study:

Research project 1:

Research project 2:

Appendix A. Overview of the top-selling online shops in the sectors apparel, electronics, furniture, and generalists.

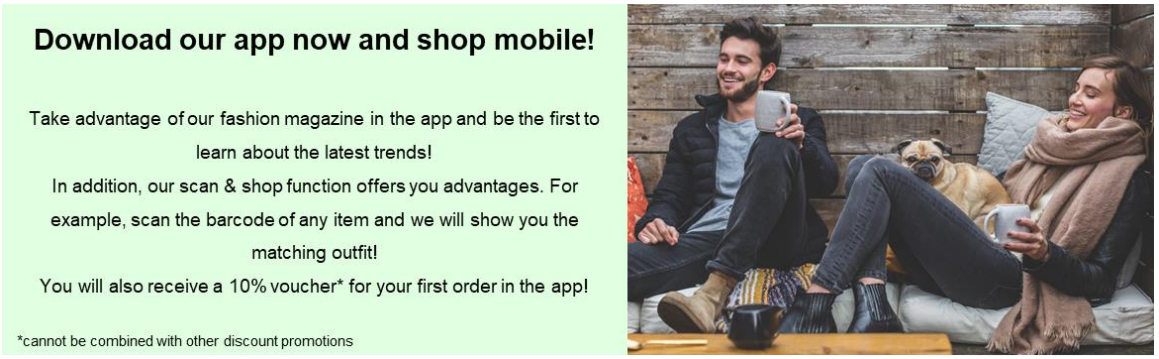
Company/Sector			
Apparel	**Electronics**	**Furniture**	**Generalists**
Zalando*	MediaMarkt*	IKEA*	Amazon*
H&M*	Saturn*	Wayfair*	Otto*
BonPrix*	Apple	Home24*	Lidl*
About You*	Notebooksbilliger.de*	HSE*	Tchibo*
Baur*	alternate	XXXLutz	Limango*
Bestsecret*[1]	Cyberport*	Reuter	Kaufland*
s.Oliver*	Conrad	bett1.de	Klingel*
Breuninger*	Mindfactory	Westwing*[2]	Bader
Shein*	QVC*		Völkner
Asos*	Jacob		Galeria*
Esprit*	Medion		
Witt Weiden*	Rebuy*		
Heine*	Computeruniverse		
Zara*	Dell		
Ernstings Family*	Teufel		
VeePee	Office-partner		
C&A*	Pearls		
P&C*	Samsung		
EMP*			
Happy Size*			

Notes: *retailers with an app. [1]Shopping community. Not every consumer may shop at this online store. Therefore, we do not consider this online store for our study. [2]We consider the online shop of Westwing: WestwingNow.

Appendix B. Overview of scenarios and an example of the main study.

Introduction	
You are looking for a new sweater. To do this, you visit the online store of a fashion retailer you prefer. In addition to the online store, the fashion retailer also has brick-and-mortar stores in the city. While you are searching for the sweater on the Internet site, the ad below appears on your screen, in which the fashion retailer draws your attention to its shopping app.	
Scenarios	
1	Online feature × rebate
2	In-store feature × rebate
3	Online feature × in-store feature × rebate
4	Online feature
5	In-store feature
6	Online feature × in-store feature
7	Rebate
8	No incentive

Example for scenarios (3)



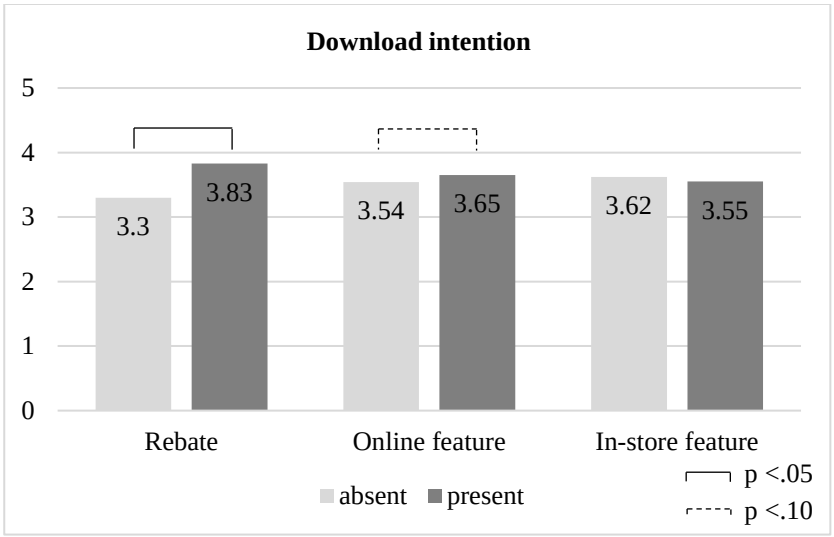
Appendix C. Overview of constructs.

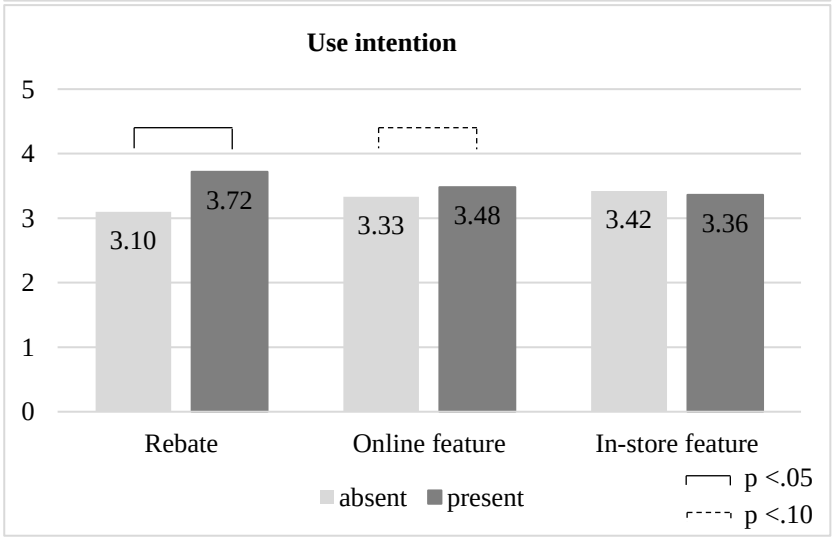
		Cronbach's alpha		**Factor loadings**	
Construct	**Items**	Main study	Follow-up	Main study	Follow-up
Perceived Usefulness	Overall, I find the shopping app of the fashion retailer useful.			.865	.853
	I can shop more efficiently with the fashion retailer's app.			.855	.845
	The app of the retailer makes shopping easier.			.841	.833
	The app of the retailer helps me to make a better purchase decision.			.817	.833
	The app of the retailer improves my shopping possibilities.	.912	.914	.703	.784
Channel Preference	Where do you prefer to buy products?	-		-	
Download Intention	How likely is it that you would download the app of the retailer?	-		-	
Intention to use	How likely is it that you would use the app of the retailer in the future?	-		-	
Realism check	It was very easy for me to put myself into the described purchase situation.			.927	.959
	I can well imagine the described purchase situation.			.916	.950
	I think the described purchase situation is realistic.	.917	.903	.841	.806
Manipulation check	*Main Study:* Which of the following benefits were offered to you? Rebate Online magazine Scan and Shop function Mobile shopping *Follow-up study:* I should imagine that I am going to the physical store of x. I should imagine that I am visiting the online shop of x. The advertisement said availability check. The advertisement said scan and shop function.				
Perceived ease of use	Downloading shopping apps is easy for me.			.893	.875
	Using shopping apps is clear and understandable for me.			.851	.875
	I find shopping apps easy to use.	.873	.826	.825	.797
Usage frequency	*Main study:* Never Less than once each week About once each week Several times each week About once each day Several times each day	-		-	
	Follow-up study (adapted): Less than once each month About once each month More than once each month About once each week More than once each week About once each day More than once each day		-		-
Privacy concerns	It bothers me that the firm is able to track information about me.	-	-	-	-
Enjoyment	I find shopping apps entertaining.			.879	
	I find shopping apps pleasant.			.850	
	I find shopping apps are fun.	.910		.835	

to be continued

		Cronbach's alpha	Factor loadings
Loyalty toward the retailer	I like X more than other retailers.		.893
	I have a strong preference for retailer X.		.857
	I give prior consideration to retailer X when I have a need for clothes.		.834
	I would recommend retailer X to others.	.875	.772
Attitude toward App	I think the app of the retailer is…		
	bad-good		.852
	unpleasant-pleasant		.851
	negative-positive	.924	.771

Appendix D. Results of main effects shown graphically.





Appendix E. Scenarios follow-up study.

Offline purchase preference:	Online purchase preference:
Imagine you walk into the retail store of XY. At the entrance, you notice the following advertising poster:	Imagine you visit the online store of XY. On the homepage, you notice the following ad banner.
S1: scan & shop function	S4: scan & shop function
S2: product availability check	S5: product availability check
S3: scan & shop function + product availability check	S6: scan & shop function + product availability check
You enter the store and look around. After a short time, you find a product that you like. You buy the product and then leave the store.	You click through the individual pages in the online store and look around. After a short time, you find a product you like. You order the product and then close the online store.

Appendix F. Number of participants per group.

Channel preference/Features	**Online feature**	**In-store feature**	**Both features**	**Total**
Online preference	14	11	10	35
Offline preference	45	55	65	165
Total	59	66	75	200

Appendix G. Samples characteristics of each sample.

Variable	**Apparel** (n=361)		**Cosmetics** (n=279)		**Electronics** (n=307)	
	n	%	n	%	n	%
Gender						
Female	267	74.0	191	68.1	178	58.0
Male	94	26.0	89	31.9	128	41.7
Diverse	-	-	-	-	1	0.3
Age						
Ø	31.1		32.74		33.09	
(σ)	5.15		12.45		12.57	
No answer	-		1		1	
Education level						
Secondary school	96	26.7	26	9.4	34	11.1
Specialized Abitur	23	6.4	23	8.3	17	5.5
Abitur	106	29.5	82	29.7	93	30.3
Bachelor degree	68	18.9	101	36.6	106	34.5
Master degree	50	13.9	24	8.7	37	12.1
Ph.D.	10	2.8	4	1.4	3	1.0
Other	6	1.7	16	5.8	16	5.2
No answer	2		3		1	
Professional stage						
Full-time	228	63.7	118	44.2	119	38.8
Part-time	59	16.5	67	25.1	62	20.2
Marginally employed	31	8.7	42	15.7	62	20.2
Unemployed	31	8.7	26	9.7	38	12.4
Other	9	2.5	14	5.2	17	5.5
No answer	3		12		9	
Income						
< 500 EUR	28	8.4	34	13.5	46	15.0
500 < 1000 EUR	23	6.9	58	23.1	55	17.9
1000 < 1500 EUR	39	11.6	40	15.9	46	15.0
1500 < 2000 EUR	53	15.8	32	12.7	24	7.8
2000 < 2500 EUR	47	14.0	25	10.0	42	13.7
2500 < 3000 EUR	50	14.9	25	10.0	21	6.8
3000 < 3500 EUR	36	10.7	20	8.0	14	4.6
3500 < 4000 EUR	26	7.8	5	2.0	10	3.3
4000 < 4500 EUR	9	2.7	10	4.0	6	2.0
4500 < 5000 EUR	11	3.3	-	-	3	1.0
5000 < 5500 EUR	5	1.5	-	-	2	0.7
5500 < 6000 EUR	3	0.9	1	0.4	2	0.7
6000 < 6500 EUR	1	0.3	-	-	-	-
6500 < 7000 EUR	-	-	-	-	1	0.3
7000 < 7500 EUR	1	0.3	-	-	1	0.3
> 7500 EUR	3	0.9	1	0.4	2	0.7
No answer	26		28		32	
Additional values						
App users	361	100	44	15.8	45	14.7
Distance to the next brick-and-mortar store (Ø)	<15 km		<10 km		<10 km	
Expenses last six months in EUR (Ø)	232.55		105.00		750.46	

Appendix H. Evaluation of formative constructs.

Features	Apparel			Cosmetics			Electronics		
	VIF	weight	loading	VIF	weight	loading	VIF	weight	loading
Pre-purchase									
Beauty mirror	-	-	-	1.23	.274*	.562***	-	-	-
Chat	1.48	.281**	.719***	-	-	-	1.17	.087	.453***
Inbox	-	-	-	1.31	.084	.481***	-	-	-
Online magazine	1.55	.345**	.630***	1.44	.115	.515***	-	-	-
Personal product recommendation	-	-	-	1.37	.093	.524***	1.21	.185	.557***
Product finding tools	1.22	.280**	.621***	1.18	.465***	.724***	1.16	.365***	.629***
Saving favorite items	1.26	.449***	.697***	1.29	.214	.598***	1.30	.413***	.761***
Sharing product links	1.53	.149	.626***	1.33	.344***	.679***	1.25	.428***	.731***
Transaction									
Data preservation	1.28	.133	.566***	1.19	.466***	.756***	1.13	.334**	.618***
E-mail for re-availability	1.30	.476***	.776***	-	-	-	-	-	-
Loyalty program	1.25	.638***	.871***	1.19	.502***	.779***	1.14	.742***	.903***
Shipment tracking	-	-	-	1.14	.386***	.667***	1.05	.263*	.468***
Cross-channel									
Check & reserve	-	-	-	1.59	-.010	.504***	-	-	-
Click & collect	-	-	-	1.67	.235	.617***	1.72	.534***	.763***
Click & meet	-	-	-	1.44	.304*	.581***	1.83	-.022	.566***
Electronical receipt	2.07	.016	.660***	-	-	-	1.12	.071	.272**
QR code scanner	1.96	.170	.708***	1.12	.357**	.578***	1.36	.526***	.746***
Payment via QR code	1.97	.294*	.725***	-	-	-	1.33	-.073	.341***
Product availability check	-	-	-	1.36	.666***	.804***	1.14	.372**	.613***
Store finder	1.36	.585***	.869***	1.32	-.274*	.213	1.16	-.048	.212*
Visual search	1.54	.213	.692***	-	-	-	-	-	-

Notes: ***p < .01; **p < .05; *p < .10.

Appendix I. Results of CTA.

Fashion: Pre-purchase	**Residual value**	**SD**	**t-value**	**p-value**	**BootLLCI**	**BootULCI**
Chat, SFI, OM, PFT	**-0.641**	**0.154**	**4.168**	**0.000**	**-0.947**	**-0.344**
Chat, SFI, PFT, OM	0.151	0.094	1.618	0.106	-0.033	0.334
Chat, SFI, OM, SPL	0.329	0.229	1.435	0.151	-0.129	0.770
Chat, OM, SPL, WL	**0.500**	**0.162**	**3.088**	**0.002**	**0.189**	**0.823**
Chat, OM, PFT, SPL	-0.270	0.243	1.110	0.267	-0.745	0.208
Fashion: Cross-channel						
PayQR, ER, SF, QR	0.171	0.205	0.834	0.404	-0.231	0.573
PayQR, ER, QR, SF	0.049	0.231	0.213	0.832	-0.406	0.498
PayQR, ER, SF, VS	**0.503**	**0.227**	**2.214**	**0.027**	**0.066**	**0.957**
PayQR, SF, VS, ER	0.011	0.149	0.073	0.942	-0.284	0.298
PayQR, SF, QR, VS	**-0.361**	**0.195**	**1.851**	**0.064**	**-0.747**	**0.018**
Cosmetics: Pre-purchase						
Inbox, SFI, BM, OM	-0.040	0.197	0.201	0.841	-0.427	0.346
Inbox, SFI, OM, BM	-0.226	0.248	0.910	0.363	-0.717	0.257
Inbox, SFI, BM, PPR	**-0.447**	**0.249**	**1.797**	**0.072**	**-0.939**	**0.038**
Inbox, BM, PPR, SFI	**0.425**	**0.233**	**1.826**	**0.068**	**-0.027**	**0.885**
Inbox, SFI, BM, SPL	**-0.796**	**0.290**	**2.741**	**0.006**	**-1.369**	**-0.231**
Inbox, SFI, OM, PPR	**-0.616**	**0.274**	**2.248**	**0.025**	**-1.163**	**-0.088**
Inbox, SFI, OM, SPL	**-0.926**	**0.305**	**3.037**	**0.002**	**-1.534**	**-0.338**
Inbox, SFI, PPR, SPL	**-0.377**	**0.228**	**1.654**	**0.098**	**-0.829**	**0.065**
Inbox, PFT, SPL, SFI	0.096	0.226	0.423	0.672	-0.345	0.540
Inbox, BM, OM, PFT	-0.250	0.221	1.129	0.259	-0.686	0.182
Inbox, BM, SPL, OM	-0.004	0.402	0.010	0.992	-0.791	0.786
Inbox, BM, PPR, PFT	0.047	0.180	0.258	0.796	-0.304	0.403
Inbox, OM, PFT, PPR	-0.219	0.300	0.729	0.466	-0.807	0.371
Inbox, OM, PFT, SPL	0.102	0.300	0.339	0.734	-0.481	0.693
Cosmetics: Cross-channel						
CC, CM, CR, SF	0.081	0.277	0.292	0.770	-0.460	0.627
CC, CM, SF, CR	**0.458**	**0.237**	**1.933**	**0.053**	**0.000**	**0.929**
CC, CM, CR, PAC	0.267	0.184	1.446	0.148	-0.089	0.634
CC, CR, PAC, CM	0.058	0.151	0.385	0.700	-0.240	0.351
CC, CM, CR, QR	0.486	0.320	1.518	0.129	-0.139	1.117
CC, CM, SF, PAC	**0.523**	**0.216**	**2.417**	**0.016**	**0.106**	**0.955**
CC, CM, PAC, QR	0.277	0.181	1.525	0.127	-0.074	0.637
CC, CR, SF, QR	-0.190	0.224	0.850	0.395	-0.631	0.247
CC, CR, QR, PAC	0.121	0.151	0.801	0.423	-0.170	0.421

to be continued

Electronics: Pre-purchase	**Residual value**	**SD**	**t-value**	**p-value**	**BootLLCI**	**BootULCI**
PFT, Chat, PR, SPL	0.273	0.254	1.074	0.283	-0.219	0.776
PFT, Chat, SPL, PR	0.343	0.242	1.414	0.157	-0.120	0.830
PFT, Chat, PR, SFI	**0.313**	**0.186**	**1.683**	**0.093**	**-0.045**	**0.686**
PFT, PR, SFI, Chat	-0.092	0.140	0.654	0.513	-0.367	0.182
PFT, PR, SPL, SFI	0.029	0.175	0.164	0.870	-0.312	0.373
Electronics: Cross-channel						
PayQR, CC, CM, SF	0.122	0.152	0.803	0.422	-0.173	0.424
PayQR, CC, SF, CM	-0.533	0.328	1.622	0.105	-1.185	0.103
PayQR, CC, CM, ER	-0.122	0.131	0.931	0.352	-0.378	0.136
PayQR, CM, ER, CC	**-0.988**	**0.355**	**2.780**	**0.005**	**-1.706**	**-0.313**
PayQR, CC, CM, QR	-0.106	0.126	0.839	0.402	-0.351	0.143
PayQR, CC, SF, ER	0.091	0.204	0.446	0.656	-0.312	0.487
PayQR, CC, SF, QR	-0.239	0.185	1.295	0.195	-0.602	0.122
PayQR, CC, ER, QR	-0.281	0.212	1.323	0.186	-0.702	0.130
PayQR, PAV, QR, CC	**-0.360**	**0.171**	**2.108**	**0.035**	**-0.702**	**-0.033**
PayQR, CM, SF, PAV	-0.041	0.108	0.377	0.706	-0.255	0.169
PayQR, CM, QR, SF	**-0.848**	**0.318**	**2.671**	**0.008**	**-1.478**	**-0.233**
PayQR, CM, ER, PAV	**-0.250**	**0.122**	**2.048**	**0.041**	**-0.495**	**-0.016**
PayQR, SF, PAV, ER	-0.057	0.098	0.585	0.559	-0.244	0.138
PayQR, SF, PAV, QR	**0.130**	**0.075**	**1.723**	**0.085**	**-0.017**	**0.279**

Notes: CC=Click & collect, CR=Check & reserve, CM=Click & meet, ER=Electronical receipt, BM=Beauty mirror, OM=Online magazine, PAV=Product availability check, PayQR=Payment via QR code, PFT=Product finding tools, PPR=Personal product recommendation, QR=QR code scanner, SF=Store finder, SFI= Saving favorite items, SPL= Sharing product links, VS=Visual search; bold: (marginally) significant tests; we did not test CTA for transaction features as this feature group considers only three items. To perform the analysis a minimum size of four items is required (Hair et al., 2017).

Appendix J. Evaluation of reflective constructs.

Construct	Items	Apparel	Cosmetics	Electronics
Loyalty toward the retailer	I like X more than other retailers.	.947		
	I have a strong preference for retailer X.	.928		
	I give prior consideration to X when I have a need for a product.	.927		
	I would recommend X to others.	.858		
CA		.936		
Satisfaction with the app	I am fully satisfied with the X app.	.917	.941	.954
	The X app fulfils my expectation.	.918	.933	.935
	Overall, I am very satisfied with the service that the X app offers me.	.914	.945	.933
CR		.940	.958	.962
AVE		.839	.883	.895
Satisfaction with the retailer	I am fully satisfied with X.	.913	.927	.954
	X fulfils my expectation.	.938	.922	.921
	Overall, I am very satisfied with the service that X offers me.	.900	.922	.962
CR		.941	.946	.959
AVE		.841	.853	.885
HTMT		.785	.531	.484

Notes: X is a replacement for the respective retailer; CA = Cronbach's alpha; CR= composite reliability; AVE = average variance extracted; HTMT= heterotrait-monotrait ratio; to the right of the items is the indicator reliability.

Appendix K. Testing of heterogeneity (FIMIX-PLS).

	Number of segments				
Criteria	1	2	3	4	5
Fashion					
AIC	1656.54	1582.16	1380.12	1309.16	**1286.36**
AIC3	1670.54	1611.16	1424.12	1368.16	**1360.36**
AIC4	1684.54	1640.16	1648.12	**1427.16**	1434.36
BIC	1710.98	1694.93	1551.23	**1538.61**	1574.13
CAIC	1724.98	1723.93	**1595.23**	1597.61	1648.13
MDL	**2040.76**	2378.04	2587.67	2928.38	3317.24
EN		0.39	0.64	**0.84**	0.74
Cosmetics					
AIC	1414.34	1373.84	1345.52	1219.63	**1190.01**
AIC3	1428.34	1402.84	1389.52	1278.63	**1264.01**
AIC4	1442.34	1431.84	1433.52	**1337.63**	1338.01
BIC	1465.18	1479.15	1505.30	**1433.87**	1458.72
CAIC	**1479.18**	1508.15	1549.30	1492.87	1532.72
MDL	**1780.53**	2132.37	2496.39	2762.83	3125.56
EN		**0.92**	0.72	0.85	0.91
Electronics					
AIC	1578.58	1546.24	1534.79	1486.39	**1357.59**
AIC3	1592.58	1575.24	1578.79	1545.39	**1431.59**
AIC4	1606.58	1604.24	1622.79	1604.39	**1505.59**
BIC	**1630.76**	1654.31	1698.74	1706.27	1633.38
CAIC	**1644.76**	1683.31	1742.77	1765.27	1707.38
MDL	**1951.46**	2138.63	2706.70	3057.81	3328.53
EN		0.62	0.51	0.59	**0.87**

	Relative segment sizes				
No. of Segments	1	2	3	4	5
Fashion					
2	0.60	0.40			
3	0.61	0.27	0.11		
4	0.70	0.15	0.11	0.02	
5	0.47	0.32	0.11	0.04	0.04
Cosmetics					
2	0.93	0.06			
3	0.73	0.17	0.09		
4	0.64	0.20	0.07	0.07	
5	0.69	0.12	0.06	0.05	0.05
Electronics					
2	0.77	0.23			
3	0.56	0.21	0.21		
4	0.40	0.35	0.20	0.04	
5	0.62	0.17	0.87	0.07	0.04

Notes: AIC = Akaike's information criterion; AIC3 = modified AIC with factor 3; AIC4 = modified AIC with factor 4; BIC = Bayesian information criterion; CAIC = consistent AIC; EN = normed entropy statistic; MDL5 = Minimum description length with factor 5; Bold = optimal solution regarding each criterion.

Appendix L. Matching results with different calipers.

Before matching				After matching			
Nonusers	**App users**	**p-value**	**Predictor**	**Nonusers**	**App users**	**p-value**	**PRB[14]**
Caliper=.05							
N=109	N=200		c=.05	N=83	N=83		M=.84
1.44	1.28	.001	gender	1.33	1.34	.870	.94
5.67	5.98	.074	privacy concerns	6.02	5.93	.660	.71
6.00	5.90	.012	purchase risk	5.95	5.93	.887	.80
3.39	4.54	.000	social interaction	3.80	3.93	.655	.89
3.66	3.46	.515	distance	3.39	3.51	.714	.40
Caliper=.10							
N=109	N=200		c=.10	N=90	N=90		M=.59
1.44	1.28	.001	gender	1.34	1.31	.636	.81
5.67	5.98	.074	privacy concerns	5.99	5.73	.168	.16
6.00	5.90	.012	purchase risk	5.96	5.81	.386	.50
3.39	4.54	.000	social interaction	3.69	3.80	.693	.90
3.66	3.46	.515	distance	3.37	3.53	.588	.20
Caliper=.15							
N=109	N=200		c=.15	N=91	N=91		M=.78
1.44	1.28	.001	gender	1.35	1.34	.877	.94
5.67	5.98	.074	privacy concerns	5.97	5.80	.377	.45
6.00	5.90	.012	purchase risk	5.96	5.77	.252	.90
3.39	4.54	.000	social interaction	3.69	3.91	.425	.81
3.66	3.46	.515	distance	3.37	3.68	.309	.55
Caliper=.20							
N=109	N=200		c=.20	N=92	N=92		M=.65
1.44	1.28	.001	gender	1.36	1.35	.878	.94
5.67	5.98	.074	privacy concerns	5.96	5.77	.315	.39
6.00	5.90	.012	purchase risk	5.95	5.79	.347	.60
3.39	4.54	.000	social interaction	3.67	4.05	.170	.67
3.66	3.46	.515	distance	3.36	3.61	.401	.25

Note: c=caliper (tolerance measurement for distance in matching); M=mean; PRB=percent reduction in bias for a covariate.

[14] To calculate the PRB, the following formula was used, analogous to Rosenbaum and Rubin (1985, p. 36):
$PRB = 1 - |(b_M/b_1)|$
b_M= mean difference between control group and treatment group after matching
b_1 = mean difference between control group and treatment group before matching.

Appendix M. Quality criteria and model fit.

	Apparel		Cosmetics		Electronics	
	AppSat	RetSat	AppSat	RetSat	AppSat	RetSat
R^2	.343	.521	.318	.277	.307	.227
Q^2	.165	.298	.213	.179	.260	.186
SRMR	.059		.061		.059	

Notes: AppSat = satisfaction with the app; RetSat = satisfaction with the retailer.

Appendix N. Results of moderation effects in detail.

Value of moderator	Effect	t	p-value	BootLLCI	BootULCI
Pre-purchase x online pre-purchase channel preference → app satisfaction					
Apparel					
2.00 (16th percentile)	.118	1.678	.094	-.0204	.2583
4.00 (50th percentile)	.248	5.812	.000	.1645	.3328
6.00 (85th percentile)	.378	5.804	.000	.2502	.5067
Cosmetics					
2.00 (16th percentile)	.286	2.657	.008	.0743	.4990
4.00 (50th percentile)	.431	6.822	.000	.3068	.5556
6.00 (85th percentile)	.575	7.945	.000	.4331	.7185
Electronics					
1.00 (16th percentile)	.278	2.571	.010	.0654	.4921
2.00 (50th percentile)	.375	4.673	.000	.2171	.5329
4.00 (85th percentile)	.567	7.636	.000	.4212	.7137
Transaction x online purchase channel preference → app satisfaction: not significant					
Cross-channel x offline pre-purchase channel preference → app satisfaction					
Apparel					
2.00 (16th percentile)	.041	.675	.499	-.0785	.1606
4.00 (50th percentile)	.245	6.081	.000	.1658	.3242
6.00 (85th percentile)	.448	7.315	.000	.3282	.5696
Cosmetics					
2.00 (16th percentile)	.016	.176	.860	-.1680	.2010
4.00 (50th percentile)	.321	5.078	.000	.1967	.4459
6.00 (85th percentile)	.626	7.506	.000	.4619	.7903
Electronics					
1.00 (16th percentile)	.134	1.104	.270	-.1049	.3732
2.00 (50th percentile)	.236	2.673	.007	.0624	.4106
4.00 (85th percentile)	.441	4.831	.000	.2615	.6209
Cross-channel x offline purchase channel preference → app satisfaction					
Apparel					
2.00 (16th percentile)	.092	1.504	.133	-.0283	.2127
4.00 (50th percentile)	.251	6.182	.000	.1715	.3316
6.00 (85th percentile)	.410	7.128	.000	.2976	.5243
Cosmetics					
2.00 (16th percentile)	.207	2.423	.016	.0390	.3763
4.00 (50th percentile)	.434	6.161	.000	.2957	.5735
6.00 (85th percentile)	.548	6.062	.000	.3701	.7261
Electronics: not significant					