Journal of Business Research xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

Online retailing across e-channels and e-channel touchpoints: Empirical studies of consumer behavior in the multichannel e-commerce environment

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ARTICLE INFO

Keywords:
Internet retailing
Online shopping
Electronic channels
Touchpoints
Online customer journey
Multichannel e-commerce

ABSTRACT

This research contributes to broadening understanding of online retailing across electronic channels (e-channels, e.g., mobile devices) and e-channel touchpoints (e.g., mobile shopping apps) from a consumer perspective. Based on the multichannel retailing approach and theoretical considerations, the authors suggest an enhanced perspective on the online retailing environment and validate this multichannel e-commerce perspective by conducting both an online survey (N = 502) and an experimental study (N = 126). The results indicate that online retailing can be classified into four e-commerce categories that entail individual e-channel touchpoints, emphasizing the need for a more differentiated consideration of "the online channel." This work advances marketing research and practice by illustrating that both technology-related quality and context-related situational benefit affect consumers' utilization of e-channels. Further findings show that retailers can enhance consumers' shopping experiences by providing alternative e-channel touchpoints (i.e., specific digital shopping formats) that contribute differently to the online customer journey.

1. Introduction

Researchers recognize that the range of Internet-enabled devices that shoppers use to search for product information or to purchase products online has expanded (Grewal et al., 2017; Maity et al., 2018). With every device that allows individuals to access online retail offerings, such as computers, smartphones, tablets, and Internet-enabled TV, online shopping is becoming not only more versatile but also more complex. In the context of consumers' channel choices, multichannel researchers have emphasized the need to understand the benefits that individuals derive from each retail channel to determine effective and efficient individual channel strategies and to employ customer-centric multichannel retailing strategies (e.g., Payne & Frow, 2005). Therefore, in this paper, we adopt the multichannel perspective for online retailing itself; that is, we investigate a multichannel e-commerce environment in which consumers conduct their online customer journeys across multiple e-channels (categories of Internet-enabled devices, e.g., mobile devices) and e-channel touchpoints (specific digital shopping formats, e.g., mobile shopping apps). The distinction between an e-channel and an e-channel touchpoint is necessary because an e-channel represents the hardware alternatives that consumers can use to shop online, while an e-channel touchpoint represents the software alternatives that retailers can provide for e-channels. Because of the various combinations of hardware and software, it can be expected that the same online retail offering will shape online customer experiences differently depending on the fit of the e-channel and the e-channel touchpoint.

The relevance of a new perspective for online retailing becomes apparent when one considers that shopping behavior is changing drastically with respect to the utilization of Internet-enabled devices. GWI (2017) investigated the device usage of online shoppers and reported that, on average, 49% of shoppers worldwide shop online via PCs/laptops, whereas 51% shop via smartphones and 9% shop via tablets. This expanding multiplicity of technologies with which customers can shop requires managers to understand both the devices that consumers use to shop online and the characteristics of the e-channels that influence these decisions (Rapp et al., 2015). The identification of specific device categories yields the opportunity for retailers to offer multiple adequate touchpoints to shoppers (Verhoef et al., 2015). Differences across devices, such as screen size, resolution, and interactivity, can affect how consumers respond to marketing content, indicating that interfaces can shape consumer reactions to identical content (McLean et al., 2018). Hence, knowledge of how, why, and when consumers use various devices to shop online is necessary for retailers to address customer needs through suitable online retailing systems (Zhang et al., 2010).

Previous research has often failed to consider the e-channels (i.e.,

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https://doi.org/10.1016/j.jbusres.2018.10.048
Received 26 March 2018; Received in revised form 19 October 2018; Accepted 22 October 2018

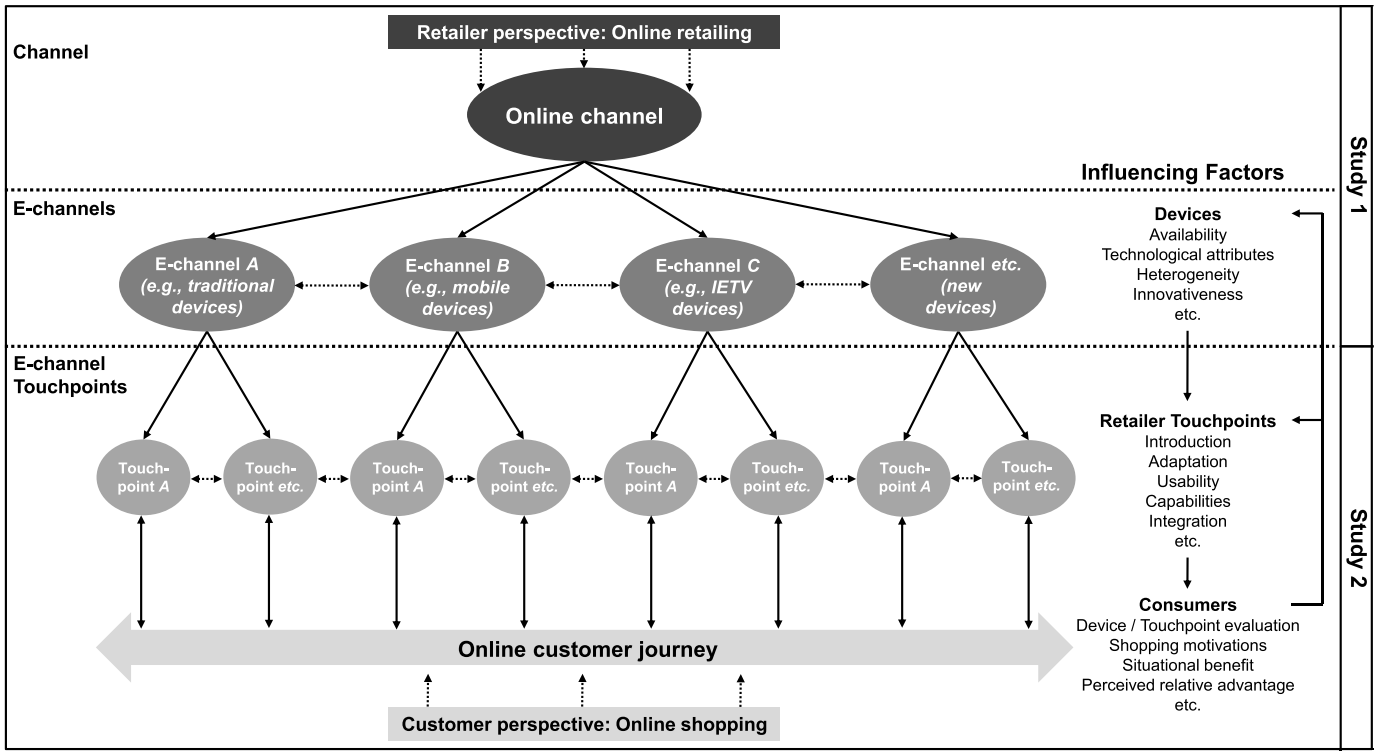

Fig. 1. Multichannel e-commerce framework.

device categories) used for online shopping and their potential effects on online purchasing behavior. As indicated by Yadav and Pavlou (2014, p. 25), "a desktop-centric perspective dominates extant research, but consumers now rely on a significantly expanded set of devices." Given the long-recognized and extensive knowledge of the great diversity of brick-and-mortar store formats that cater to different needs, choices, segments, and occasions of customers (e.g., van Kenhove et al., 1999), it is surprising that only a few authors have recognized diverse shopping e-channels and their corresponding touchpoints. Therefore, a key objective of this paper is to extend the existing knowledge of online retailing by identifying and classifying the multiplicity of devices and the diversity of e-channel touchpoints that consumers now use for online purchases. By addressing the issues described above, this study makes three important contributions to the literature on Internet retailing and online consumer behavior. (1) By categorizing the relevant literature into two perspectives (narrow vs. enhanced), we show that empirical research on online retailing has widely excluded online consumer behavior across diverse e-channels and e-channel touchpoints. (2) We develop a framework that illustrates the changed environment of online retailing and empirically investigate the determinants and effects of consumers' online shopping across e-channels and e-channel touchpoints. (3) Based on our findings, we derive relevant implications and future research opportunities for the evaluation of e-channels, the design of e-channel touchpoints, and the development of customer-centric multichannel e-commerce systems.

2. Conceptual background

2.1. Definition of e-channels and e-channel touchpoints

The altered online retailing environment illustrates the need to develop clear definitions and distinct differentiations between the terms "e-channel" and "e-channel touchpoint" to establish a framework for investigating online retailing across multiple devices and shopping formats (Verhoef et al., 2015). Neslin et al. (2006, p. 96) define a channel as "a customer contact point, or a medium through which the firm and the customer interact." However, this definition does not explicitly consider that retailers might offer, and consumers might utilize, multiple online retailing touchpoints (e.g., a shopping app, a mobile website, or both) of an e-channel (e.g., a mobile device). While the definition of Neslin et al. (2006) was appropriate for an environment in which online retailing was equal to selling through a website so that the medium (computer) and the contact point (website) were inseparably linked, the increasing multiplicity of shopping devices and digital shopping formats requires an enhanced and more particular perspective on the online channel. Therefore, we argue that a further distinction between an e-channel and an e-channel touchpoint is necessary. This distinction is in line with the perspective of the physical store as a retail channel category that encompasses different store formats (e.g., supermarkets and convenience stores), which differ in design or service level (Zielke & Komor, 2015).

We define an e-channel as a category of Internet-enabled devices (for example, mobile devices) that consumers can use to interact with and purchase products from an online retailer. By e-channel touchpoint, we mean a specific digital shopping format (for example, a mobile shopping app) that a retailer employs to provide consumers with an online shopping opportunity. Lemon and Verhoef (2016) propose a typology that includes four types of touchpoints (brand-owned, partner-owned, customer-owned, and social/external). In this context, e-channel touchpoints are brand-owned transaction touchpoints designed and managed by the firm and under the firm's control (Lemon & Verhoef, 2016). While brand-owned touchpoints in general include all brand-owned media (e.g., advertising or loyalty programs), an e-channel touchpoint is characterized by its online shopping capability. Moreover, for partner-owned transaction touchpoints (e.g., a product offering on eBay), customer-owned touchpoints (e.g., a customer product review blog), and social/external touchpoints (e.g., a hotel review on TripAdvisor) a retailer cannot control the customer (shopping) experience, such as the usability or certain features of a mobile app.

By introducing the terms "e-channel" and "e-channel touchpoint," we extend the understanding of "the online channel" to a perspective of "multichannel e-commerce" (see Fig. 1). Furthermore, the multichannel

Table 1
Literature overview on online retailing literature.

Article	Online retailing			
	Narrow perspective		Enhanced perspective	
	No further specification of online channel	Retailing via a retailer's website	Consideration of alternative e-channels (devices)	Consideration of alternative e-channel touchpoints
Chen et al. (2010)		x		
Chu et al. (2010)	x			
Glover and Benbasat (2010)	x			
Hernández et al. (2010)	x			
Kukar-Kinney and Close (2010)	x			
Maditinos and Theodoridis (2010)	x			
Pizzutti and Fernandes (2010)	x			
Wang et al. (2010)		x		
Cai and Xu (2011)		x		
Lee et al. (2011)		x		
Mazaheri et al. (2011)		x		
Ofek et al. (2011)	x			
Punj (2011)	x			
Valentini et al. (2011)	x			
Wakefield et al. (2011)		x		
Wells et al. (2011a)				
Wells et al. (2011b)		x		
Yoo and Lee (2011)	x			
Avery et al. (2012)	x			
Bianchi and Andrews (2012)	x			
Luo et al. (2012)		x		
Park et al. (2012)		x		
Rose et al. (2012)		x		
Bang et al. (2013)			x	
Barrutia and Gilsanz (2013)		x		
Bartl et al. (2013)		x		
Brasel and Gips (2014)			x	
Campbell et al. (2013)		x		
Chang and Tseng (2013)		x		
Kim and Lee (2013)			x	
Kim et al. (2013)		x		
Kushwaha and Shankar (2013)	x			
Liu et al. (2013)		x		
Özpolat et al. (2013)		x		
Yoon et al. (2013)		x		
Anaza (2014)	x			
Ashraf et al. (2014)		x		
Blázquez (2014)	x			
Chiu et al. (2014)		x		
Hsieh et al. (2014)		x		
Konuş et al. (2014)	x			
Ashraf and Thongpapanl (2015)		x		
Bilgicer et al. (2015)	x			
Cao and Li (2015)	x			
Emrich et al. (2015)	x			
Herhausen et al. (2015)	x			
Kaptein and Parvinen (2015)		x		
Li et al. (2015)	x			
Pauwels and Neslin (2015)	x			
Wang et al. (2015)			x	
Anderl et al. (2016)		x		
Chakraborty et al. (2016)		x		
Chaparro-Peláez et al. (2016)	x			
Chou et al. (2016)			x	
Clemons et al. (2016)	x			
Huang et al. (2016)			x	
Kim et al. (2016)	x			
King et al. (2016)		x		
Lin and Lekhawipat (2016)	x			
Voorveld et al. (2016)	x			
Yang et al. (2016)	x			
Ashraf et al. (2017)	x			
Bhatnagar et al. (2017)		x		
Dennis et al. (2017)			x	
Gelbrich et al. (2017)	x			
Ho et al. (2017)		x		
Hubert et al. (2017)				x
Huyghe et al. (2017)		x		
Kim et al. (2017)				x

(*continued on next page*)

Table 1 (*continued*)

Article	Online retailing			
	Narrow perspective		Enhanced perspective	
	No further specification of online channel	Retailing via a retailer's website	Consideration of alternative e-channels (devices)	Consideration of alternative e-channel touchpoints
Liao et al. (2017)	x			
Malhotra et al. (2017)		x		
Moody et al. (2017)		x		
Sohn et al. (2017)			x	
Xu-Priour et al. (2017)	x			
Huang et al. (2018)	x			
Maity et al. (2018)	x			
McLean et al. (2018)				x
Morath and Münster (2018)	x			
Sengupta et al. (2018)		x		
Thongpapanl et al. (2018)	x			
Wu et al. (2018)		x		
Zhuang et al. (2018)	x			
Current study			x	x

Note: The overview contains research published in 34 marketing and information systems journals (based on the two most recent subrankings of the Harzing (2018), Journal Quality List, 62nd edition, April 3): ABS 2018 and Hceres 2018. We include only those journals that ranked at least “B” (in Hceres 2018) and “3” (in ABS 2018). Included were articles based on the following criteria: published between 2010 and 2018 (July; list includes articles in press); relate to B2C online retailing/online shopping; contain empirical data (e.g., surveys, experiments, transaction data); include at least one online shopping-related variable (e.g., online purchase intention, purchase volume, m-commerce use).

e-commerce perspective merges the perspective of the retailer (online retailing perspective, i.e., selling through “the online channel”) and the perspective of the customer (online shopping perspective, i.e., a seamless online customer journey across preferred e-channels and e-channel touchpoints), which is essential for developing customer-centric multichannel e-commerce systems.

2.2. Literature overview

Because online retailing is an interdisciplinary topic, relevant articles are published in a wide variety of works in the marketing and information systems literature (Kannan & Li, 2017). Therefore, we investigate the most relevant marketing and information systems journals (based on the two most recent subrankings of the Harzing (2018), Journal Quality List, 62nd edition, April 3): ABS 2018 and Hceres 2018. We include only those journals that ranked at least “B” (in Hceres 2018) and “3” (in ABS 2018) to provide a broad but quality-focused overview of academic online retailing-related research published from 2010 to 2018 (see Table 1). This time period is chosen for investigation because Deighton et al. (2012) date the proliferation of new media, channel, and customer contact points in their mapping of priority topics over the past quarter century to 2010. Furthermore, in 2009 (and earlier), several mobile shopping apps (e.g., Amazon, eBay, Net-a-porter) were already available for consumers to shop online via different types of mobile devices (Beaumont, 2009). Therefore, research from 2010 to 2018 should be aware of an enhanced perspective on alternative e-channels (devices) and e-channel touchpoints (digital shopping formats).

We define an enhanced perspective on online retailing as the consideration of the effects of alternative e-channels and alternative e-channel touchpoints on consumers' perception and evaluation of online shopping. As Table 1 illustrates, few contemporary studies on online retailing have considered the availability and influences of alternative e-channels (i.e., different devices) in their empirical studies. However, the few examples that do exist illustrate the relevance of considering the effects of differing devices. For example, Dennis et al. (2017) investigate channel contribution to the well-being of disabled consumers and find that online shopping using a mobile device contributes more to well-being than online shopping using a traditional PC. Based on an investigation of the effects of varying devices (laptop vs. tablet) on consumer perceptions of products online, Brasel and Gips (2014) argue that research on the interfaces used to access content is as important as research into the content itself. However, the authors do not consider the influence of the potentially missing adaptation of the stimuli (a website) to the characteristics of the devices. Overall, research on the effects of alternative e-channel touchpoints (i.e., different digital shopping formats) has been much sparser and only related to the comparison of mobile online shopping between shopping apps and mobile websites (Hubert et al., 2017; Kim et al., 2017). This is problematic because, for example, a mobile store experience might be moderated by both the device and the e-channel touchpoint utilized. The online retailer Amazon, for example, provides three e-channel touchpoints for tablet users that differ in design, handling, and functionality: a tablet-responsive website, a tablet shopping app (that offers a reduced design and a different menu structure), and a “window” shopping app (that features an intuitive approach of swiping across product categories). Thus, mobile online shopping experiences on the same tablet device might be perceived and evaluated differently. In the context of the listed articles, this study fills a unique gap by proposing an approach that emphasizes the consideration of alternative e-channels and e-channel touchpoints to foster an enhanced perspective on online retailing, which previous research has not adequately addressed (see Table 1). Specifically, our approach seeks to enrich and extend prior research on consumer behavior in an online retailing environment by adopting a consumer-centric view of e-channels and e-channel touchpoints.

This enhanced perspective has relevance because, as our literature review reveals, most current studies of online retailing are limited to the perspective of customers visiting and purchasing products on a retailer's website (e.g., Park, 2017) or consumers using “the online channel” in general (e.g., Zhuang et al., 2018), which we define as a narrow perspective. Thus, these studies exclude the effects of alternative e-channels or e-channel touchpoints. Studies that investigate only consumers' evaluations of online shopping websites do not distinguish whether individuals increasingly use alternative e-channels or e-channel touchpoints. On the one hand, the device utilized might affect the perception and evaluation of a website; for example, when a website is accessed via smartphone, the screen size and handling differ considerably. On the other hand, consumers might prefer and use other e-channel touchpoints to shop online, such as mobile shopping apps. When interaction with a website is exclusively under investigation,

other e-channel touchpoints either might not be captured (leading to an incomplete observation) or might bias the findings (through observation of consumers' evaluations of multiple touchpoints when only one is recognized by the researcher). The examination of the online channel or online shopping in general (i.e., without considering the utilization of e-channels and e-channel touchpoints) does not capture whether shoppers use alternative e-channels and whether the employed e-channel or e-channel touchpoint influences consumers' intentions. Therefore, studies that investigate consumers' intentions to shop online in general tend to disregard the fact that the online shopping behavior of individuals has become varied. Our research approach overcomes the indicated research gap of a narrow perspective both by considering and categorizing the multiplicity of alternative devices into groups of e-channels and by illustrating the varying effects of alternative e-channel touchpoints on the evaluation of online shopping with one specific device.

We recognize that physical channels might also play a relevant role in the interrelationship of e-channels and e-channel touchpoints (for example, the role of a mobile device in a brick-and-mortar store) (e.g., Rapp et al., 2015). Nevertheless, in this study, we focus on the online retailing environment because the first step to understanding the role of digital channels within a portfolio of physical channels should be to understand the manifold relationships across e-channels and e-channel touchpoints. Thus, we aim to provide a general framework to create a foundation for future comparisons of digital and physical channels.

3. Theoretical framework

As a theoretical foundation, we incorporate a rationale to explain varying consumer perceptions and evaluations across e-channels and e-channel touchpoints. In particular, we identify relevant constructs and appropriate measurements derived from diverse theories and models to explore how consumers evaluate various e-channels and e-channel touchpoints.

The theory of reasoned action (TRA) suggests that consumers evaluate the consequences of their behavior and intend to act consistently with these evaluations (Fishbein & Ajzen, 1975). Thus, the TRA is useful to explain consumers' intentions to use a specific e-channel or e-channel touchpoint. Based on the TRA, Davis (1986) developed the technology acceptance model (TAM), which states that the *intention to use* a certain technology is a consequence of beliefs in two dimensions: *usefulness* and *ease of use*. Researchers have extended the TAM by integrating additional dimensions and underlying attributes (e.g., *enjoyment* and *trust*) to enhance its explanatory power (Ha & Stoel, 2008). Following these models, beliefs about the benefits of e-channel or e-channel touchpoint attributes should affect consumers' perceptions and evaluations of an e-channel with respect to its advantages for online shopping. Loiacono et al. (2007) extend the TRA and TAM to develop the WebQual instrument, an empirically grounded set of scales covering four dimensions (*usefulness*, *ease of use*, *entertainment*, and *complementary relationship*) that focus specifically on the interface of a website, such as an online store site. Although WebQual was developed to evaluate websites, the authors mention that this approach may be valuable as new information technologies appear on the market (Loiacono et al., 2007). Thus, we can borrow the WebQual instrument for the evaluation and comparison of different e-channels. Moreover, based on Bhattacherjee's (2001) expectation-confirmation model in the IT domain (ECM-IT), we expect that there are differences with regard to *satisfaction* and *usage intention* when an e-channel is accessed with diverse e-channel touchpoints. In particular, the ECM-IT suggests that consumers use an e-channel (touchpoint) with pre-use expectations about its anticipated performance and evaluate the perceived performance of the e-channel (touchpoint) compared with their primary expectations about it. Usage intention can be understood as the intention to (re)use an e-channel (touchpoint) to gain information or to make future purchases and is primarily determined by satisfaction with prior e-channel (touchpoint) use (Bhattacherjee, 2001).

Furthermore, we draw on the uses and gratifications theory (U&G), introduced by Blumler and Katz (1974). U&G predicts that a specific medium will be used as a means to satisfy wants or interests and is therefore applicable for the use of an e-channel or e-channel touchpoint (Keeling et al., 2007). As a theoretical framework, U&G aids in understanding and explaining the motivations for using new media and technology through a “how and why” approach (Kim & Lee, 2013). For example, gratification can be obtained from e-channel attributes (e.g., information quality), from familiarity with e-channel utilization (e.g., intuitive operation), and from the social context in which an e-channel is used (e.g., the presence or absence of others). The evaluation of a single subject without considering available alternatives is often mentioned as a limitation of behavioral research (Muthitcharoen et al., 2011). U&G, however, allows the incorporation of the possibility that users might have alternatives to satisfy their needs, and it is capable of helping to identify why consumers use a specific e-channel or e-channel touchpoint. According to U&G, consumers who believe that the attributes of a new online shopping alternative are superior to those of the one they currently use are likely to prefer the new alternative. Therefore, we assume that an explicit comparison among alternative e-channels and e-channel touchpoints might influence a consumer's adoption or rejection of available e-channels and might affect an individual's online shopping behavior.

Beyond technological attributes, situational circumstances are relevant factors that can influence consumers' store-choice decisions (van Kenhove et al., 1999), customer experience (Verhoef et al., 2009), and online impulse-buying behavior (Floh & Madlberger, 2013). Usage situations, or those factors particular to a time and place of observation, which do not follow from personal and stimulus attributes and which have a demonstrable and systematic effect on current behavior, are thus important in the study of online shopping motivations (Belk, 1975). With regard to online consumer behavior, this importance indicates that instead of one e-channel being universally superior to another, the perceived benefit of a particular e-channel depends on the situational context. This assumption is supported by Stigler's (1961) economics of information theory, which explains consumer preferences for shopping channels by examining the subjective costs of information search for different channels. Therefore, we suggest that the use of an e-channel to shop online is not only a consequence of its inherent attributes but also a result of the situational context. Based on the aforementioned conceptual and theoretical considerations, we aim to answer a set of related research questions (RQs).

RQ1: What types of devices do consumers (currently) use to shop online, and can these devices be categorized into diverse e-channels from a consumer perspective?

RQ2: How do consumers' evaluations of online shopping vary across diverse e-channels, and how do different situational factors influence e-channel utilization?

RQ3: Do consumers' evaluations of e-channels differ depending on the e-channel touchpoints used for online shopping?

4. Empirical studies

4.1. Overview of studies

By conducting two individual studies, we explore several facets of consumer behavior in a multichannel e-commerce environment appropriate for answering our research questions. We employ two different methods by conducting an online survey in study 1 and by applying an experimental approach in study 2. The studies were conducted with two different samples of German consumers. Study 1 ($N = 502$) is related to our first and second research questions. Concerning RQ1, we provide an overview of Internet-enabled devices that consumers currently use for online shopping and identify relevant e-channel categories. Concerning RQ2, we further investigate how

consumers' evaluations of online shopping vary across diverse e-channels and utilization scenarios. The objective of our second study (N = 126) is to answer RQ3 by investigating how consumers' evaluations of an e-channel differ depending on the utilized e-channel touchpoint.

4.2. Study 1: consumers' utilization and evaluation of e-channels

4.2.1. Procedure and sample

To obtain a relevant set of Internet-enabled devices that consumers utilize for online shopping for further evaluation, we conducted a preliminary study at a large university in Germany. For this preliminary study, a group of undergraduate students (N = 82, age M = 24.4 (SD = 2.4) years, 51% female) who, as "digital natives," are known to show innovative online shopping and technology usage behaviors (Wolfinbarger & Gilly, 2003), were invited to participate in a paper-and-pencil survey. The participants were asked which devices they generally use to access the Internet and which of these devices they employ to search for product information and make purchases online. Answers were categorized into the types of devices that consumers employ for online shopping purposes. Two experienced researchers individually coded and controlled for consistency and unambiguousness of the answers until saturation occurred. In a second round, discrepancies were discussed and resolved between the researchers. Twelve distinct types of Internet-enabled devices (and one remaining response, "car," which was put in the category "other") were derived from the preliminary study and included in the main study of consumers' utilization and evaluation of e-channels (see Table 2).

For the main study, a nationwide online survey was conducted addressing German Internet users. Respondents were invited via e-mail and social online networks to participate in the survey. Invitations were sent to consumers who have volunteered to be part of a research panel and to the contacts of undergraduate students who participated in a research seminar. Incentives in the form of a drawing for online shopping gift vouchers (5 × 10 €) were offered to respondents for completing the online questionnaire. Participants were assured that the results would be evaluated in the aggregate to ensure their anonymity and would be used only for research purposes. After eliminating the data of two participants that contained missing values, the valid data of 502 respondents were obtained for further analyses. Women constituted 56% of the respondents, and the average age of the sample was M = 30.1 (SD = 12.3) years. On average, the participants had used the Internet for M = 10.58 (SD = 3.67) years and had shopped online for M = 5.88 (SD = 3.15) years.

Table 2
Number and proportion of utilization of online shopping devices.

Device	Number of users (N = 502)	Proportion of users (in %)
Laptop/Notebook	438	87.3
Personal computer (PC)	378	75.3
Smartphone	335	66.7
Tablet computer	154	30.7
Netbook (with UMTS/3G)	95	18.9
Cellphone (classic mobile phone)	71	14.1
Internet-Enabled TV (via game console) [IETV2]	44	8.8
Internet-Enabled TV (TV with integrated online access) [IETV1]	43	8.6
Portable Media Player	37	7.4
Internet-Enabled TV (via Internet-TV-box, Blu-ray player, etc.) [IETV3]	35	7.0
E-reader	34	6.8
In-store kiosk	8	1.6
Other	4	0.8

Note: Device types were derived from preliminary study (N = 82) and included in main study (N = 502). In the main study, participants were asked, "Please indicate which of the following devices you already have used to shop (search for product information/purchase) online." Thus, a multiple selection of up to 12 device types (plus the option to indicate "others") was possible for each respondent.

4.2.2. Methods

For the main study (N = 502), we used multidimensional scaling (MDS) as a perceptual mapping approach to capture and illustrate consumers' unbiased conceptions of Internet-enabled devices in the online shopping context. In an MDS process, the input is a similarity matrix (usually based on ranking or similarity of objects), and the output is a low-dimensional dataset called an MDS configuration, which can usually be illustrated using a 2- or 3-dimensional map (Wang, 2012). To produce a similarity matrix, the participants were asked to indicate perceived similarities between a subset of devices (deduced from the preliminary study, see Table 2). This subset was composed of only devices that participants already used for online shopping and that therefore could be judged on the individual's experience. To avoid fatigue effects, each participant had to rate a maximum of six devices (resulting in 15 pairwise comparisons). If the participants had used fewer devices, they rated fewer pairwise comparisons. Answers were given based on a pairwise comparison of devices (for example, "smartphone and laptop/notebook") using a 7-point Likert scale (1 = not similar at all; 7 = very similar). These pairwise comparisons are necessary to produce the similarity matrix for conducting the MDS. Overall, the similarity matrix includes 4392 pairwise comparisons, i.e., on average, there were 366 comparisons per device and 8.75 pairwise comparisons per respondent.

To analyze the data, we performed visual mapping of the consumers' perception space using an MDS algorithm combined with a hierarchical cluster analysis and the property-fitting approach (Padgett & Mulvey, 2007). To examine consumers' perception space, we first created a proximity matrix based on the pairwise comparison ratings (perceived similarities) of the devices. Based on the matrix, we derived the perceptual map through an MDS procedure. We used the algorithm SPSS-PROXSCAL (multidimensional scaling of proximity data) (Borg & Groenen, 2005). Next, we performed hierarchical cluster analysis to identify groups of similar devices. The coordinates of dimensions 1 and 2 from the MDS were used as inputs for single linkage, complete linkage, average linkage, and Ward's cluster algorithm and were compared for interpretability and consistency. To estimate the optimal number of clusters, we applied the elbow criterion by graphing the development of heterogeneity against the number of clusters.

To investigate how consumers' evaluations of online shopping vary across diverse e-channels, we draw on U&G theory. Thus, the respondents were asked to rate several attributes of the devices in their subset. Criteria for evaluating the technology-related attributes of a device with respect to the online shopping context were adapted from WebQual. The composite WebQual scale, which is derived from the TRA and the TAM, is significantly correlated with intentions to purchase from a website and intentions to revisit a website and therefore is an adequate instrument for the evaluation of e-channels and e-channel touchpoints (Wolfinbarger & Gilly, 2003). Items of the central WebQual dimensions of *usefulness*, *ease of use*, *entertainment*, and *complementary relationship* were rated by the respondents for the different devices (see Table 3). A list of variables and related items for accessing qualitative attributes is given in Appendix A.

To control for situational characteristics, we draw on Belk's (1975) situational factors framework. Thus, the respondents were asked to identify situations in which they used a device to shop online. Situational variables were adapted from Belk (1975) and included (1) *physical surroundings*, including geographic location; (2) *social surroundings*, including the presence of other persons; (3) *temporal perspective*, including the temporal effects of channel choice; (4) *task definition*, including intention to shop; and (5) *antecedent states*, including momentary moods. Table 3 provides items to capture the different situational

Table 3
Variables and property-fitting results for interpretation of e-channel categorization.

Dependent Variable	Dimension	R^2	F value	Sig.	ß Coefficient 1	Coefficient 2
I. WebQual characteristics						
1. Functional fit-to-task	Usefulness	0.79	16.68	***	−2.05***	0.21
2. Information quality		0.71	10.96	***	−2.28***	0.27
3. Tailored information		0.62	7.35	**	−1.68***	0.46
4. Trust		0.48	4.22	*	−1.27**	0.09
5. Response time		0.51	4.74	**	−1.06**	−0.00
6. Availability		0.59	6.48	**	−1.53**	−1.26*
7. Ease of understanding	Ease of use	0.53	5.06	**	−1.39**	0.45
8. Intuitive operations		0.64	8.15	**	−1.49***	−0.48
9. Visual appeal	Entertainment	0.60	6.85	**	−1.15***	0.19
10. Innovativeness		0.52	4.80	**	−0.99**	−0.28
11. Emotional appeal		0.64	8.14	**	−1.40***	−0.33
12. Online completeness	Complementary relationship	0.77	14.96	***	−2.18***	0.39
13. Relative advantage		0.69	10.08	***	−1.97***	−0.19
II. Situational characteristics (I use the device…)						
14. … on the way	Physical surroundings	0.50	4.44	**	−0.83	−2.06**
15. … at school/work		0.73	11.93	***	−1.33**	−1.75***
16. … at home		0.43	3.39	**	−1.40**	0.36
17. … with friends	Social surroundings	0.08	0.37	n.s.	−0.22	−0.45
18. … with family/partner		0.27	1.67	n.s.	−0.75	0.08
19. … alone		0.48	4.19	*	−1.27**	−0.31
20. … when I am pinched for time	Temporal perspective	0.56	5.61	**	−1.48**	−1.08*
21. … to bridge waiting time		0.72	11.42	***	−0.50	−1.84***
22. … when I have time and ease		0.20	1.16	n.s.	−0.72	0.12
23. … to purchase/order	Task definition	0.66	8.53	***	−1.98***	0.35
24. … to search/inform		0.66	8.71	***	−2.16***	0.26
25. … by the way		0.37	2.68	n.s.	−1.14*	−0.49
26. … spontaneously	Antecedent states	0.18	0.98	n.s.	−0.72	−0.19
27. … when I am bored		0.56	5.70	**	−0.74**	−0.77**
28. … when I am comfortable		0.17	0.90	n.s.	−0.36	−0.68

Note: ß coefficients = unstandardized beta values from the regressions. Scales: (1) = does not apply at all; (7) = applies completely.
* = $p < .1$ significance level.
** = $p < .05$ significance level.
*** = $p < .01$ significance level.

states. A list of dimensions and related items for accessing situational characteristics is given in Table 3 and Table 4.

4.2.3. Results

As Table 2 illustrates, consumers utilize all 12 types of devices identified in the preliminary study for online shopping, but there are some differences with respect to the frequency and proportion of users across the diverse devices. The small number of "other" devices (0.8%) indicates that the 12 identified types of devices sufficiently cover the range of online shopping devices.

Our MDS analysis reveals that the 12 devices constitute four areas on the perceptual map, one area in each quadrant. The hierarchical cluster analyses used single linkage, complete linkage, and average linkage algorithms to produce a four-cluster solution that supports the visual disposition of the devices in a conglomeration (see Fig. 2). The first cluster (A) encompasses three devices: PCs, laptops, and netbooks. These devices are frequently used to shop online through a web browser and are quite similar in handling (i.e., keyboard and mouse controls). Because these devices are the primary means of online shopping, we name this cluster the "traditional e-channel." The second cluster (B) includes smartphones and tablet computers, both of which are handheld technologies. Both devices are compact and portable; hence, we refer to them as the "mobile e-channel." Three Internet-enabled TV (IETV) formats (integrated online access; online access via a game console; and online access via an Internet-TV box, connected Blu-ray player, etc.) constitute the third cluster (C), the "IETV e-channel." Compared with the traditional e-channel, IETV devices are used more passively, in the "laid back" atmosphere of a living room. The last cluster (D) is less homogeneous than the other three groups. It includes e-readers, in-store kiosks, portable media players, and cellphones. These devices are rarely used for online shopping but instead complement other e-channels (the "complementary e-channel"). Interestingly, cellphones (i.e., traditional feature phones that lack certain capabilities of smartphones, such as touch control) are not part of the mobile e-channel, which includes smartphones and tablets. Due to limited technological possibilities, e.g., limited input, limited size, and limited processing, the online shopping experience on cellphones seems to be similarly limited (Ozok & Wei, 2010).

To improve the interpretability of the MDS configuration, we use the property fitting approach. Property fitting is based on a set of regressions in which the value of the characteristic is used as the dependent variable, and the two coordinates of each device in the two-dimensional space are the independent variables (Padgett & Mulvey, 2007). Thus, this technique measures the extent to which each characteristic is associated with the position of devices in the two-dimensional space. Table 3 provides the dependent variables, R^2 and F values, significances, and coefficients (unstandardized beta values from the regressions) that can be fitted as vector arrows to the perceptual map, contributing to the interpretation of the clusters and dimensions (see Fig. 2).

For the WebQual characteristics, all of the F values are significant, indicating that all characteristics contribute to the interpretation of the MDS configuration. The bunching of arrows in Fig. 1 indicates that consumers evaluate all of the WebQual characteristics, with the exception of "availability" (no. 6), in the same manner. Concerning the direction of the vector arrows (from right to left), dimension 1 can be associated with the perceived overall quality of online shopping. Consumers evaluate both the traditional e-channel and the mobile e-channel as adequate with respect to their *usefulness*, *ease of use*, *entertainment*, and *complementary relationship*. The IETV e-channel and the complementary e-channel perform much worse in terms of their perceived online shopping quality. The cluster of the mobile e-channel

Table 4
Evaluation of e-channel quality and situational utilization.

Dimension	Attribute	Traditional e-channel (Cluster A)	Mobile e-channel (Cluster B)	IETV e-channel (Cluster C)	Complementary e-channel (Cluster D)
WebQual characteristics					
Usefulness	Functional fit-to-task	**4.88 (1.69)**	3.87 (1.64)	2.28 (1.39)	2.36 (1.71)
	Information quality	**5.77 (1.24)**	5.52 (1.32)	3.32 (1.89)	3.40 (2.23)
	Tailored information	**5.19 (1.39)**	4.92 (1.39)	3.60 (1.99)	3.14 (1.94)
	Trust	**4.82 (1.53)**	4.19 (1.64)	3.51 (1.80)	3.10 (1.89)
	Response time	**4.75 (0.85)**	4.47 (0.86)	3.62 (1.33)	3.52 (1.41)
	Availability	4.05 (1.37)	**5.80 (1.11)**	2.38 (1.23)	4.22 (1.97)
Ease of use	Ease of understanding	**6.23 (1.01)**	5.20 (1.30)	4.70 (1.97)	4.04 (1.96)
	Intuitive operations	**6.12 (1.09)**	5.88 (1.06)	4.18 (1.85)	4.87 (1.72)
Entertainment	Visual appeal	**5.77 (1.14)**	5.35 (1.24)	4.44 (1.64)	4.20 (2.00)
	Innovativeness	4.83 (1.33)	**5.52 (1.11)**	3.98 (1.59)	4.18 (1.99)
	Emotional appeal	**5.75 (1.21)**	5.71 (1.23)	4.06 (1.88)	4.44 (2.06)
Complementary relationship	Online completeness	**6.41 (1.02)**	5.74 (1.45)	4.01 (2.04)	3.84 (2.28)
	Relative advantage	**5.78 (1.32)**	5.48 (1.43)	3.62 (1.94)	3.90 (1.98)
Situational characteristics					
	I use the device…				
Physical surroundings	…on the way	2.22 (1.57)	**5.51 (2.01)**	1.33 (1.05)	4.04 (2.61)
	… at school/work	3.56 (2.12)	**4.75 (2.14)**	1.25 (1.06)	3.57 (2.51)
	… at home	**5.76 (1.61)**	4.96 (1.91)	4.14 (2.42)	3.76 (2.42)
Social surroundings	… with friends	2.35 (1.58)	**4.56 (2.07)**	2.65 (2.07)	3.22 (2.36)
	… with family/partner	4.02 (1.98)	**4.25 (2.01)**	3.36 (2.24)	3.15 (2.23)
	… alone	**5.45 (1.59)**	**5.45 (1.68)**	3.70 (2.33)	4.56 (2.36)
Temporal perspective	… when I am pinched for time	3.22 (1.80)	**5.58 (1.86)**	1.85 (1.64)	3.75 (2.40)
	… to bridge waiting time	2.90 (1.92)	**5.46 (2.08)**	2.54 (2.17)	4.17 (2.48)
	… when I have time and ease	**5.45 (1.68)**	4.15 (2.04)	4.35 (2.43)	3.98 (2.31)
Task definition	… to purchase/order	**5.61 (1.64)**	3.84 (2.03)	2.72 (2.37)	2.82 (2.11)
	… to search/inform	**5.55 (1.54)**	5.26 (1.71)	2.85 (1.98)	3.23 (2.38)
	… by the way	3.70 (2.00)	**4.94 (1.96)**	2.50 (1.95)	3.32 (2.44)
Antecedent states	… spontaneously	3.49 (1.69)	**5.42 (1.75)**	3.20 (1.99)	3.57 (2.33)
	… when I am bored	4.24 (2.01)	**5.24 (1.88)**	3.50 (2.21)	4.28 (2.51)
	… when I am comfortable	3.49 (2.01)	**5.04 (1.97)**	3.86 (2.32)	4.01 (2.44)

Note: Mean (SD). Highest rating across e-channels is indicated in bold. See Appendix A for measurement items of WebQual characteristics. Scales: (1) = does not apply at all; (7) = applies completely.

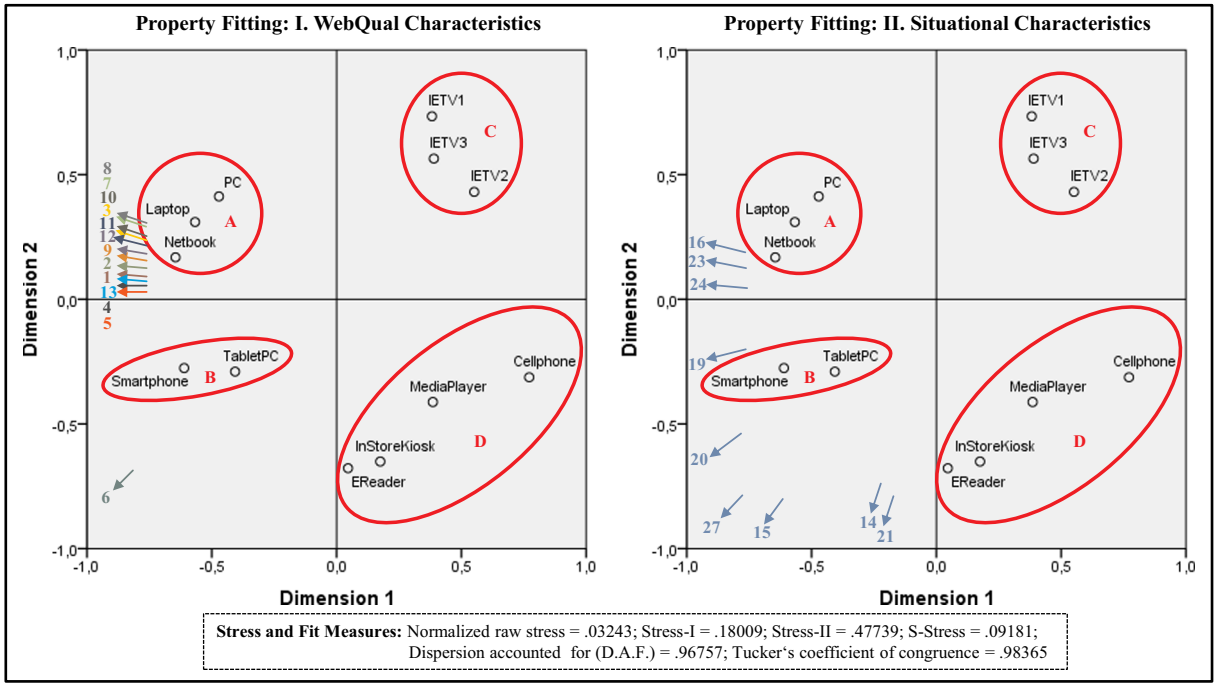

Fig. 2. MDS-Results: Perceptional space, clusters and vectors for WebQual and situational characteristics.
Note: Labeling of WebQual vectors is due to the spatial closeness of arrows illustrated in the same order and corresponding color (from top to bottom). Vector numbers are stated in Table 3. For explanations of IETV1, IETV2, and IETV3, see Table 2. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

indicates its inherent advantages with respect to the direction of the "availability" arrow. The usefulness of mobile devices is a result of their availability and enables consumers to shop anywhere and anytime (Wang et al., 2015).

The results of the property fitting with situational characteristics (variables 14 to 28 in Table 3) as dependent variables demonstrate that in addition to the evaluation of quality characteristics, other factors affect consumers' perceptions of online shopping devices. The situational variables allow for a more differentiated interpretation of the clusters and help to explain why consumers switch to an e-channel with lower perceived online shopping quality (see Fig. 2). The results reveal that the mobile e-channel becomes relevant for online shopping when consumers are away from home (physical setting: 14 and 15) and when time is critical or would otherwise go unused (temporal perspective: 20 and 21). The traditional e-channel is the preferred option when online shopping or when online information is accessed (task definition: 23 and 24) at home (physical setting: 16). Drawing on Stigler's (1961) economics of information theory, Becker's (1965) theory of time allocation, and Goodhue and Thompson's (1995) task-technology fit theory, one can conclude that the situational e-channel choice largely depends on the perceived benefit of the individual combination of the temporal perspective, the physical surroundings, and the chosen task definition (search or purchase). Thus, dimension 2 can be associated with the situational benefit of an e-channel.

Concerning the IETV e-channel and the complementary e-channel, the findings indicate that consumers perceive both e-channel categories as less appropriate for online shopping because of their qualitative attributes. However, consumers perceive both categories as alternative online shopping formats that are relevant in specific situations. IETV formats might constitute a more relevant e-channel when their market diffusion and utilization frequency increase. At first glance, the devices of the complementary e-channel are quite heterogeneous with regard to their technological attributes and usage scenarios. However, they have in common that they offer the complementary benefit of online shopping opportunities in specific temporal (temporal perspective: 21) and local (physical setting: 14) situations. Therefore, these devices extend usual online shopping in a complementary manner by offering special and device-specific online shopping opportunities at certain times (e.g., e-book purchases) or in certain places (e.g., in-store ordering), making them relevant for omnichannel retailing strategies (Verhoef et al., 2015).

As illustrated in Table 4, consumers' evaluations of online shopping vary across the four e-channel categories. Respondents evaluated the traditional e-channel most positively with respect to WebQual attributes, with the exception of "availability" and "innovation," which show the highest scores for mobile devices (cluster B). However, a closer examination of the evaluation of situational characteristics indicates that the situational context strongly influences actual utilization, which stimulates the use of the mobile e-channel in particular.

4.2.4. Discussion

The findings of study 1 show that consumers currently use 12 different devices, which can be classified into four categories of e-channels: traditional e-channel, mobile e-channel, IETV e-channel, and complementary e-channel. Thus, we can conclude that a perspective on online retailing that considers only e-commerce, only m-commerce, or both is no longer sufficient to represent the entire online retailing landscape. The share of users who utilize IETV and complementary devices is currently quite low but is increasing, provoked by the success of Netflix and other digital media offerings. The large-screen and high-resolution displays of Internet-enabled TV devices offer a high level of media richness, making them suitable for a detailed product presentation with high-definition pictures, videos, and even 3D animations (Maity et al., 2018). However, neither online retailers nor IETV manufacturers currently seem to provide a satisfactory solution (e.g., an adequate IETV shopping app) for IETV commerce, leading to low evaluations of the qualitative attributes of the IETV e-channel. The complementary e-channel comprises a heterogeneous set of devices relevant for retailers in offering additional services or specific products. Increasing demand for digital goods, such as digital music, e-books, or video on demand, presents opportunities for retailers to establish new business models in this field. Therefore, we recommend considering IETV commerce and complementary e-commerce (c-commerce) as two further categories. A comparison of the evaluation of e-channel quality and situational utilization illustrates differences across the four e-channel categories. Overall, e-channel evaluation is a result of perceived qualitative benefits in a specific situational context. Therefore, the advantageousness of an e-channel or device for online shopping is a combination of the individual, the technology, and the context. This finding underscores that consumers evaluate and utilize e-channels not only because of their inherent qualitative attributes, such as the usefulness or ease of use of a device, but also based on an overall judgment that includes situational benefits (Wang et al., 2015). From a methodological perspective, multidimensional scaling is an appropriate approach to map the e-channel landscape from the consumer perspective.

4.3. Study 2: influence of e-channel touchpoints on consumers' evaluations of an e-channel

4.3.1. Procedure and sample

Whereas our first study focused on the distinction and overall evaluation of e-channels, in our second study, we address the effects of e-channel touchpoints on the evaluation of e-channels (see Fig. 1). We draw on TAM and ECM-IT to employ an experimental research (between-subjects) design to compare three mobile e-channel touchpoints: (1) a standard website, (2) a mobile-optimized website, and (3) a mobile shopping app. The mobile e-channel was chosen for this study because mobile devices currently constitute the most important e-channel for consumers (GWI, 2017). Additionally, we included a control group that used a common desktop PC (with a Windows operating system) to visit the standard website of a retailer via a browser (Internet Explorer) using a keyboard and computer mouse. This group served as a benchmark e-channel touchpoint (of the traditional e-channel) with which to compare the mobile e-channel touchpoint groups. Because the devices of the IETV e-channel and the complementary e-channel are used for online shopping on rare occasions (see Table 1) and limited e-channel touchpoints are available for these categories, we refrained from including these (in study 1 identified) e-channels in study 2. We implemented an experimental two-step laboratory design. First, attendees had to use a mobile device (we chose an Apple iPhone because it is a common device for mobile shopping) to finish a task (searching and simulated ordering of a given DVD movie). In the second stage of the experiment, attendees were asked to participate in a survey to evaluate their experience with the e-channel touchpoint. To ensure realistic conditions in the different mobile environments, we used the existing standard website, a mobile-optimized website, and a mobile app from the same online retailer (Amazon). One hundred and twenty-six volunteers (gender: 54% female; age: M = 30.86 (SD = 9.86) years) participated in our second study. Sixty-five percent of the sample population owned a smartphone. Of these people, 74% had used a mobile device for online shopping. The experiment was conducted in a laboratory room at a German university. A convenience sample of participants was recruited in the environment of the university and the city of the university. As an incentive to participate, free coffee and pastries were offered. The participants were randomly assigned to one of the three different conditions (each cell size of the mobile e-channel touchpoint groups consisted of 34 respondents, and the cell size of the control group consisted of 24 respondents).

4.3.2. Methods

In the questionnaire, the participants had to assess six dimensions (*usefulness*, *ease of use*, *enjoyment*, *satisfaction*, *privacy issues*, and

Table 5
ANOVAs and post hoc results across four e-channel touchpoints.

Dimension	Mobile e-channel touchpoint (smartphone)			Traditional e-channel touchpoint (PC)		
	1. Standard website	2. Mobile-optimized website	3. Mobile Shopping App	4. Standard website	F value	Part. eta^2
	M (SD)	M (SD)	M (SD)	M (SD)		
Usefulness	2.80 (0.90)^{2,3,4}	4.18 (0.66)^{1}	3.83 (1.01)^{1,4}	4.69 (0.35)^{1,3}	30.16***	0.43
Ease of use	2.90 (0.81)^{2,3,4}	4.32 (0.75)^{1}	4.39 (0.70)^{1}	4.35 (0.55)^{1}	33.60***	0.45
Enjoyment	2.19 (0.99)^{2,4}	3.24 (1.00)^{1}	2.85 (1.01)^{4}	3.71 (0.88)^{1,3}	12.63***	0.24
Privacy	3.53 (1.04)	3.43 (1.00)	3.28 (0.77)	3.90 (0.91)	2.13 n.s.	0.05
Satisfaction	2.91 (0.85)^{2,3,4}	4.35 (0.62)^{1}	4.42 (0.81)^{1}	4.59 (0.45)^{1}	37.93***	0.48
Shopping intention	2.26 (0.83)^{4}	2.93 (1.01)^{4}	2.52 (1.24)^{4}	4.24 (0.68)^{1,2,3}	21.19***	0.34
	N = 34	N = 34	N = 34	N = 24		

Note: Between-subjects design. Scales: (1) = strongly disagree; (5) strongly agree. Elevated numbers indicate a significant difference (Scheffé post hoc $p < .05$) compared with the enumerated touchpoint.
*** = Significance level: $p < .001$.

shopping intention) indicated as relevant to online shopping, each measured with multiple items (e.g., Bruner & Kumar, 2005; Ha & Stoel, 2008). In addition to some utilitarian dimensions, which were also evaluated in study 1, we included "*enjoyment*" as a hedonic shopping motive and "*privacy issues*," which are especially relevant for the mobile context (Maity & Dass, 2014). In addition, privacy issues can be seen as nonmonetary costs of mobile online shopping (Morath & Münster, 2018). All of the measures were adapted from the literature. A complete list of variables and related items is presented in Appendix B.

4.3.3. Results

The results of several ANOVAs illustrate that consumers' evaluations of online shopping differ significantly across e-channel touchpoints for five of six dimensions (see Table 5). Only the privacy dimension shows nonsignificant differences across all three mobile e-channel conditions and the traditional e-channel touchpoint ($F = 2.126$, $p > .1$). Additionally, we conducted Scheffé's post hoc test to check for significant differences between groups of individual e-channel touchpoints. The respondents considered the standard website accessed through the mobile device less useful ($M = 2.80$, Scheffé's post hoc $p < .05$) than did the other groups. This result underlines the importance for retailers to develop and adapt suitable e-channel touchpoints for consumer-relevant e-channels and not to rely on the accessibility of the standard website. Concerning usefulness, the standard website accessed through the traditional e-channel ($M = 4.69$, Scheffé's post hoc $p < .05$) performed significantly better than the mobile shopping app did ($M = 3.83$, Scheffé's post hoc $p < .05$), whereas there was no significant difference compared with the mobile-optimized website ($M = 4.18$, Scheffé's post hoc $p > .1$). Further means and Scheffé's comparisons are illustrated for all dimensions and across all of the touchpoints in Table 5. As indicated by the ANOVA, the only nonsignificant difference holds for the privacy dimension (Scheffé's post hoc $p > .1$). We controlled for the influence of gender and age on all independent variables and found no significant effects. Moreover, we controlled for whether experience with mobile device usage or preference for a specific mobile e-channel touchpoint affect the independent variables, which was not the case. Because we use one specific mobile e-channel device (an Apple iPhone), we also controlled for the influence of preferring this device for online shopping and found a significant influence only on perceived ease of use ($p < .05$). However, because it can be expected that respondents who regularly use this device for online shopping perceive it as easier to use and because those respondents are evenly distributed across the treatment groups, this effect should not bias our findings.

From a multichannel perspective, it is interesting that individual touchpoints perform differently with respect to diverse dimensions; for example, the mobile-optimized website performs better than the shopping app with respect to perceived usefulness, but overall satisfaction with the app remains higher. Another noteworthy finding is that shopping intention is quite low across all mobile e-channel touchpoints compared with shopping intention via the traditional e-channel touchpoint (standard website). Moreover, participants evaluate the ease of use of the mobile shopping app as marginally better than the ease of use of the traditional e-channel. Although this difference is not statistically significant, it shows that there is potential to enhance the customer experience of mobile shopping by providing adequate touchpoints that can even outperform the traditional e-channel in qualitative dimensions.

4.3.4. Discussion

The findings of study 2 reveal that the perception and evaluation of an e-channel and the online shopping experience are dependent on the availability and capability of e-channel touchpoints. These findings indicate that the overall evaluation of an e-channel is affected by the e-channel touchpoint utilized and thus depends on the development and adaptation of the e-channel touchpoint to the characteristics of the device. In particular, our results show that a mobile-optimized website and mobile app both significantly exceed the evaluation of a mobile-accessed standard website. Interestingly, privacy concerns barely differ across mobile touchpoints, and the differences are nonsignificant. This result might be because security issues are affected by consumers' privacy perceptions of online retailers (e.g., regarding their privacy policies), which were the same for all touchpoints.

These observations lead to two relevant insights. First, consumers' evaluations of an e-channel must be considered based on available touchpoints to capture the variety of e-channel shopping formats. Second, retailers must be aware of differences across touchpoints with respect to their online shopping appropriateness. Some consumers might prefer a specific e-channel touchpoint, whereas others might prefer to switch across touchpoints that perform equally well, even on the same device. Retailers can use this knowledge to satisfy heterogeneous consumer needs by designing and combining e-channel touchpoints with differing capabilities adapted to the characteristics of the e-channel and the situational context of the utilization.

5. Conclusions and implications

5.1. Research contribution and theoretical implications

With the multichannel e-commerce framework, we provide insights into how the expanding number of e-channels and e-channel touchpoints changes the online retailing landscape. We offer knowledge that is useful both for further investigation of online consumer behavior (e.g., the design of experiments, surveys, or modeling approaches) and for marketing practice decisions (e.g., the relevance of e-channels and touchpoints). By developing and validating the multichannel e-

commerce framework, we provide a theoretical foundation to capture the online customer journey across all brand-owned e-channel touchpoints. This contribution can also help to explain either contradictory findings in previous studies, such as inconsistent findings on the effect of website complexity (Mai et al., 2014) or conflicting results of the determinants of online shopping acceptance (Ingham et al., 2015).

The identification of four distinct e-channel categories from a consumer perspective supports the evolution from e-commerce (the e-channel) to multichannel e-commerce (a multiplicity of e-channels). This finding is in line with the assumption that diverse "channels" exist within the online environment (Kannan & Li, 2017). Thus, online retailing research would benefit from integrating multichannel research concepts. In particular, knowledge of customer behavior in multichannel e-commerce delivers strategic advantages, creating a foundation for e-channel integration (Payne & Frow, 2005). Moreover, the results support the significance of a combination of technology-related attributes and context-related situational variables to explain the utilization of an e-channel. This finding underscores that technology acceptance is dependent on the situational context of utilization.

Furthermore, the results indicate that the range of Internet-enabled devices is quite dynamic. Whereas new devices will appear on the scene and extend the current range, such as smart watches and voice-operated devices, other technologies that have reached the decline phase in their product life cycle (e.g., cellphones) will likely disappear. This range requires dynamic models of consumers' evaluations of online shopping devices. By addressing general e-channel characteristics, our studies offer a set of dimensions that could be valuable for evaluating the new e-channels that will appear on the market and assessing the state of established e-channels.

5.2. Managerial implications

Our findings suggest practical implications both for the introduction and adoption of new e-channel touchpoints and for the interrelation of touchpoints. Because our results demonstrate that the evaluation of online shopping differs significantly across e-channel touchpoints, online retailers must provide adequate touchpoints through adaptation for the Internet-enabled devices that customers utilize for online activities. This finding is in line with elements of the contingency theory, which is guided is by the general view that organizations (i.e., retailers) whose features (i.e., ability to offer appropriate touchpoints) best match the demands of their environments (i.e., customers who employ specific e-channels) will achieve the best adaptation (Hult, 2011).

Moreover, the findings indicate that retailers should consider the relevant attributes and capabilities of an e-channel to design an e-channel touchpoint that enhances consumers' online shopping experiences. Our results are in line with Arts et al. (2011), who found that consumers prefer to adopt innovations with less complexity and higher relative advantages, suggesting that e-channel touchpoints should be easy to use and should offer a preeminent benefit when used to shop online. Our findings also confirm elements of U&G theory (Blumler & Katz, 1974) in that gratification can be obtained from specific e-channel attributes (e.g., associated quality for online shopping). By providing innovative new e-channel touchpoints for new types of connected devices, retailers can enhance the shopping experience and make online shopping even more convenient.

Nevertheless, retailers should evaluate online shopping based not only on the quality of technological facilities but also on the influence of the situational context (e.g., the temporal perspective of online shoppers). This finding offers support for the theoretical tenets of the economics of information theory (Stigler, 1961) by explaining consumer preferences for e-channels with regard to the perceived benefit of information search for different e-channel alternatives, especially time benefits. Therefore, an e-channel touchpoint should be designed to fulfill customers' needs and wishes in specific situations, such as "on the go" or in a "laid back" situation at home. For example, IETV devices present new opportunities for making online shopping more comfortable by considering the living-room environment when developing IETV shopping apps (Wagner et al., 2017).

Furthermore, our results suggest the relevance of a multichannel strategy for online retailers to design, operate, and combine diverse e-channels through appropriate touchpoints. In this sense, the consideration of e-channel touchpoints can be seen as a valuable extension of the omnichannel framework proposed by Saghiri et al. (2017), which embeds virtually infinite sets of customer value-adding journeys via different channel stages, types, and agents.

5.3. Limitations and future research directions

Our findings provide initial insights into how the multiplicity of e-channels and e-channel touchpoints has refined the online retailing environment. Nevertheless, the limitations of our studies and technological developments provide several issues for further investigation. The studies reported here are a first attempt to illustrate the expanded perspective of online retailing and consumer behavior across diverse e-channels and e-channel touchpoints. Therefore, in the following, we briefly discuss possible directions for future research to expand our work and overcome its underlying limitations.

Our multichannel e-commerce framework and our studies are limited to brand-owned e-channel touchpoints. Further research should investigate the role of partner-owned, customer-owned and social/external touchpoints in the online customer journey, as suggested by Lemon and Verhoef (2016). Studies that control for specific products that are searched or purchased would yield richer insights into how the perception and evaluation of an e-channel or e-channel touchpoint vary across different product categories. In our studies, consumer behavior was investigated based on self-reported usage of e-channels and e-channel touchpoints and the utilization intentions of individuals. Future studies should analyze actual purchase data (e.g., sales figures via each e-channel touchpoint) and observe online shopper behavior (e.g., tracking cross-e-channel-movements) to validate the results of our studies and to generalize our findings. Further research could investigate the role of different categories of e-channels and e-channel touchpoints for diverse retailers' online and multichannel strategies to capture the complete customer journey, in which individuals often switch between digital and physical channels. In our second study, the individual cells exhibit a relatively small sample size. Moreover, we did not control for familiarity with individual e-channel touchpoints or with the online retailer. Therefore, the findings should be interpreted cautiously prior to future replication, extension (e.g., different smartphone devices, diverse online retailers), and validation of our study. For example, analyses of e-channel touchpoint evaluations on other devices (e.g., tablets or IETV) and simultaneous utilization (e.g., tablets and IETV) could extend the findings of study 2 and deliver valuable insights into how and why consumers use combinations of devices and e-channel touchpoints. Finally, because both of our studies utilized German consumers, which limits the generalizability of our findings, research could replicate our studies in other countries to investigate whether the relevant set of Internet-enabled devices, e-channels, and e-channel touchpoints varies across countries, cultures, or retailers.

Declarations of interest

None.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgements

The authors thank Dennis Herhausen, Oliver Emrich, Marco Ieva, the two anonymous R&D symposium reviewers at the SMA Conference 2017, the four anonymous JBR reviewers, and the Co-Editors (Charles

A. Ingene and Maria Kalamas Hadden) for their valuable comments and suggestions on an earlier draft of this paper.

Appendix A. Measurement scales of study 1

Variable	Items	Source
Functional fit-to-task (α = 0.93)	The [device] is pretty much what I need to shop online. The [device] adequately meets my online shopping needs. The [device] allows me to shop more effectively.	Adapted from Loiacono et al. (2007)
Information quality (α = 0.90)	The [device] offers me the possibility to find information when I need it. The [device] provides complete information. The [device] provides access to accurate information.	Adapted from Ahn et al. (2007)
Tailored information (α = 0.86)	The [device] allows me to interact with it to receive tailored information. The [device] has interactive features, which help me accomplish my shopping task. I can interact with the [device] in order to get information tailored to my specific needs.	Adapted from Loiacono et al. (2007)
Trust (α = 0.89)	I feel safe in my online shopping transactions with the [device]. I trust that my personal information is secure when shopping online with the [device]. I trust that my payment data will not be misused through the use of the [device].	Adapted from Loiacono et al. (2007)
Response time (α = 0.80)	The [device] provides a fast Internet connection. Online content loads quickly to the [device]. When using the [device], long loading times must be expected. (R)	Adapted from Loiacono et al. (2007)
Availability (α = 0.77)	The [device] allows me to access the Internet from anywhere. The [device] is always available. The [device] provides me with fast access to Internet offerings.	Adapted from Parasuraman et al. (2005)
Ease of understanding (α = 0.93)	Images displayed on the [device] are clearly visible. Text displayed on the [device] is easy to read. It is easy to get used to how the [device] displays content.	Adapted from Loiacono et al. (2007)
Intuitive operations (α = 0.88)	Learning to operate the [device] is easy for me. It would be easy for me to become skillful at using the [device]. I find the [device] easy to use.	Adapted from Loiacono et al. (2007)
Visual appeal (α = 0.93)	The display format of the [device] is visually pleasing. The [device] displays visually pleasing content. The [device] presents content in a visually appealing manner.	Adapted from Loiacono et al. (2007)
Innovativeness (α = 0.90)	The [device] is innovative. The display use of the [device] is innovative. The possibilities for using the [device] are creative.	Adapted from Loiacono et al. (2007)
Emotional appeal (α = 0.85)	I feel happy when I use the [device]. I feel cheerful when I use the [device]. I feel sociable when I use the [device].	Adapted from Loiacono et al. (2007)
Online completeness (α = 0.93)	The [device] allows transactions online. The complete purchase process can be completed via the [device]. Online shopping can be completed via the [device].	Adapted from Loiacono et al. (2007)
Relative advantage (α = 0.85)	It is easier to use the [device] to complete my online purchases than it is to telephone, fax, or mail a retailer. The [device] is easier to use than calling a sales assistant on the phone. The [device] is an alternative to calling customer service or sales.	Adapted from Loiacono et al. (2007)

Note: Items were measured on a seven-point Likert scale: (1) = does not apply at all; (7) = applies completely; [device] is a proxy and was replaced in the online questionnaire by a device type (see Table 1) that respondents already used to shop online. (R) = reverse coded.

Appendix B. Measurement scales of study 2

Variable	Items	Source
Usefulness (α = 0.84)	I would find this touchpoint useful to shop online. Using this touchpoint enhances my online shopping effectiveness. Using this touchpoint improves my online shopping performance.	Adapted from Bhattacherjee (2001)
Ease of use (α = 0.89)	My interaction with this touchpoint is understandable. I find this touchpoint easy to use. Learning to operate this touchpoint will be easy for me.	Adapted from Davis (1989)
Enjoyment (α = 0.89)	It is fun to use this touchpoint to shop online. Using this touchpoint to shop online is enjoyable.	Adapted from Venkatesh (2000)
Privacy (α = 0.89)	I feel like my privacy is protected at this touchpoint. I feel safe in my transactions with this touchpoint.	Adapted from Ha and Stoel (2008)
Satisfaction (α = 0.90)	Overall, I am very satisfied using this touchpoint to shop online. Using this touchpoint to shop online would meet my expectations. This touchpoint equates to an ideal online shopping experience.	Adapted from Homburg et al. (2005)
Usage intention (α = 0.84)	I intend to continue using this touchpoint to shop online. My intentions are to continue using this touchpoint rather than use any alternative means to shop online. I intend to continue using this touchpoint rather than discontinue its use.	Adapted from Bhattacherjee (2001)

Note: Items were measured on a seven-point Likert scale: (1) = does not apply at all; (7) = applies completely.

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