The Impact of Risk Perceptions on the Attitude toward Multi-Channel Technologies

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The Impact of Risk Perceptions on the Attitude toward Multi-Channel Technologies

Several studies show that retailers experience favorable outcomes if consumers use multiple channels. Thus, retailers aim to encourage consumers to do so in a convenient way by offering multi-channel technologies (MCTs). However, not much is known about what affects a positive attitude toward such technologies. Our study investigates how different risk perceptions influence the attitude toward specific MCTs in comparison (check and reserve, click and collect, availability check). Moreover, we examine whether the customer's general purchase channel preference moderates these effects. Results show that three risk dimensions have significant impacts on the attitude toward MCTs. These effects are generally worst for click and collect, as the negative effects (product quality and data risk) are highest, while the positive effect (product availability risk) is lowest, compared to the other two MCTs. Additionally, we generally find that the more a customer prefers buying via the online channel, the weaker the effects of the risk dimensions on the attitude are. Our findings provide implications on how to improve consumers' attitudes toward the selected MCTs by influencing their perceptions of different risk dimensions.

Keywords: Multi-channel; Omni-channel; Channel integration; Multi-channel technologies; Perceived risk

Introduction

Along with the growing importance of e-commerce, more and more retailers are adding new retail channels and becoming multi-channel retailers in order to fulfill the rising expectations of consumers (Arora and Sahney 2017). During recent years, it is not simply the addition of channels that has become an essential topic in practice and research, but beyond, the integration of channels is also becoming increasingly crucial for retailers to stay competitive, leading to omni-channel retailing (Chatterjee 2010; Frasquet and Miquel 2017; Gallino and Moreno 2014). Verhoef, Kannan and Inman (2015, 176) define omni-channel retailing as 'the synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance over channels is optimized'. Thus, through integration, omni-channel retailing offers consumers a seamless shopping experience across all the available channels of a retailer (Brynjolfsson, Hu, and Rahman 2013; Verhoef, Kannan, and Inman 2015). Hence, with integrated channels, consumers are free to use a channel of their choice for researching and buying products (Kim, Park, and Lee 2017) and can easily switch between the channels during the whole purchase process (Chatterjee 2010). A number of studies have shown that retailers experience favorable outcomes if consumers use multiple channels, such as positive effects on perceived service quality (Herhausen et al. 2015), image (Schramm-Klein et al. 2011), trust (Schramm-Klein et al. 2011; Zhang et al. 2018), satisfaction (Frasquet and Miquel 2017; Shuqing at al. 2017; Zhang et al. 2018), willingness to pay (Herhausen et al. 2015), sales growth (Cao and Li 2015) and customer retention and loyalty (Bendoly et al. 2005; Frasquet and Miquel 2017; Lee and Kim 2010; Li et al. 2018; Schramm-Klein et al. 2011). Therefore, retailers aim to encourage consumers to do so in a convenient way by offering multi-channel technologies (MCTs). We generally define such MCTs as technologies that intend to integrate the online and offline chan-

nels of multi-channel retailers and aim to create a seamless buying experience for the customer. Thus, they provide 'opportunities for transactions associated with the other channel' (Bendoly et al. 2005, 317).

Depending on the direction of channel integration, researchers distinguish between different general types of MCTs, such as web-to-store technologies, supporting online-offline integration, and store-to-web technologies, enhancing offline-online integration (Picot-Coupey, Huré, and Piveteau 2016). As brick and mortar retailers increasingly face decreasing sales growth due to a general shift of purchases toward online retailing (PwC 2016), our study focuses on web-to-store technologies as a way to re-increase traffic in a retailer's offline store (Gallino and Moreno 2014; Hübner, Holzapfel, and Kuhn 2016; Mahar and Wright 2017). With online-offline integration, employees have the opportunity to cross- or up-sell products, when customers pick up products at the store, which they have searched for or already ordered online (Gallino and Moreno 2014; Ma, Su, and Oh 2014). Consequently, retailers can achieve a higher sales volume and additionally they can save packaging and shipping costs (Gallino and Moreno 2014; Gao and Su 2017; Mahar et al. 2014), making it worthwhile to consider factors that potentially influence a consumer's attitude toward the selected MCTs.

However, research on online-offline integration and especially on corresponding MCTs is sparse (Herhausen et al. 2015; Jin, Li, and Cheng 2018; Kim, Park, and Lee 2017; Ma, Su, and Oh 2014; Mahar and Wright 2017). Only a limited number of previous studies examine these topics (e.g., Bendoly et al. 2005; Cao and Li 2015; Chatterjee 2010; Gallino and Moreno 2014; Gao and Su 2017; Herhausen et al. 2015; Kim, Park, and Lee 2017). These studies mainly focus on click and collect, i.e. buying a product online and pick it up at a local store (Chatterjee 2010; Gallino and Moreno 2014; Gao and Su 2017; Kim, Park, and Lee 2017; Ma, Su, and Oh 2014), as this MCT is regarded as the most important and popular one

in the context of online-offline integration (Forrester 2014; Jin, Li, and Cheng 2018). However, the use of several channels can also be encouraged by other MCTs, such as check and reserve, i.e. reserve a product online and purchase and pick it up at the store (e.g., Hübner, Holzapfel, and Kuhn 2016; Jin, Li, and Cheng 2018), or the option of checking in-store product availability online (e.g., Bendoly et al. 2005; Gallino and Moreno 2014; Herhausen et al. 2015). These three MCTs are similar, but have different individual characteristics. Thus, we separately analyze factors that potentially influence customers' attitude toward these MCTs, defined as the positive or negative evaluation of MCTs (Ajzen 1991).

Existing literature states that certain risks experienced during shopping affect the customer's shopping behavior (Park and Jun 2003). In the context of MCTs, data and payment risks may negatively influence the attitude toward technologies, where customers have to reveal their personal and payment data online (e.g., click and collect). Product quality risks may result in a more positive attitude toward technologies allowing customers to check products physically before buying them (e.g., check and reserve). Product availability risks may positively influence attitudes toward technologies, where customers buy or reserve the product in the online channel. These risks may also increase the usefulness of availability checks and thus enhance the attitude toward this MCT. However, there is no empirical study on how different risk perceptions of consumers influence the evaluation of the selected MCTs. Addressing this research gap, the objective of our study is to examine the impact of the mentioned risk dimensions on the attitude toward MCTs.

Customers also exhibit different habits in terms of internet usage for purchasing. Therefore, we cannot expect the selected MCTs to be evaluated the same by all kinds of customers, as they may deal with risk perceptions differently depending on their channel preference in the context of purchasing. In order to consider this aspect in our study, but at the same time keep the focus on the main effects of the consumers' risk perceptions, we analyze this

moderation effect in a general and aggregated way. Thus, we address the following research questions:

- How do different risk perceptions influence consumers' attitudes toward specific MCTs (availability check, check and reserve, click and collect)?
- How do these effects differ between the particular MCTs?
- Does the customer's general channel preference moderate these effects?

In answering these questions, we shed light on the so far entirely neglected research field of factors that influence the evaluation of MCTs. Existing research on channel integration mainly focuses on the outcomes of channel integration (e.g., Frasquet and Miquel 2017; Herhausen et al. 2015; Li et al. 2018; Shuqing et al. 2017; Zhang et al. 2018). Single studies analyze outcomes of particular MCTs (e.g., Gallino and Moreno 2014) or factors influencing the usage intention for specific MCTs (e.g., Chatterjee 2010; Kim, Park, and Lee 2017). However, to our knowledge, no prior study examines factors influencing the attitude toward different MCTs in a comparative study.

A second research stream analyzes perceived shopping risks related to purchases in either the offline (e.g., Dowling and Staelin 1994; Roselius 1971) or online channel (e.g., Arora and Kaur 2018; Katta and Patro 2017). A few studies examine the impact of the provision of MCTs on consumers' risk perceptions (Gallino and Moreno 2014; Gao and Su 2017) and the influence of consumers' general perceived online risk on the intention to use click and collect (Kim, Park, and Lee 2017). However, our study is among the first studies that investigate the impact of different specific risk perceptions on technologies integrating the offline and online channel.

This study has also high practical relevance, as many retailers offer MCTs, but are not aware of what impacts customers' attitudes toward them. This study, therefore, delivers important implications by which a retailer's marketing strategy can be aligned, as findings reveal which aspects of perceived risks retailers have to pay attention to when implementing and designing the particular MCTs in order to improve consumers' attitudes toward each of them. By analyzing the moderating role of the customers' general channel preferences, we additionally examine for which customer groups the impact of risk dimensions can be particularly important. With this knowledge, retailers can address customers' potential risk perceptions tailored to the target group's specific requirements.

Literature Review and Research Hypotheses

Perceived Risk

The existing literature offers several approaches to the understanding of risk. For the present study, we make use of the often-cited risk definition by Bauer (1960), which maintains that risk involves the consequences of a consumer's behavior that he/she considers as negative and that he/she cannot foresee with certainty. We focus here on the risk that a consumer subjectively perceives, referred to as perceived risk (Mitchell 1999).

In the context of buying situations, risk refers to the shopping risk during a purchase decision. Past research distinguished risk dimensions, which relate to different aspects of loss (Dowling 1986). The most prevalent distinctions include functional or performance risk, financial, physical, psychological, social and time or convenience risk (e.g., Bearden and Mason 1978; Festervand, Snyder, and Tsalikis 1986; Dowling and Staelin 1994; Gemünden 1985; Peter and Ryan 1976; Pi and Sangruang 2011; Roselius 1971; Stone and Mason 1995). Forsythe and Shi (2003) mention product performance, financial, psychological and time or convenience risk as the most important risk dimensions in the context of online retailing.

Thakur and Srivastava (2015) refer to these risks as performance, security, privacy and time risk. As the online channel is an essential part of MCTs, we focus on analyzing the influence of these four risk dimensions.

In our study, we evaluate risks in the specific purchase context involving the use of the selected MCTs. Therefore, we derive context-sensitive risk dimensions from the previously mentioned general purchase risk dimensions. Functional or performance risk generally refers to the risk that a product does not have the expected or desired characteristics, functions or performance (Horton 1976; Huang, Schrank, and Dubinsky 2004; Pi and Sangruang 2011). In the context of MCTs, product quality risk reflects the functional risk dimension, as product quality often involves the risk of not meeting the customer's initial expectations when buying a product via the online channel (Pi and Sangruang 2011).

There is a general time or convenience risk if a customer is uncertain about the (temporal) effort, which is connected with the purchase or use of the product or a possibly necessary reparation or replacement (Derbaix 1983; Pi and Sangruang 2011; Roselius 1971; Stone and Mason 1995). Regarding the context of MCTs, this risk dimension can be transferred to product availability risk, meaning the risk that the product is not available at the retailer's offline store (Gallino and Moreno 2014). Thereby, we in particular address the risk that consumers have to pay time and effort visiting other stores to check if the product is available elsewhere, if the desired product is not in stock when they want to buy it in their selected store (Bendoly et al. 2005).

Regarding the general purchase risks, financial risk refers to a customer‘s perceived uncertainty about financial losses resulting from a purchase (Derbaix 1983; Horton 1976; Huang, Schrank, and Dubinsky 2004; Roselius 1971; Stone and Mason 1995). Besides the functional risk dimension, the literature regards financial risk as one of the most relevant risk dimensions in multi-channel contexts, as it constitutes a major hurdle in online retailing

(Aladwani 2001; Liebermann and Stashevsky 2002; Miyazaki and Fernandez 2001; Yang and Jun 2002; Zhao et al. 2008). Thakur and Srivastava (2015) also refer to financial risk as security risk, regarding the security of payment data. Despite the meanwhile fairly long existing opportunity of online payments, many customers still fear that their payment data is not secure in the context of online purchases and can be stolen or misemployed (Miyazaki and Fernandez 2001; Sreya and Raveendran 2016; Swinyard and Smith 2003), leading to a possible loss of money (Bhatnagar, Misra, and Rao 2000; Thakur and Srivastava 2015). Therefore, we refer to financial risk as payment data risk.

Generally, there is a psychological risk if consumers are not sure whether the product really fits their personality or self-image or if they fear they will feel uncomfortable with it (Dowling and Staelin 1994; Horton 1976; Huang, Schrank, and Dubinsky 2004; Peter and Tarpey 1975; Stone and Mason 1995). This risk dimension can be transferred to personal data risk, when using MCTs, as customers may experience disappointment, frustration or shame, if the entered personal data is revealed to an unauthorized person and thus their privacy is violated (Forsythe and Shi 2003; Pi and Sangruang 2011). Thereby, personal data refers to the consumer's privacy in terms of e.g. name, address, contact data or data with regard to the consumer's online usage behavior or habits (Thakur and Srivastava 2015).

Influence of Perceived Risk on the Attitude toward the MCTs

According to the theory of perceived risk, grounding on Bauer (1960), perceived purchase risk can affect a consumer's behavior. As behavior is normally prevailed by the attitude toward it (Fishbein and Ajzen 1975; Wang et al. 2016), we assume that purchase risk also influences the attitude toward MCTs. Several studies show that the inclusion of the online channel increases perceived shopping risk and that this shopping risk can involve specific additional risks, e.g. concerning data protection (Katta and Patro 2017). Thus, risk plays a major role in

online and thus also in multi-channel shopping contexts (see, e.g., Bezes 2016; Doolin et al. 2005; Forsythe and Shi 2003; Kuhlmeier and Knight 2005; McCole, Ramsey, and Williams 2010; Thakur and Srivastava 2015; Wang et al. 2016). As McKnight, Choudhury, and Kacmar (2002a) or Miyazaki and Fernandez (2001) point out, the usage of the online channel in the context of shopping can be constrained by perceived purchase risks. Several studies support this and show a negative relationship between perceived shopping risk or particular risk dimensions and the consumer's attitude, usage intention or actual usage of the online channel (e.g., Bianchi and Andrews 2012; Boyle and Ruppel 2006; Coker, Ashill, and Hope 2011; Chang and Wu 2012; Forsythe and Shi 2003; Herhausen et al. 2015; Manzano et al. 2009; Miyazaki and Fernandez 2001; Montoya-Weiss, Voss, and Grewal 2003; Pi and Sangruang 2011; Thakur and Srivastava 2015; Wang et al. 2016; Wu and Ke 2015). Building on the enormous amount of literature regarding the impact of risk perceptions on online shopping, we assume that the already mentioned risk dimensions also affect the attitude toward the selected MCTs, as these MCTs inevitably involve the usage of the online channel.

Product Quality Risk

Especially in an online purchase context, the risk of not meeting the consumer's expectations is problematic due to the lacking opportunity for the consumer to touch, feel or try the desired product before buying it (Forsythe and Shi 2003; Sreya and Raveendran 2016). This is one of the most important shortcomings of the online channel (Thakur and Srivastava 2015), as consumers can only receive hints on product quality by pictures, descriptions or sometimes videos, which cannot replace a real product inspection concerning product quality (Shim and Lee 2011). Thus, consumers are unable to evaluate the product exactly and carefully prior to the purchase (Forsythe and Shi 2003; Li and Huang 2009). Consequently, customers perceive a higher quality risk when buying via the internet, compared to an offline purchase (Laroche et

al. 2005; Li and Huang 2009; Shim and Lee 2011). Drawing on the theory of perceived risk, people strive to reduce perceived risk, for example by collecting further risk-related information (Chaudhuri 2000; Cunningham, Gerlach, and Harper 2005; Dowling 1986; Dowling and Staelin 1994; Gemünden 1985; Mitchell 1992; San Martin and Camarero 2009). Principal-agent theory leads to the same conclusion: Due to asymmetric information with regard to product quality between the better-informed party (here the retailer) and the less-informed party (here the customer), the latter will perceive higher risk (San Martin and Camarero 2009). Therefore, the consumer will try to equalize the informational asymmetry by gathering information. By using the online channel during the product research stage, the consumer can obtain detailed information about the product, but cannot receive the relevant haptic information, avoiding a comprehensive impression of the product quality (Forsythe and Shi 2003). As he/she prefers to have all possible information and thus a minimal level of uncertainty, according to the assumptions of the theory of perceived risk and principal-agent theory, we expect product quality risk to have a negative effect on the attitude toward click and collect, because the customer purchases the product solely based on the information gathered online. Conversely, product quality risks may result in a positive attitude toward technologies allowing customers to obtain detailed information online and additionally check products physically before buying them, which is the case with the availability check and check and reserve. Thus, we conclude:

H1: The higher the perceived product quality risk, a) the more negative the attitude toward click and collect and the more positive the attitude toward b) the availability check and c) check and reserve.

Product Availability Risk

According to the theory of perceived risk, we assume that a high perceived product availability risk will positively affect the consumers' attitudes toward the chosen MCTs, as these MCTs can decrease this risk (Bendoly et al. 2005; Gallino and Moreno 2014). Thereby, product availability risk may influence attitudes toward technologies more positively, the higher the probability that the product is really available (see Su and Zhang 2009). Consequently, the attitude will be most positive for click and collect, as the customer already owns the product when visiting the store (Gallino and Moreno 2014). With check and reserve, the probability of product availability is still high, as the retailer should have reserved the product for the consumer. Thus, product availability risk should affect the attitude positively. Although the availability is not as certain as with the other two MCTs, availability risk may also increase the usefulness of availability checks and thus increase the attitude toward this MCT. Consequently, we derive:

H2: The higher the perceived product availability risk, the more positive the attitude toward a) the availability check, b) check and reserve and c) click and collect. d) This effect is strongest for click and collect, followed by check and reserve and the availability check.

Payment Data Risk

Following the theory of perceived risk, customers who perceive a high payment data risk may search online, but will avoid purchasing via the internet to decrease this risk (Frasquet, Mollá, and Ruiz 2015). Referring to the selected MCTs, perceived payment data risk will have a negative effect on click and collect, as the purchase occurs online, forcing the customer to enter payment data on the internet. Conversely, with check and reserve and the availability check, consumers can benefit from the internet channel without having to be concerned about their payment data, as they purchase offline. Therefore, we hypothesize:

H3: a) The higher the payment data risk, the more negative the attitude toward click and collect. Payment data risk has no effect on the attitude toward b) check and reserve and c) the availability check.

Personal Data Risk

The customer's lacking control of unauthorized access to personal data and the resulting perceived risk deters many customers from revealing their data in online processes (Hoffmann, Novak, and Peralta 1999). Hence, personal data risk may negatively influence the attitude toward technologies, where customers have to reveal their personal data online, which is the case for all three MCTs. Thereby, we expect a clear order: As the customer has to reveal most data for click and collect, we assume the negative impact to be strongest for this MCT. This is supposed to be followed by check and reserve, where the consumer still has to enter data actively. For the availability check, consumers do not have to enter any personal data. However, consumers can perceive personal data risk, as retailers may track their product preferences and search behavior. Thus, we conclude:

H4: The higher the personal data risk, the more negative the attitude toward a) the availability check, b) check and reserve and c) click and collect. d) This effect is strongest for click and collect, followed by check and reserve and the availability check.

Moderating Role of Channel Preference

Beyond these basic relationships, we analyze the moderating role of channel preference, i.e., to what extent a consumer generally prefers to buy via the online or the offline channel. This preference may significantly influence the consumer's familiarity with the online channel and associated risks. As this study primarily focuses on the main effects of the four risk dimensions on the attitude toward the MCTs, we examine this moderation effect in an aggregated

way.

Generally, customers should perceive less risk when buying via the internet the more they prefer and use this channel for their purchases (Ko et al. 2004; Montoya-Weiss, Voss, and Grewal 2003). Thereby, the inherent risk of the online channel, which is in general latently inherent in a certain product class or here a channel (Bettman 1973), should be the same for all customers. However, the individually handled risk, i. e. the risk that the selection of a specific product or here channel factually elicits in the customer (Bettman 1973), presumably differs depending on the channel preference, leading to different effects of risk on the attitude toward the MCTs.

As mentioned previously, one of the main problems in online purchasing is the limited opportunity of accurately evaluating product quality because of missing haptic information. However, we assume that this is less problematic, the more a consumer generally prefers the online channel for purchasing, as here, the quality risk may be perceived as lower and/or handled better due to the customer's habituation toward it (Doolin et al. 2005; Kuhlmeier and Knight 2005). The more this applies to a consumer, the more the online channel's advantages will prevail to him, leading to a mitigation of the negative influence of product quality risk on click and collect. Analogously, the positive effect of quality risk on the other two MCTs also becomes weaker the more customers prefer the online channel, as the physical product inspection prior to the purchase is less important for these customers. The same argumentation is applicable for the moderation of the impact of payment and personal data risks. Thus, we assume that customers can better handle the perceived payment and personal data risk the more they prefer the online channel for purchasing, as they are more accustomed to these risks. Besides, if they continuously prefer the online channel for purchasing, they presumably have made good experiences concerning the revealing of their data, which further lessens the negative impact of data risk perceptions on the attitude toward the MCTs (see also Doolin et al.

2005). Regarding product availability risk, we argue that the positive effect is stronger the more a customer prefers the offline channel, as offline customers face a greater loss of time or extension of effort if the product is not available, because they have to visit other physical stores (Su and Zhang 2009). Customers, using the online channel, can simply switch to an alternative provider by one click and buy the product on another website. Consumers in the offline channel have a much higher effort to visit another retailer and, in some cases, cannot purchase the product at all, as no reachable physical store has it in stock. Thus, the MCTs provide a greater value for these customers. Therefore, availability risk has a more positive impact on the attitude toward the MCTs the more customers usually prefer the offline channel for shopping and the less they prefer the online channel.

Overall, the moderating effect of a consumer's general channel preference shows the same presumed effect for the impacts of all the risk dimensions. Therefore, we hypothesize:

H5: The more a customer generally prefers to purchase via the online channel, the weaker the effects of the risk dimensions on the attitude toward the selected MCTs.

Research Model

The following research model summarizes the previously developed hypotheses (Figure 1).

[Figure 1 near here]

Empirical Study

Data Collection and Sample

To test our hypotheses, we analyzed our framework by conducting an online survey. In the questionnaire, we first asked respondents about their general channel preference for buying products. Subsequently, we measured personal characteristics (innovativeness and time pres-

sure) as control variables. Afterwards, each of the three MCTs was explained briefly to the respondents before measuring their attitudes. Then, we asked about their subjective risk perceptions regarding the four risk dimensions. Lastly, we measured demographics. Respondents had to answer most of the questions with reference either to electronics or to clothing in order to additionally control for the product class.

We pretested the questionnaire with eight respondents and made minor adjustments. Subsequently, during a five-week period between October and November 2017, students collected the data in Germany by distributing an online link via social media or private communication. Additionally, they surveyed test persons without internet access face-to-face and completed the questionnaire for them. The online survey yielded 1110 valid questionnaires. The respondents well represent the population in terms of age and gender quotas. The average age is about 44 years and the gender distribution is balanced (51.6% male, 48.4% female). 551 respondents answered the questions with reference to electronics, 559 with regard to clothing.

Measures

We mostly used items from the literature to measure constructs. The four risk dimensions were measured using seven-point Likert scales ranging from totally disagree to totally agree. All these scales contained three items, except the scale for the availability risk, which consisted of four items. The items for the two data risk dimensions were based on McKnight, Choudhury, and Kacmar (2002b) and Toufaily, Souiden, and Ladhari (2013). Product quality risk was measured by items similar to Forsythe and Shi (2003) and Verhoef, Neslin, and Vroomen (2007). Since, to the best of our knowledge, no adequate items for the availability risk exist in the literature, we created own items. We therefore asked experts to evaluate sev-

eral possible items regarding their suitability for the desired scale, resulting in four items. Attitude was measured with a semantic differential seven-point scale, ranging between -3 and +3, and involving three items taken from Gardner (1985). For the measurement of general channel preference, we used our own seven-point single-item semantic differential scale ranging from in the store to via the internet. The scale for innovativeness is based on Goldsmith and Hofacker (1991), Konus, Verhoef, and Neslin (2008) and Königstorfer and Gröppel-Klein (2012), and the scale for time pressure is taken from Konus, Verhoef, and Neslin (2008). Each scale consists of three items and had to be answered on a seven-point Likert scale ranging from totally disagree to totally agree. All items are listed in the appendix.

Method

For data analysis, we used IBM's statistical software SPSS. We first conducted a factor analysis with varimax rotation to assess the discriminant validity of the four risk dimensions. Subsequently, we mean-centered variables in order to employ moderated multiple regression for testing the hypotheses (Cohen et al. 2003). Moderated multiple regressions were conducted for each MCT separately.

Results

Reliability of Scales and Factor Analysis

We first checked reliability to evaluate the internal consistency of the scales. Cronbach's alpha exceeded the critical value of 0.7 for all constructs, indicating an adequate reliability (Loewenthal 2001; see appendix for detailed values). We then conducted a factor analysis for the four risk dimensions. The analysis resulted in three factors with eigenvalues larger than one. Thereby, results indicate that respondents only differentiate between three risk dimensions, as all six items of the two data risk dimensions show loadings near 0.7 or larger for the

first factor. The second factor loads highly on the four items measuring the availability risk and the third factor loads on the three product quality risk items. Exact values of factor loadings can be found in the appendix. As this analysis did not clearly separate personal data and payment data risk, we merged these two risk dimensions for subsequent analyses. The alpha value of this new data risk construct is also larger than 0.7. For the subsequent moderated multiple regressions, we calculated sum scores for the construct variables.

Testing of Hypotheses

Impact of the Risk Dimensions on Attitude

For product quality risk, we find a negative impact on the attitude toward two of the three MCTs. In particular, the negative effect is strongest for click and collect (ß=-.161, p=.000), but also significantly negative for the inventory availability check (ß=-.078, p=.015). Product quality risk has no impact on the attitude toward check and reserve. Thus, results support H1a, while we have to reject H1b and c. Conversely, availability risk has a significant positive effect on the attitude toward all three MCTs. This impact is strongest for the availability check (ß=.162, p=.000), followed by check and reserve (ß=.156, p=.000) and click and collect (ß=.092, p=.002). Therefore, H2a, b and c find support. We have to reject H2d, because the order concerning the strength of the positive impact on the single MCTs shows the opposite effect of what we expected. Data risk only negatively influences the attitude toward click and collect (ß=-.131, p=.000). We cannot test H3 and H4 separately, but their combined risk dimensions show the hypothesized effects for click and collect, supporting H3a and H4c. The same applies to H3b and c, as there is no significant effect of data risk on check and reserve and the availability check. This means at the same time that we have to reject H4a and b, which assumed a significant negative effect. Regarding H4d, the tendency of the order concerning the strength of the negative impact of data risk on the individual MCTs is as expected,

but due to the non-significant effect on check and reserve and the availability check, we have to reject H4d.

Moderating Effect of Channel Preference

The results predominantly reveal a significant moderating effect of the consumer's general channel preference on the relationships between the product availability and data risk dimensions and the attitude toward the MCTs. In both cases, the relationship between risk and attitude generally becomes weaker the stronger a customer prefers purchasing via the online channel. For availability risk, this effect is strongest for check and reserve (ß=-.111, p=.000), followed by the availability check (ß=-.079, p=.005) and click and collect (ß=-.075, p=.008). Regarding data risk, the moderation effect is also strongest for check and reserve (ß=.117, p=.000), followed by the availability check (ß=.101, p=.001). For the attitude toward click and collect, the general channel preference has no significant effect on the impact of data risk. The same applies to the influence of product quality risk on the attitude in all cases. Thus, for the availability risk, we can fully support H5. Regarding data risk, we also find support for H5, except for the impact of data risk on the attitude toward click and collect. However, due to the missing significance in the moderation of the relationships between product quality risk and the attitude, we have to reject H5 for this risk dimension regarding all three MCTs.

Table 1 summarizes the standardized beta coefficients with the corresponding significance levels, the testing results of the hypotheses and the adjusted R-squared values for the three regression models.

[Table 1 near here]

Additional Analyses

After testing hypotheses, we present some additional analyses that provide further insight.

Generally, the attitude toward the MCTs is most positive for the availability check (M=1.194, SD=1.661 on a scale ranging between -3 and +3), followed by check and reserve (M=0.883, SD=1.712) and click and collect (M=-0.032, SD=1.776), as shown in Figure 2.

[Figure 2 near here]

We further found significant effects of channel preference on the attitude toward the MCTs, with the strongest effect for availability check (ß=.143, p=.000), followed by check and reserve (ß=.116, p=.001) and click and collect (ß=.074, p=.025). Thus, the more a customer prefers the online channel for purchasing, the more positive is his/her attitude toward the MCTs. Furthermore, we controlled for the product category. Results indicate that the attitude toward the MCTs is significantly more positive for electronics than for clothing in all cases (all $p<.01$). Furthermore, we find a significant positive impact of innovativeness and time pressure (all $p<.01$) on the attitude toward each MCT, except for the effect of time pressure on the attitude toward click and collect, which is not significant.

Discussion

As only very limited research has investigated MCTs, our study is among the first to uncover the effects of particular perceived risk dimensions on the attitude toward specific MCTs. Thereby, the results reveal that risks significantly influence the attitude toward the chosen MCTs and thus play an important role in the formation of a positive attitude. First, the study shows that consumers do not discriminate between payment and personal data risk. Consequently, these risk dimensions need to be considered as one dimension concerning customer data in general.

Second, predominantly in line with our expectations, all remaining three risk dimensions have significant impacts on the attitude toward the MCTs. Thereby, product qual-

ity risk and data risk exert negative effects, while product availability risk positively influences the attitude. Thus, these results reveal that certain risk perceptions may deteriorate the attitude toward the MCTs, while others have a potential to improve them. Therefore, not all risk perceptions are negative regarding their effect on the attitude toward MCTs.

Third, the analyses show differences in the impact of the risk dimensions on the attitude between the three selected MCTs. Generally, the effects of the risk dimensions are worst for click and collect, because the negative effects (product quality and data risk) are highest, while the positive effect (product availability risk) is lowest, compared to the other two MCTs. Regarding the impact of product quality risk, we find a negative effect of quality risk on the availability check attitude and no significant impact on the attitude toward check and reserve. This confutation of the expected positive influence may occur because even though the consumer does not actually buy the product on the internet, he or she at least choses a particular product online when using these two MCTs. Thus, the physical inspection of the product is not possible in the product selection process, preventing a positive effect of product quality risk on the availability check and check and reserve. Regarding the impact of product availability risk, the order concerning the strength of the impact on the individual MCTs shows exactly the opposite of what we expected (i.e. we observed the strongest effect for the availability check and the smallest effect for click and collect). A possible explanation could be that the fact that the customer has already purchased the product mitigates the positive impact of product availability risk on the attitude toward click and collect. Hence, on the one hand, it may be indeed more assured that the product will be available when the customer wants to pick it up, but on the other hand, the consumer would feel worse if the product was not available when he/she has already paid for it. Thus, the impact of product availability risk is less positive for click and collect, while it is nearly equally positive for the other two risk dimensions.

Fourth, we find a moderating effect of a consumer's general channel preference on the relationships between product availability and data risks and the attitude toward the MCTs. Results reveal that the more a customer prefers buying via the online channel, the weaker the effects of the risk dimensions on the attitude are. As this does not apply to product quality risk, this emphasizes the great importance of especially considering this risk dimension, because it has an equally negative impact for all kinds of customers and cannot be mitigated by a frequent usage or preference of the online channel. A possible explanation for this result is that it is most difficult for a consumer to get used to product quality risk or benefit from positive previous experiences, because in each purchase the consumer has to evaluate a completely new product with individual characteristics. Consequently, the assessment does not become easier with the experience of having evaluated other products previously. Thus, a habituation effect can only occur to a very limited degree compared to e.g. data risk, where the revealing of data is always nearly the same and thus customers develop more trust the more often they use the online channel and disclose their data (Doolin et al. 2005). Moreover, only for the relationship between data risk and the attitude toward click and collect there is no moderating effect of channel preference, which can be explained by the fact that for this technology consumers have to reveal the greatest quantity of and the most sensitive data, causing a negative effect on the attitude, independently of the channel preference.

Fifth, descriptive results reveal that consumers have the most negative attitude toward click and collect, while they evaluate the online availability check most positively. This is remarkable, as many retailers regard click and collect as the most important omni-channel technology (Forrester 2014; Kim, Park, and Lee 2017) and Ma, Su and Oh (2014) state that it is among the most popular MCTs offered by multi-channel retailers (see also Hübner, Wollenburg, and Holzapfel 2016; Jin, Li, and Cheng 2018). A possible explanation for this result is

that click and collect is less familiar to the test persons and less used than e.g. the online availability check (Accenture 2012). This may lead to a more negative attitude, as people often evaluate things they do not know well worse than things they are familiar with (Zajonc 1968).

Sixth, additional analyses also show significant main effects of channel preference on the attitude toward the particular MCTs, insofar as customers evaluate all chosen MCTs more positive the more they prefer the online channel for purchasing. As consumers, who prefer the online channel probably value its benefits more than customers who rather buy offline, it is likely that this positive evaluation of the internet may also be transferred to the online elements of the chosen MCTs.

Seventh, we find that the attitude toward the MCTs is generally more positive for electronics than for clothing. This can be explained by the individual characteristics of these two product categories. Electronics are search goods, i.e. consumers can evaluate their quality appropriately prior to the purchase, without the need of a physical inspection of the product. Thus, for electronics, the selected MCTs can generate a benefit for consumers as they enable more convenience and freedom of choice concerning how to purchase the product, without evoking a greater risk independent of the purchase channel. Clothing ranks among search goods, as well, when purchased in the store. However, when offered online, clothing becomes an experience good, i.e. customers can only evaluate its quality, e.g. the real color or haptic aspects, properly after the purchase (see also Frasquet, Mollá, and Ruiz 2015). Thus, for clothing, consumers presumably evaluate the MCTs not as useful as for electronics, because they rather decide for a certain product offline, where they can involve haptic information in their decision (see also Gehrt and Yan 2004).

Management Implications

Generally, multi-channel retailers should try to improve consumers' attitudes toward the selected MCTs by considering the outlined impacts of the different risk dimensions and by influencing the consumers' risk perceptions accordingly. First, as quality risk exerts a significant negative impact on the availability check and click and collect, it is crucial for retailers to reduce this risk perception, e.g. by providing as realistic pictures as possible, additional product videos, opportunities of virtual fitting or realistic customer reviews. As the consumer's channel preference does not moderate these effects, a reduction of the perceived quality risk is equally important for all customer groups. Conversely, multi-channel retailers can use availability risk as an opportunity to ensure a more positive attitude toward their MCTs, especially if consumers rather prefer the offline channel for purchasing. Therefore, for example, retailers should advertise the opportunity to check in-store product availability via the internet in their store or recommend the MCTs especially to offline consumers who cannot buy their preferred product because it is out of stock.

Second, as data risk perceptions have negative impacts on the attitude toward click and collect, retailers should assure their customers that they protect their data well, when they offer this technology. Therefore, they could point out data security activities they undertake. Thereby, as consumers apparently do not discriminate between different kinds of data, retailers should not do so, as well. They should assure the consumer that all kinds of data are protected equally well and thereby minimize risk perceptions and ensure a more positive attitude toward the MCTs.

Third, retailers should consider that the selected risk perceptions most negatively affect click and collect, as negative influences are highest, while the positive effect is lowest for this MCT. Additionally, consumers generally have the most negative attitude toward click and collect. However, click and collect is among the most popular MCTs offered by multi-channel

retailers (Jin, Li, and Cheng; Kim, Park, and Lee 2017; Ma, Su, and Oh 2014), even though it is presumably the most expensive of the three selected MCTs due to its highest complexity. Taken together with the results of this study, it does not seem advisable for retailers to focus on click and collect that strongly or even exclusively, as besides the presumably higher costs, consumers evaluate it the worst and the examined risk dimensions most negatively affect it. Consequently, retailers should rather think about supplementing click and collect by the availability check and check and reserve or focus more on them, as here, both attitudes and the impacts of the risk dimensions are more positive, while costs may be lower. Nevertheless, as this is among the first empirical studies comparing the evaluation of the selected MCTs, further research is needed to validate the results in order to give reliable implications regarding a retailer's MCT offering, especially as this study does not take any other outcomes in consideration, which may be more positive for click and collect.

Fourth, as additional analyses reveal that consumers evaluate the selected MCTs more positive, the more they generally prefer the online channel for purchasing, retailers should promote the MCTs especially to offline customers visiting their store. Thereby, they should point out the advantages of the MCTs and actively try to minimize the consumer's perceived quality and data risks.

Theoretical Contribution

Due to the relatively sparse amount of research on MCTs, our study extends existing literature in several ways. First, our study is among the first studies that empirically investigate factors influencing the attitude toward MCTs. Existing omni-channel literature rather analyzes several outcomes of channel integration or individual MCTs (e.g., Frasquet and Miquel 2017; Gallino and Moreno 2014; Li et al. 2018; Shuqing et al. 2017; Zhang et al. 2018) or influencing factors on the intention to use particular MCTs (e.g., Chatterjee 2010; Kim, Park, and Lee

2017). Therefore, we contribute to the literature by analyzing impact factors on the attitude of MCTs. This provides further insights in how the actual usage of the selected MCTs comes off and demonstrates that researchers should consider risk perceptions when analyzing MCTs.

Second, we examine the impact of risk perceptions on three different web-to-store MCTs in comparison to each other. Prior studies focus on MCTs in general by examining overall channel integration (e.g., Herhausen et al. 2015; Shuqing et al. 2017) or solely on single MCTs, mostly click and collect, in comparison to pure online shopping (e.g., Kim, Park, and Lee 2017). Thus, the separate and comparing consideration of three particular MCTs contributes to the omni-channel literature by providing detailed information on individual technologies. Especially the consideration of check and reserve reveals new insights, as nearly no study empirically analyzed this technology so far (Jin, Li, and Cheng 2018).

Third, we provide insights in how consumers' channel preferences moderate the proposed effects of the risk dimensions. Thus, our study provides information about customer groups that researchers should especially pay attention to, when investigating consumers' risk perceptions in a multi- or omni-channel context.

Fourth, we investigate the outcomes of different specific risk perceptions not only with regard to the use of either the offline (e.g., Derbaix 1983; Dowling and Staelin 1994; Roselius 1971) or online channel (e.g., Arora and Kaur 2018; Katta and Patro 2017), but to technologies supporting their combined utilization. Hence, our study extends current research by showing that risk perceptions may have different consequences in the interplay between online and offline channels compared to a single channel perspective.

Limitations and Future Research

When interpreting the results of this study, certain limitations have to be taken into account. First, we did not conduct the study in a real purchase setting. Thus, answers cannot entirely

depict the real consumer evaluations of MCTs in such settings. Future studies should try to involve real customers and existing retailers already offering the chosen MCTs.

Second, the study focuses only on three web-to-store technologies. Consequently, conclusions can only be drawn on a limited number and kind of MCTs, which could be extended in future research, e.g. by also examining store-to-web technologies.

Third, the utilized research model does not comprehensively include all possible factors influencing the attitude toward the selected MCTs. Therefore, future studies may include additional influencing factors, because risk perceptions and their effects can differ e.g. by culture (Zhao et al. 2008) or the distance to the retailer's store (Chocarro, Cortiñas, and Villanueva 2013; Gallino, Moreno, and Stamatopoulos 2017; Jin, Li, and Cheng 2018).

Conclusion

The study has shown that product quality and data risks negatively influence the attitude toward the MCTs, while product availability risk shows a positive impact and that these effects depend on the type of technology and customers' general channel preferences. In particular, the attitude toward click and collect suffers most from data and product quality risks, while it benefits least from availability risk. Therefore, retailers should focus more on technologies that suffer less and benefit more from the risk dimensions. Furthermore, they should try to minimize quality and data risks. As results also show that product availability and data risks become more important, the more customers prefer the offline channel for purchasing, retailers should consider such risks predominantly for this segment.

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Appendix

Constructs	Items	Cronbach's alpha	Factor loadings
Product quality risk	It is difficult to judge the quality of a [product], when I can solely regard it online.		0.778
	There is a large probability that I do not get the [product] I have expected, when buying via the online channel.		0.863
	When I buy a [product] online, I am often disappointed, when I finally hold it in my hands.	0.803	0.814
Product availability risk	When I want to buy a [product] in the store, I am often disappointed, if it is not in stock.		0.726
	It is difficult to asses, whether a certain desired [product] is available in the store.		0.779
	Once in a while, I experienced that a [product] was out of stock when I wanted to buy it in the store.		0.854
	There is a high probability that a desired [product] is not available when I want to buy it in the store.	0.836	0.848
Payment data risk	I think it is risky to provide one's financial data, as credit card information, online.		0.861
	I hesitate to enter my bank connection online.		0.845
	I believe that my financial data is well protected online. (reverse)	0.820	0.703
Personal data risk	I hesitate to enter personal information like my name, address and phone number online.		0.770
	I think it is risky to provide one's personal data online.		0.846
	I believe that my personal data is well protected online. (reverse)	0.783	0.652
Attitude (for each of the particular MCTs)	Good - Bad		0.826-0.886
	Pleasant - Unpleasant		0.826-0.887
	Like - Dislike	0.960-0.965	0.825-0.876
Channel preference	In general, where do you preferably buy [products]?	-	-
Innovativeness	In general, I am among the first in my circle of friends to try new products and services.		0.851
	I always use the newest products and services.		0.830
	I like to try new and different products.	0.896	0.825
Time pressure	I am always busy.		0.832
	I usually find myself pressed for time.		0.895
	Gernerally, I have little time for shopping.	0.867	0.856

Tables

Table 1: Standardized beta coefficients and significance levels of constructs.

Construct	Availability check	Check & reserve	Click & collect	Hypotheses testing			
PQ risk	-0.078*	-0.047	-0.161***	H1a	✓	H1b,c	X
PA risk	0.162***	0.156***	0.092**	H2a,b,c	✓	H2d	X
Data risk	-0.023	-0.044	-0.131***	H3a,b,c, 4c	✓	H4a,b,d	X
Channel pref.	0.143***	0.116**	0.074*	-		-	
Channel pref. * PQ risk	-0.003	-0.002	0.022			H5	X
Channel pref. * PA risk	-0.079**	-0.111***	-0.075**	H5	✓		
Channel pref. * Data risk	0.101**	0.117***	0.047	H5 ✓ (except click & collect)			
Corr. R-squared	19.9%	19.7%	21.0%				

Note: ***= p<.001; **= p<.01; *= p<.05; ✓=hypothesis supported; X=hypothesis rejected

PQ = product quality; PA = product availability; Channel pref. = channel preference (with higher values indicating a preference for purchasing via the online channel).

Figures

Figure 1: Research model.

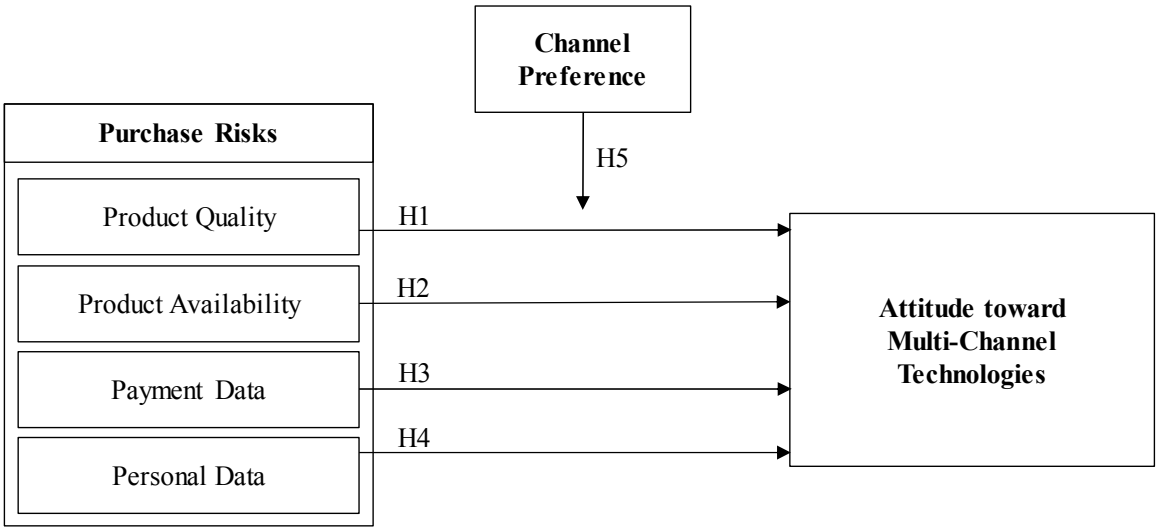

Figure 2: Mean differences of the attitude toward the MCTs.