Acceptance of Smartphone-Based Mobile Shopping: Mobile Benefits, Customer Characteristics, Perceived Risk and the Impact of Application Context

Marco Hubert
Newcastle Business School, Northumbria University
City Campus East, Newcastle upon Tyne NE1 8ST, UK

Markus Blut
Aston Business School, Marketing & Strategy Group
Aston Triangle, Birmingham B4 7ET, UK

Christian Brock
University of Rostock
Ulmenstr. 69, 18057 Rostock, Germany

Christof Backhaus*
Aston Business School, Marketing & Strategy Group
Aston Triangle, Birmingham B4 7ET, UK
c.backhaus@aston.ac.uk

Tim Eberhardt
EBC University
Grafenberger Allee 87, 40237 Düsseldorf, Germany

* Corresponding author

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Abstract

Despite their generally increasing use, the adoption of mobile shopping applications often differs across purchase contexts. In order to advance our understanding of smartphone-based mobile shopping acceptance, this study integrates and extends existing approaches from technology acceptance literature by examining two previously underexplored aspects. Firstly, the study examines the impact of different mobile and personal benefits (instant connectivity, contextual value and hedonic motivation), customer characteristics (habit) and risk facets (financial, performance, and security risk) as antecedents of mobile shopping acceptance. Secondly, it is assumed that several acceptance drivers differ in relevance subject to the perception of three mobile shopping characteristics (location sensitivity, time criticality, and extent of control), while other drivers are assumed to matter independent of the context. Based on a dataset of 410 smartphone shoppers, empirical results demonstrate that several acceptance predictors are associated with ease of use and usefulness, which in turn affect intentional and behavioral outcomes. Furthermore, the extent to which risks and benefits impact ease of use and usefulness is influenced by the three contextual characteristics. From a managerial perspective, results show which factors to consider in the development of mobile shopping applications and in which different application contexts they matter.

Keywords: smartphone-based mobile shopping, customer acceptance, technology acceptance model, risk, application characteristics

With more than a third of all e-commerce transactions in business-to-consumer industries being executed via mobile devices nowadays, consumers in most countries perform their mobile retail purchases via smartphone as opposed to tablet devices (Criteo, 2016). At the same time, smartphones are also the predominant driver of growth of mobile e-commerce (m-commerce) transactions (Criteo, 2015). Against this background, this study focuses on mobile commerce—or, more explicitly, on mobile shopping—as being conducted via smartphones. Building on existing approaches in the area of mobile shopping (Barnes, 2002), smartphone-based mobile shopping is defined as commercial transactions conducted through smartphones over a wireless telecommunication network. Smartphone-based mobile shopping offers the opportunity to purchase products and services wherever and whenever a customer wants (Balasubramanian, Peterson, & Jarvenpaa, 2002). Despite its generally increasing importance, however, mobile shopping does not seem to "take off" equally across diverse goods and services contexts (Criteo, 2015). For example, mobile shopping is quite common in service industries for purchasing tickets (e.g., public transportation), while it is less common for services such as financial products (Criteo, 2015).

Addressing this issue, existing research has examined several factors to explain mobile shopping acceptance in different industries (Groß, 2016; Wu & Wang, 2005). Empirical studies examining acceptance drivers in relation to (1) mobile benefits, (2) customer characteristics, or (3) risk perceptions/costs of using mobile shopping often report mixed results. While some studies find significant effects of certain drivers, other studies do not find any effect at all (e.g., Groß, 2016; Kleijnen, de Ruyter, & Wetzels, 2007; Ko, Kim, & Lee, 2009). A reason for the inconsistent findings may be that existing studies often test only a few drivers without controlling for the influence of other drivers. In addition, existing studies regularly focus on direct effects of mobile shopping acceptance without considering potential indirect effects imposed via mediators. In order to better understand which factors

impact mobile shopping acceptance, our conceptual model integrates mobile and personal benefits (instant connectivity, contextual value and hedonic motivation), customer characteristics (habit), and risk facets (financial, performance, and security risk) as antecedents of mobile shopping acceptance. It also considers ease of use and usefulness perceptions as key mediating mechanisms.

Existing literature argues that mobile shopping contexts differ from each other with regard to several characteristics, such as the particular role of time, space, and control (Balasubramanian et al., 2002; Blut, Chowdhry, Mittal, & Brock, 2015), and that these characteristics may affect acceptance of mobile shopping applications. Against this background, this study investigates the interplay between mobile benefits, perceived risk, and the perception of three main contextual characteristics of mobile shopping characteristics, including (1) location sensitivity, (2) time criticality, and (3) extent of control (Balasubramanian et al., 2002). Based on a dataset of 410 smartphone shoppers, the results of this study improve our understanding of the factors that impact mobile shopping acceptance and their relevance across contexts. From a managerial perspective, results show which mobile benefits to provide to customers, which customers to target as a firm, and which risk perceptions to consider. In addition, the results show which factors matter to mobile shoppers depending on the application context.

Theoretical Background and Conceptual Framework

Determinants of Mobile Shopping Acceptance

Prior studies examining acceptance of new technologies have regularly referred to the technology acceptance model (TAM) as the conceptual basis (King & He, 2006). Consequently, TAM has emerged as one of the most frequently used theoretical frameworks to explain acceptance of technology by customers (Venkatesh & Davis, 2000). Venkatesh and colleagues merged TAM and other prominent theories and acceptance models to develop a

unified theory of acceptance and use of technology (UTAUT), which was later advanced to UTAUT2 (e.g., Venkatesh, Thong, & Xu, 2012).

A recent review of studies on mobile shopping suggests that adoption intention is strongly affected by perceptions of usefulness (utilitarian performance expectancy) and ease of use (effort expectancy) (Groß, 2015). In addition to these two key mediators, further antecedents include instant connectivity, hedonic motivation, habit, risk, and contextual value as essential predictors (Bigné, Ruiz, & Sanz, 2007; Jih, 2007; Kim, Shin, & Lee, 2009; Ko, Kim, & Lee, 2009; Lee & Jun, 2007; Venkatesh et al., 2012; Wong, Lee, Lim, Chua, & Tan, 2012). Referring to the characteristic of ubiquity, instant connectivity represents the key advantage of shopping via smartphone (e.g., Ko, Kim, & Lee, 2009). Furthermore, Venkatesh and colleagues (2012) show a strong positive impact of hedonic motivation and habit on intention to use in the mobile context. Hence, fun and enjoyment, in addition to automaticity in using a technology, play a crucial role. Contextual value can be created by the personalization and localization of marketing measures and is a key benefit of mobile marketing activities fostering both value and adoption (Kim, Chan, & Gupta, 2007; Lee & Jun, 2007). In the context of mobile services, Kleijnen et al. (2007) have suggested three types of risk, namely financial risk, performance risk, and security risk. Existing studies have often investigated the effect of an overall risk perception instead of differentiating between different risk facets (Bauer, Barnes, Reichardt, & Neumann, 2005; Groß, 2016) (see Table 1 for an overview).

Insert Table 1 about here

Moderators Examined in Prior Research

As Table 1 indicates, prior literature has tried to address the differing relevance of predictors across customers and contexts by examining either personal characteristics or environmental characteristics as moderators. Firstly, with regard to personal characteristics of customers, Kleijnen et al. (2007) have argued that time consciousness imposes a moderating effect on the relationship between benefits or costs and perceived value of mobile transactions. Other customer-related variables that have been examined include sociodemographic characteristics, such as age and gender, or individual motivations (e.g., Koenigstorfer & Groeppel-Klein, 2012).

Secondly, the few quantitative studies examining the influence of environmental circumstances often assume contextual characteristics to directly impact customer-level outcomes (e.g., Vlachos & Vrechopoulos, 2008). As one of the few studies acknowledging the role of application context more explicitly, Chan and Chong (2013) have investigated the role of a set of determinants for four different types of m-commerce usage activity, including content delivery, transactions, location-based services, and entertainment. Their results have shown a relatively consistent pattern in terms of positive direct effects of enjoyment, ease of use, and usefulness in all four activities. Security risk, however, has been found to have strong negative effects in case of transactions and location-based services, whereas no significant effects could be observed for content delivery and entertainment services (Chan & Chong, 2013). Drawing on a multi-group comparison, Nysveen, Pedersen, and Thorbjørnsen (2005a) find that there is a difference between goal-directed and experiential services. These different services moderate the relationship between perceived enjoyment, expressiveness, and perceived control and usage intention of a mobile service. Furthermore, the role of contextual characteristics and their interplay with different determinants has not yet been investigated in sufficient depth. Thus, the following section discusses the mobile shopping classification proposed by Balasubramanian et al. (2002), since this framework has the

potential to contribute to a better understanding of the context-dependence of specific acceptance drivers.

Classifications of Mobile Shopping Applications

With the aim of systematically mapping the broad spectrum of different m-commerce applications and providing a conceptual basis for the scientific discourse, the literature provides a few suggestions for potentially relevant dimensions and taxonomies (e.g., Buellingen & Woerter, 2004). From a customer activity-based perspective, Balasubramanian et al. (2002) have suggested that mobile shopping applications can meaningfully be categorized alongside three dimensions: (1) location sensitivity, (2) time criticality, and (3) initiated/controlled by recipient or user (here, extent of control). The first two of these dimensions is derived from two of the "most fundamental dimensions of all economic activity" (Balasubramanian et al., 2002, p. 350), which are time and space. Taking into account that the extent to which mobile shopping applications are location sensitive and time critical can vary considerably, location sensitivity and time criticality can be considered two important characteristics of mobile shopping applications. The third dimension, extent of control, takes into account that mobile applications differ with regard to whether information exchange is primarily initiated—and thereby controlled—by the recipient or the provider. Given that it is the customer who decides whether or not to use an application, the activity-based perspective was considered a fruitful avenue for gaining further insights into mobile shopping adoption across use contexts.

Hypotheses Development

The conceptual model of the present study integrates three sets of hypotheses. Firstly, assumptions about the relationships between ease of use, usefulness, and usage are derived (hypotheses $H1_{a\text{-}c,}$ $H2_{a\text{-}c}$). The second group of hypotheses relates to the roles of different benefits (instant connectivity, contextual value and hedonic motivation), customer

characteristics (habit), and risk facets (financial, performance, and security risk) as antecedents of mobile shopping acceptance ($H3_{a-e}$). Finally, hypotheses $H4_{a-c}$ and $H5_{a-f}$ relate to the role of location sensitivity, time criticality, and extent of control as moderators between perceived usefulness and their antecedents (see Figure 1).

Insert Figure 1 about here

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(1) Relationships between Ease of Use, Usefulness, and Usage of Mobile Commerce

Predominantly drawing on the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), literature on acceptance of information systems (IS) suggests that perceived usefulness, ease of use and behavioral intentions are key predictors of intended and actual usage of IS (King & He, 2006). While perceived ease of use refers to the degree to which a person believes that using an IS will be free of effort, perceived usefulness is defined as the extent to which a person believes that using an IS will enhance his or her job/task performance (Davis, 1989). In the case of mobile shopping, actual usage behavior refers to a specific shopping situation. To broaden this specific perspective, two more outcomes were included in this study: favorable experience response and cross-category usage. Favorability refers to the (general) assessment of mobile shopping based on an experience with a specific shopping situation. The construct plays an important role in the IS literature, and in particular within the context of e-commerce (e.g., Kim & Malhotra, 2005; Shih & Venkatesh, 2004). Self-referencing theories and theories on repeated behavioral patterns suggest that prior favorable experiences (i.e., technology use) lead to future use and therefore a positive favorable experience response (Kim & Malhotra, 2005). Prior favorable experiences (i.e., for a specific product category) are also assumed to lead to cross-category usage, which comprises the intention to use the technology for shopping in other product categories.

While the effect of perceived usefulness on behavioral intention (typically use intention) is clearly supported, perceived ease of use often exerts both a strong direct and indirect influence on behavioral intention via perceived usefulness, especially in the context of internet technologies (Davis, 1989). Against this background, it is assumed that ease of use, in addition to the influence exerted via perceived usefulness, has a direct positive effect on behavioral intention. Thus,

H1a-c: Greater behavioral intention to use mobile shopping applications is associated with greater **a)** actual usage behavior of mobile shopping for a given product category; **b)** favorable experience response; and **c)** cross-category usage of mobile shopping applications.

H2a-b: Greater perceived usefulness and greater perceived ease of use is associated with greater behavioral intention to use mobile shopping applications.

H2c: Greater perceived ease of use is associated with greater perceived usefulness.

(2) Antecedents of M-commerce Acceptance

Instant connectivity, contextual value and hedonic motivation

While TAM suggests that IS characteristics and associated user motives matter for adoption of IS in general (Davis, 1993), limited research has tested which factors impact usefulness and ease of use of mobile shopping. With respect to instant connectivity as a technological benefit, which refers to time convenience and mobility of mobile shopping, literature argues that mobile value is the greatest advantage differentiating m-commerce from e-commerce (Anckar & D'Incau, 2002), and that time convenience has a significant effect on customers' m-commerce value (Kleijnen et al., 2007). Mobile technologies have led to a shift of loci of activities from limited space and time to flexibility regarding both dimensions (Balasubramanian et al., 2002). According to motivation and goal-setting theories (Brown, 1990; Locke, 1968; Locke & Latham, 2002), perceived benefits and the perception of added

value often lead to goal-directed behavior and, in consequence, to acceptance of a situation and decision. Therefore, it is assumed that the higher the perceived benefit of instant connectivity regarding mobile shopping, the higher the usefulness perception and effort displayed by the customer in understanding and applying a given technology. Hence,

H3a: Greater instant connectivity is associated with greater perceived usefulness and greater perceived ease of use of mobile shopping applications.

With regard to mobile shopping, contextual value (e.g., according to the use of contextual marketing) as content-specific benefit is composed of service and information that individually address the customer and allow a direct interaction with the customer (Lee & Jun, 2007). In particular, it is assumed that individualized marketing and its contextual values are beneficial for the customer since customer-centered products and services are more likely to meet individual needs and, in consequence, the perception of greater contextual value should be associated with greater perceived usefulness of mobile shopping applications (Lee & Jun, 2007). However, despite such advantages of contextual marketing, literature also suggests that a personalization of marketing activities may also lead to greater complexity in information processing (Alba & Hutchinson, 1987), and thus negatively influence perceived ease of use. Customers who regularly receive individualized advertising may, for example, have difficulties realizing the terms and conditions related to an offer, and may be irritated in case of high frequency of exposure (Haghirian, Madlberger, & Tanuskova, 2005). In combination with the technical limitations of mobile shopping technologies compared to desktop-based e-commerce technologies (i.e., screen size: Haghirian et al., 2005), contextual marketing could have a negative impact on the perceived ease of use of m-shopping technologies. Therefore, it is assumed that:

H3b: Greater perceived contextual value with regard to contextual marketing is associated with greater perceived usefulness but lower perceived ease of use of mobile shopping applications.

Furthermore, customers' hedonic motivation is a well-established predictor for decision-making and behavior in several IS models such as UTAUT (Venkatesh et al., 2012). Hedonic motivation as a personal benefit can be better served by mobile commerce compared to regular e-commerce, since using mobile shopping devices allows a seamlessly integrated shopping experience without any interruption (Hirschman & Holbrook, 1982; Holbrook & Hirschman, 1982). Therefore, we assume, that:

H3c: Greater hedonic motivation is associated with greater perceived usefulness and greater perceived ease of use of mobile shopping applications.

Habit

Habit, is a strong predictor for repetition and longevity of existing behavior (Venkatesh et al., 2012). Unified theory has introduced habit as a predictor to IS literature and has found it to impact usage intention and usage of mobile internet by consumers (Venkatesh et al., 2012). Kim and Malhotra (2005) have also found that prior IS use is a strong predictor of future technology use. The more experienced a customer is, the better the customer assesses whether the technology is beneficial, and the easier it is to use. Given that habit relates to more automatic cognitive processes, its inclusion furthermore allows for a more rigorous assessment of the differential role of the cost-benefit related antecedents that are of a more deliberate nature (Bagozzi, Wong, Abe, & Bergami, 2000). Therefore, it is proposed that:

H3d: Greater habit is associated with greater perceived usefulness and greater perceived ease of use of mobile shopping applications.

Financial, performance and security risk

According to technology acceptance theories (Bensaou & Venkataman, 1996; Lu, Hsu, & Hsu, 2005; Pavlou, 2001, 2003), risk represents a major determinant of ease of use and usefulness perception of new technologies. It is argued that during the acceptance process, and especially with regard to the perceived usefulness of mobile shopping applications, customers often perceive significant risks and concerns (Groß, 2016; Holak & Lehmann, 1990; Lee, 2009). Based on prior findings which showed that the facets of perceived risk are context-dependent (Campbell & Goodstein, 2001), and following existing literature on m-commerce evaluation (Kleijnen et al., 2007), a risk construct containing the following three components was integrated into the conceptual framework: (1) financial risk, which refers to money loss caused when using a mobile shopping application; (2) performance risk, which refers to the possibility that the application is flawed and does not work in the way it was originally intended; and (3) security risk, which refers to the possibility of losing control of personal information (Featherman & Pavlou, 2003; Kleijnen et al., 2007). In consequence, the greater the perceived risk of mobile shopping applications, the greater the costs and concerns of using mobile technology (i.e., smartphones) and the more critical the consumer when assessing mobile shopping applications (Groß, 2016; Kleijnen et al., 2007; Pavlou, 2003). Therefore,

H3e: Greater perceived financial, performance, and security risk are associated with lower perceived usefulness and lower perceived ease of use of mobile shopping applications.

(3) Moderating Effects: Types of Mobile Shopping Application

Given that hedonic motivation as a personal benefit and habit as a personal characteristic (Venkatesh et al., 2012) are related to the general use of smartphone-based online shopping, these factors are independent of application characteristics and should thus be less prone to moderation. With regard to the perceived technological benefit of instant

connectivity and content-specific benefits of contextual value and the perceived costs of the different risk facets, it is assumed that these aspects are dependent on mobile shopping application characteristics (Conchar, Zinkhan, Peters, & Olavarrieta, 2004; Kleijnen et al., 2007; Lee & Jun, 2007). Furthermore, taking into consideration that perceived ease of use of the smartphone is relatively comparable for different mobile shopping application contexts, perceived usefulness may differ according to application characteristics. Therefore, it is assumed that the application characteristics of location sensitivity, time criticality, and extent of control mainly affect the relationships of the aforementioned antecedents with perceived usefulness and are less relevant for perceived ease of use.

Types of mobile shopping application and benefits

Overall, the relationship between instant connectivity and usefulness should be similarly relevant for high and low values of location sensitivity but more affected by time criticality and extent of control. Theories about decision-making suggest that individuals under time pressure are more prone to negative information and outcomes (Hwang, 1994; Wright, 1974). Consequently, the perceived benefits of instant connectivity (Keen & Mackintosh, 2001; Kleijnen et al., 2007) should be more salient for low time critical applications compared to high time critical applications where possible problems of connectivity or access should be valued higher in a negative way (Hwang, 1994; Wright, 1974). For example, connectivity issues experienced in the process of booking a train ticket a few minutes prior to departure are, compared to the same process without time pressures, assumed to result in comparatively more negative experiences. In a similar vein, according to the theory of planned behavior (TPB), perceived control also positively affects benefits and perceptions of using an IS system (i.e., mobile shopping application) (Venkatesh, 2000). Therefore, with an increasing extent of control, an increase in the perceived benefits of mobile applications should be more salient (Ko et al., 2009). Thus,

H4a-b: There is a stronger positive relationship between instant connectivity and perceived usefulness if a customer's perception of the mobile shopping application **a)** is low time critical compared to a mobile shopping application which is high time critical; and **b)** has a high extent of control compared to a mobile shopping application which has a low extent of control.

Similarly, the relationship between contextual value and usefulness persists for all application characteristics, but should be more susceptible to moderation in case of location sensitive applications. Location sensitivity describes the level of an application's embeddedness in the customers' spatial context without a content-specific focus (Balasubramanian et al., 2002). Contextual value relates to the specific content provided in dependence on the spatial context of an application, for example the benefits of providing coupons when stores a located close to the smartphone user (Ghose, Goldfarb, & Han, 2012; Lee & Jun, 2007). In this context, literature on internet browsing behavior suggests that the benefit of browsing for stores located closely to a user's home is higher when using a mobile phone as compared to using a personal computer (Ghose et al. 2012). Thus, this research proposes that customers appreciate contextual value more when applications are location sensitive. Hence,

H4c: There is a stronger positive relationship between contextual value and perceived usefulness if a customers' perception of the mobile shopping application is location sensitive compared to a mobile shopping application which is location insensitive.

Types of m-commerce application and risk facets

Risk processing theories propose that the context of the consumption situation exerts a major influence on risk processing and risk perception (Campbell & Goodstein, 2001; Conchar et al., 2004). Against this background, the authors assume that there will be differences in the perceptions of risk facets and their interplay with high and low values of

mobile shopping application characteristics. In more detail, whereas the perception of financial and performance risk is seen to be more technology-driven, the perception of security risk is more from an individual perspective of providing personal data for a commercial transaction (Bensaou & Venkataman, 1996; Featherman & Pavlou, 2003; Pavlou, 2003). Therefore, this study also expects differences in the likelihood of moderation for different risk facets.

In the case of m-shopping applications that a) draw on location information or b) have a low extent of control, transaction or information exchanges are often initiated by the application provider (Balasubramanian et al., 2002) and represent a situation where a customer has less control – for example, when receiving a coupon while passing by a retail store. According to Venkatesh (2000), perceptions of control are supposed to interact with customer beliefs such as risk beliefs. Customers with higher perceived control are more aware of the activities they can actively do to relieve their risk (Kleijnen et al., 2007). It follows that financial and performance risk should increase in relation to increasing location sensitivity and a decreasing extent of control, because of their dependency on the performance of external systems and technology (Featherman & Pavlou, 2003). In contrast, due to self-referencing and reasoning about how much information is delivered through the system (Featherman & Pavlou, 2003), security risk should be more relevant in case of a decrease in location sensitivity and an increase in extent of control, because the awareness of control is higher (Kleijnen et al., 2007; Venkatesh, 2000). Additionally, in case of location sensitive applications, there is stronger a priori acceptance and expectation when it comes to data provision to receive individualized marketing activities compared to location insensitive applications (Bhattacherjee, 2001; Chellappa & Sin, 2005; Lee & Jun, 2007).

With regard to the interplay of time and risk perception, Kleijnen et al. (2007) have found an interaction effect between time perception of an individual and risk perception in

perceived value of mobile applications. In case of highly time critical applications, customers have less time to engage in risk reducing strategies such as an information search to assess the performance of the technology accurately and are more willing to apply simplified strategies to solve a problem (Hwang, 1994). Therefore, customers may be more sensitive to technology-related risks, because there is a higher demand that the system is not flawed and works as intended (performance risk), and that there is no money lost by using the specific mobile application (financial risk) (Featherman & Pavlou, 2003; Grewal, Gotlieb, & Marmorstein, 1994). However, customers are aware that there is little that they can do to reduce risk and are therefore more willing to accept it compared to low time critical applications (Zhou, 2011), where a more complex decision making process can be applied (Hwang, 1994) and customers can actively relieve their risk (Kleijnen et al., 2007). Therefore, this study proposes:

> **H5a-c:** There is a stronger negative relationship between financial risk/ performance risk and perceived usefulness if a customer's perception of the mobile shopping application **a)** is location sensitive, compared to a mobile shopping application which is location insensitive; **b)** is high time critical, compared to a mobile shopping application which is low time critical; and **c)** has a low extent of control, compared to a mobile shopping application which has a high extent of control.
>
> **H5d-f:** There is a stronger negative relationship between security risks and perceived usefulness if a customer's perception of the mobile shopping application **d)** is location insensitive, compared to a mobile shopping application which is location sensitive; **e)** is low time critical, compared to a mobile shopping application which is high time critical; and **f)** has a high extent of control, compared to a mobile shopping application which has a low extent of control.

Method

Data Collection and Procedure

The data for this research were collected in the United Kingdom (UK). Members of a survey panel were invited to participate in the study via a link on an online survey platform. They could earn rewards in the form of a panel-specific points-based system for their participation in the survey. This procedure led to a total of 410 completed questionnaires (47.1 percent females). To increase the external validity of our study (Jones, 2010), a student sampling approach was avoided and instead the aim was to collect a representative sample of the UK population (M_{age}: 45.33, SD = 12.99). Participants were given a definition of smartphone-based mobile shopping prior to the survey: "In general, mobile shopping is understood as any kind of commercial transaction conducted through a smartphone if the device is connected to the internet (e.g., booking an event ticket via smartphone; buying clothes via an app of a retailer via smartphone), whereby a telephone order via smartphone is not meant". In the survey, they had to answer several questions with regard to their recent mobile shopping experiences in different product categories—e.g., "In the last three months, did you gain some shopping experience with (or seriously consider buying) a product or service in the following categories via your smartphone?"). Table 2 provides an overview of these categories. While participants have experience in more than one product category, as displayed in Table 2, they answered the survey only with respect to one specific product category (fashion: n = 49; luxury: n = 7; mass merchants: n = 6; travel services: n = 55; sporting goods: n = 24; health & beauty: n = 35; home: n = 46; books: n = 52; financial services: n = 59; entertainment: n = 65; other: n = 12). Furthermore, socio-demographics and different variables of m-commerce usage were obtained (Table 2).

Insert Table 2 about here

Measures and Measurement Properties

Established multi-item measures which had been tested in previous studies investigating online shopping motives and/or customer behavior (see Table 3) were adapted. In particular, instant connectivity, which refers to the time convenience and mobility of mobile shopping, was operationalized with items from established scales (Kleijnen et al., 2007; Ko et al., 2009; Lu & Yu-Jen Su, 2009; Mathwick et al., 2001). Hedonic motivation items capture whether using mobile shopping technology is perceived to be personally enjoyable in its own right (Kaltcheva & Weitz, 2006). The contextual value items include service, information, and further benefits that individually address the customers and allow a direct interaction with them (Lee & Jun, 2007). While the financial risk items assess the potential money loss caused when using a mobile shopping application, performance risk items refer to the possibility that the application is flawed (Kleijnen et al., 2007; Stone & Grønhaug, 1993). Security risk items were used to assess the possibility of losing control of personal information (Kleijnen et al., 2007). Venkatesh et al. (2012) provide a definition and measurement of habit, which refers to the extent to which people tend to carry out a behavior such as using mobile shopping automatically because of learning.

Three mediators and three outcome variables were examined in this study. While the ease of use items capture the effort necessary to use mobile shopping, usefulness items assess whether mobile shopping is perceived as an effective and efficient means of shopping (Chan & Chong 2013; Chong, 2013). Usage intention of mobile shopping was measured with items from Dabholkar and Bagozzi (2002). For the outcome variable usage behavior, items from Wulf, Odekerken-Schroeder, and Iacobucci (2001) were utilized. The items for experience response were adapted from Speed and Thompson (2000), while cross-category usage intention items were adapted from Dhabolkar and Bagozzi (2002). Items for most constructs

were measured with seven-point Likert scales (7 = “totally agree”; 1 = “totally disagree”), except usage behavior items.

Most constructs showed Cronbach’s alpha (CA) and composite reliability (CR) scores exceeding the threshold value of .70 (Nunnally, 1978). Only hedonic motivation showed a lower composite reliability of .66. Furthermore, average variances extracted (AVE) were greater than .50 in all examined cases (see Table 4). Discriminant validity of the constructs was satisfactory.

Insert Tables 3 and 4 about here

Finally, mobile shopping context characteristics were assessed using three items derived from the definitions provided by Balasubramanian et al. (2002). The three items were assessed with regard to (1) location sensitivity (“In how far was the mobile shopping application you used location sensitive? Location sensitivity refers to the extent to which the application was ‘tied in’ to your physical environment”); (2) time criticality (“In how far was the mobile shopping application time critical? Time critical applications usually involve transactions related to a scheduled event [e.g., a flight departure], transactions that may quickly change in value [e.g., when participating in a virtual auction] or information that is required to address some emergency”); and (3) extent of control (“In how far was the shopping experience controlled by yourself vs by the provider? Level of control refers to the extent to which you as the user initiate the interaction with the mobile shopping application”). All items were assessed using seven-point Likert scales (7 = “highly time critical” / “high level of control” / “location sensitive”).

Data Analysis and Results

Structural equation modeling was used to test the direct and indirect effects of acceptance drivers. All analyses were conducted using the MPLUS software package (Muthén & Muthén, 2007). Maximum likelihood estimation was used with robust standard errors (MLR) for estimations since this estimator is considered to be robust to non-normality (Muthén & Muthén, 2007). Since no missing values were detected in the survey items, there was no need to exclude participants or to impute missing data. It was hypothesized that predictors influence outcome variables indirectly through ease of use and perceived usefulness. In addition to the effects on these mediators, whether determinants exert a direct influence on outcomes as proposed was also tested, for instance, by theories such UTAUT. Table 5 summarizes the results of the calculated path model.

Insert Table 5 about here

The calculated path model shows a good overall fit: CFI = .93; TLI = .92; RMSEA = .043; SRMR = .051. The calculated model was controlled for the shopping context and included the following control variables: service vs. product, monetary value, wifi vs. non-wifi, app vs. non-app, and alone vs. non-alone. Significant results were found for service vs. product ($\beta = -.11$; $p < .05$) and monetary value ($\beta = -.04$; $p < .05$) in experience response and alone vs. non-alone ($\beta = -.07$; $p < .05$) in cross-category usage. The examined constructs explain 44.8 percent of variance of actual usage of mobile shopping for a given product category (experience response: 63.2 percent; cross-category usage: 51 percent; usage intention: 44.1 percent; perceived usefulness: 44.5 percent; ease of use: 54.8 percent). In line with hypothesis H1a-c, it was observed that usage intention of mobile shopping is positively associated with actual usage ($\beta = .26$; $p < .05$), experience response ($\beta = .23$; $p < .05$), and cross-category usage ($\beta = .44$; $p < .05$). It was also observed that usefulness is positively

related to a customer's stated usage intention ($\beta = .12$; $p < .05$) and to perceived ease of use ($\beta = .23$; $p < .05$). Furthermore, perceived ease of use influenced usage of mobile shopping through perceived usefulness ($\beta = .25$ $p < .05$), which confirmed a partial mediation of perceived ease of use on usage intention. Therefore, hypotheses H2a-c are supported by these findings.

With regard to acceptance predictors, several of them were found to be associated with ease of use and usefulness mediators. With respect to instant connectivity, this benefit was found to be positively associated with ease of use ($\beta = .62$, $p < .05$) but not with perceived usefulness. Hence, H3a is partially supported. With respect to H3b, contextual value is related to usefulness ($\beta = .26$, $p < .05$) but not to ease of use. Contrary to the predictions in hypothesis H3c, hedonic motivation impacts neither usefulness nor ease of use. Since habit is positively related to usefulness ($\beta = .32$, $p < .05$) and to ease of use ($\beta = .13$, $p < .05$), H3d is supported. Finally, partial support was found for H3e because financial risk is negatively related to usefulness ($\beta = -.10$, $p < .05$). Surprisingly, performance risk is positively related to usefulness ($\beta = .14$, $p < .05$). However, no significant effects were found for security risk on usefulness and ease of use, and no effects of financial and performance risk were found on perceived ease of use.

While habit directly affects actual usage of mobile shopping for a given product category ($\beta = .35$, $p < .05$), experience response ($\beta = .14$, $p < .05$), cross-category usage ($\beta = .17$, $p < .05$), and usage intention ($\beta = .19$, $p < .05$), instant connectivity impacts experience response ($\beta = .15$, $p < .05$) and usage intention directly ($\beta = .24$, $p < .05$) and contextual value impacts experience response slightly ($\beta = .08$, $p = .05$). Therefore, usefulness and ease of use represent strong mediators for most mobile shopping characteristics, while habit and instant connectivity also have strong direct effects.

The moderating effects were tested using moderated regression analysis in SPSS. Average scores were calculated across items of a construct and these were used as input for multiple regression analysis. Before calculating interaction terms, the constructs were mean-centered and tested together with main effect. In addition, control variables for the shopping context have been included in the model. Results of hypothesized moderated regressions and associated plots are shown in Table 6 and Figure 2. The displayed variance inflation factor is 2.58, indicating that the extent of multi-collinearity is acceptable and does not affect the results (Hair, Anderson, Tatham, & Black, 1998).

Insert Table 6 and Figure 2 about here

With regard to location sensitivity, no interaction effect was found with contextual value ($\beta = .02$, $p = .31$), financial risk ($\beta = .03$, $p = .27$), or performance risk ($\beta = -.08$, $p = .10$), but there is a positive interaction effect with security risk ($\beta = .11$, $p < .05$) on perceived usefulness. Thus, H4c and H5a are rejected and H5d is supported by these findings. The negative relationship between security risk and perceived usefulness was found to be stronger for location insensitive services compared to location sensitive services.

With regard to time criticality, a negative interaction effect was found for financial risk ($\beta = -.08$, $p < .05$) but no effect was found for performance risk ($\beta = .09$, $p = .07$). Since a negative relationship was assumed between financial risk (performance risk) and usefulness and an associated negative interaction effect, H5b is partially supported. The negative relationship between financial risk and perceived usefulness was found to be stronger for high time critical applications compared to low time critical applications. There is no support for H5e, because time criticality does not interact with security risk ($\beta = -.04$, $p = .25$). Furthermore, there is a negative interaction effect between instant connectivity and time

criticality on perceived usefulness (β = -.12, p < .05), which confirms H4a. The positive relationship between instant connectivity and usefulness is stronger for low time critical applications than for high time critical applications.

For extent of control, results suggest a positive interaction effect with performance risk (β = .16, p < .05) but no effect with financial risk (β = -.05, p = .14) or security risk (β = -.02, p = .38). Hence, hypotheses H5c and H5f are rejected. The positive relationship between performance risk and usefulness is stronger for high extent of control applications than for low extent of control applications. Giving support for H4b, a positive interaction effect was found with instant connectivity (β = .18, p < .05). It was observed that the positive relationship between instant connectivity and perceived usefulness is stronger for high extent of control applications compared to low extent of control applications.

While not hypothesized, interaction effects were observed with predictors on ease of use. In particular, security risks (β = .13, p < .05) and habit (β = -.10, p < .05) were found to interact with location sensitivity. The effects were stronger for location insensitive compared to location sensitive applications. Furthermore, an interaction between time criticality and contextual value (β = .09, p < .05) was found, where the positive effects were stronger for high time critical than for low time critical applications (see Figure 2).

Discussion

Insights on Key Mediators of Mobile Shopping Acceptance and Usage

The positive effect of behavioral intention on actual behavior (H1a) is in line with technology acceptance models (Davis, Bagozzi, & Warshaw, 1989). The positive effects of behavioral intention on favorable experience response (H1b) and cross-category usage (H1c) are in line with theories on post-adoption and self-referencing behavior (Kim & Malhotra, 2005; Shih & Venkatesh, 2004; Yang, 2010; Yu, 2012). Customers with prior positive experiences and intentions with a smartphone are more likely to use their smartphone for m-

commerce activities in general and other product categories respectively. Emphasizing this product-specific angle of behavioral intentions in this study appears to be particularly important when examining the effect on cross-category usage. Furthermore, the effects of usefulness (H2a) and perceived ease of use (H2b) on behavioral intention are also in line with technology acceptance models (Davis et al., 1989). The partially mediated effect of ease of use on behavioral intention (H2c) can also be observed for other technologies and not only for m-commerce (e.g., Adams, Nelson, & Todd, 1992). Thus, studies examining m-shopping acceptance should incorporate these well-established mediators and outcomes.

Insights on Factors Influencing Acceptance of Mobile Shopping

Regarding the mobile and personal benefits of mobile shopping, results indicate that instant connectivity significantly relates to perceived ease of use but not to usefulness (H3a). It seems that flexibility and mobility motivate customers to better understand mobile shopping and improve ease of use perception (Kleijnen et al., 2007). The significant direct effects of instant connectivity on experience response and intention to use (see Table 5) are strong reasons why instant connectivity is an important predictor for mobile shopping acceptance: future mobile shopping studies are encouraged to consider this unique benefit that refers to time convenience and mobility of mobile shopping. The picture is different for contextual value, as the content-specific benefit investigated (H3b). Here, the significant effect on usefulness is in line with the study by Lee and Jun (2007). However, no negative effect of contextual value on perceived ease of use was found. Therefore, effective individualized marketing is seen as beneficial for usefulness (Lee & Jun, 2007). It seems that this unique benefit has to be considered in order to fully understand the reasons for m-shopping acceptance. Hedonic motivation as a personal benefit did not show any relationship with ease of use and usefulness (H3c). Especially for ease of use, customers looking for a

better shopping experience are less likely to spend their time on learning technical aspects, since the necessity to learn does not immediately contribute to satisfaction.

With regard to habit as a personal characteristic, the observed effects show the necessity of integrating habit even into models trying to explain acceptance of mobile shopping technology and actual usage (H3d). Habit is a strong predictor for usefulness and ease of use (Venkatesh et al., 2012). Furthermore, habit also shows strong direct effects on behavioral intention and the other dependent variables, which is in line with post-adoption theory and UTAUT (Kim & Malhotra, 2005; Venkatesh et al., 2012).

Regarding the risks (H2e), results demonstrate that risk is composed of different facets (i.e., financial risk, security risk, performance risk), and that these facets directly influence usefulness perceptions but not ease of use. Differences were observed regarding (a) the weight of influence of the risk facets, and (b) the direction of their influence (Campbell & Goodstein, 2001; Wu & Wang, 2005). The negative effect of financial risks (Featherman & Pavlou, 2003) indicates that this risk type seems to act as an inhibitor of acceptance and should be deliberately considered in the development of mobile shopping applications. Financial risk in a mobile shopping context refers to customer concerns related to monetary losses, lowering the likelihood of repeated usage. With regard to the effect of performance risks—which is partly in line with existing literature (Wu & Wang, 2005)—a reason for the observed positive effect could be a stronger salience effect. Especially for applications with high time criticality and a high extent of control, the salience of performance risk increases, and therefore customers will have a higher awareness of a technology, its features, and potential problems (Hwang, 1994; Wright, 1974). Contrary to our proposition, we do not find an unconditional effect of security risk on usefulness perception. One explanation for the non-significant effect may be that our security risk measurement assesses the experienced risk of an individual in the mobile shopping situation, while prior studies regularly use non-

experiential measures. Thus, depending on the chosen measurement, customers seem to assess the likelihood of losing control of personal information differently. These insights underline the necessity to investigate not only the indirect effects of risk facets through an overall risk category (Kleijnen et al., 2007; Luo, Li, Zhang, & Shim, 2010), but instead to investigate their direct relationships with relevant outcomes.

Insights on Context-dependence of Mobile Shopping Predictors

The study finds that several relationships differ in importance depending on customers' perception of location sensitivity, time criticality, and extent of control. Particularly, the relevance of risk facets seems to vary across different mobile shopping applications, while the importance of the remaining drivers is largely independent of the application context.

Firstly, the proposed stronger negative relationship between security risk and usefulness for location insensitive services compared to location sensitive services (H5d) can be confirmed. It seems that customers perceive applications which make use of location information to be better designed. Therefore, such applications might meet their requirements in a more appropriate way so that customers are less concerned about data security issues. This finding underlines the importance of well-integrated and individualized marketing activities drawing on location information, since they help lower reactance and concerns among customers. Similarly, Bhattacherjee (2001) argues that usefulness perceptions of new technologies such as mobile shopping are determined through confirmation of an individual's expectations.

Secondly, with regard to time criticality, results revealed a stronger negative relationship between financial risk and usefulness for high time critical compared to low time critical applications (H5b). Especially for financial reasons, applications which are highly time critical are less prone to correction due to customer mistakes or system failure. While

users of applications with lower time criticality can still correct mistakes and, for instance, reorder a product or service, this is not always possible in case of timely urgent applications—for example, due to potential monetary losses. Furthermore, instant connectivity showed a positive relationship with usefulness for both low time and high time critical applications, but stronger effects for low time critical applications (H4a). This indicates that the perceived benefits of instant connectivity are more salient for low time critical applications than for high time critical applications (Hwang, 1994).

Thirdly, the moderating hypotheses for extent of control and different risk types (H5c, H5f) have to be rejected. Contrary to expectations, performance risk showed a significant positive effect on usefulness perception which is stronger for high extent of control applications. A recent meta-study on technology acceptance also finds risk to display positive effects (Blut, Wang, & Schoefer, 2016). The authors refer to attentional control theory (Eysenck, Derakshan, Santos, & Calvo, 2007) to explain the effect of risk on the acceptance of self-service technologies. The theory suggests that individuals being confronted with different tasks—in particular, tasks placing significant demands on their cognitive resources—may feel uncomfortable. Against this, if applying less cognitively demanding tasks such as mobile shopping (a more demanding task is the learning of a new software package), individuals' concerns can motivate them to improve their task performance to avoid failure and negative evaluation, thereby implying a positive association between performance risk and usefulness perceptions. Since the task is less complex with a higher extent of control and vice versa, this theory offers an explanation for the observed amplifying effect. The proposed interaction effect between instant connectivity and extent of control is supported by our findings (H4b), suggesting that the mobile shopping benefits become more salient for customers with an increasing extent of control.

Managerial Implications

The findings of this research are important since they help practitioners to further increase usage of mobile shopping. Here, this research particularly emphasizes a positive effect of instant connectivity on mobile shopping usage. Independent of time and space, usage of mobile shopping provides an avenue to the online shopping world other than classical e-commerce and traditional channels. Thus, practitioners' decision to occupy the mobile channel and offer mobile technologies is comparable to the earlier decision to enter the online channel via online shops besides the traditional POS (Zinkhan & Watson, 1998). With regard to the observed effects of hedonic motivation and habit, results show that shopping enjoyment is less important for m-shopping usage, but rather customers have to develop some habituation. Thus, firms should motivate customers to use an application by providing temporary discounts and thereby ensure that repeated performance of a shopping behavior produces habituation. Turning to the observed effects of perceived risk facets, the results suggest employing risk-reduction measures such as money back guarantees, general satisfaction guarantees, or collaboration with technological infrastructure providers, since financial risk particularly is perceived as negative. Finally, managers should consider location sensitivity, time criticality and extent of control of m-shopping application when making decisions about measures, for instance, when communicating the benefits of mobile shopping. For example, implementation measures aiming at reducing financial risk seems particularly relevant in the case of time critical applications.

Limitations and Further Research

While the study contributes in several ways to a better understanding of mobile shopping, several questions remain unanswered and should be addressed in the future. Firstly, against the background of the relevance of risk facets revealed in this study, examination of the interplay between risk perception and customer characteristics such as risk sensitivity seems a fruitful area for future research. It may be that for risk-sensitive customers, the

perceived risk is too high so that they refuse smartphone-based shopping at all, while risk-insensitive customers do not care much about the associated risks. Secondly, an impact of different facets of perceived risk and contextual characteristics on mobile shopping acceptance, and an interaction between those constructs, was shown. While this investigation supports theoretical concepts (Balasubramanian et al., 2002) with empirical data, future research could deepen our understanding of the contextual variables and simulate diverse risk situations by using experimental research designs. Thirdly, further research should also integrate not only the benefits of m-shopping, habit, and risk perception in examined models, but also the specific measures taken by firms to shape these predictors. For instance, establishment of a strong (lifestyle) retail brand may at the same time impact an individual's risk and benefit perceptions. Fourthly, this study draws on perceptual data to empirically assess the role of contextual characteristics in customer acceptance of mobile shopping. Here, multi-level designs utilizing observed data at the contextual level might be useful to further advance understanding of the mechanisms at work.

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Table 1. Selected studies on determinants and moderators of mobile shopping acceptance

Study	Context, Method, Sample size(s)	Dependent Variable(s)	Determinant(s) and Findings	Moderator(s)
Agrebi & Jallais (2015)	Mobile shopping sites, n=200 mobile purchasers; n=200 mobile non-purchasers	Intention to use	Satisfaction (+)	—
Aldás-Manzano, Ruiz-Mafé, & Sanz-Blas (2009)	Mobile services, n=470 mobile telephone users	Mobile shopping intention	Personality variables: innovativeness (+), affinity (+), and compatibility (+)	—
Bigné, Ruiz, & Sanz (2007)	M-shopping (purchase decision), n=2,104 internet users	M-commerce adoption	Experience as online shopper (+), internet exposure (n.s.); sociodemographics: gender (n.s.), age (-), and social class (n.s.)	—
Chan & Chong (2013)	Mobile service companies, n=402	Content delivery; transactions; location-based services; entertainment	Perceived security risk (n.s./-/-/n.s.)	—
Chong, Chan, & Ooi (2012)	M-commerce activities, n=222 Chinese consumers; n=172 Malaysian consumers	Consumer intention to adopt m-commerce	Trust (+), cost (-), social influence (+), variety of services (+/n.s.), and trialability (n.s.)	Cross-country (Malaysia vs. China)
Gummerus & Pihlström (2011)	Mobile services use situations, qualitative interviews, n=85;	Conditional value	Time, location, lack of alternatives, uncertain conditions	—
Groß (2016)	Amazon sample, n=150; eBay sample; n=150	Continued usage intention	Trust in the mobile vendor (+/+); perceived risk: overall privacy (+/+), security (n.s./+), financial (+/+), and transactional (+/n.s.)	—
Khalifa & Ning-Shen (2008)	No m-commerce experience, n=202 mobile phone users	Perceived usefulness	Formative items of perceived usefulness: cost, convenience, privacy, efficiency, and security	—
Kleijnen, de Ruyter, & Wetzels (2007)	Mobile brokerage, n=232	Value m-channel	Time convenience (+), user control (+), service compatibility (+), perceived risk (-), and cognitive effort (-)	Time consciousness (high vs. low)
Ko, Kim, & Lee (2009)	M-internet acquaintance, n=511	Perceived value	Instant connectivity (-) and enjoyment (+)	—
Koenigstorfer & Groeppel-Klein (2012)	M-services, n=190	Choosing mobile internet device	Consumer innovativeness (1: +; 2: n.s.), desire for social contact (1: +; 2: n.s.), and technology optimism (1: n.s.; 2: +)	(1) Gender (f/m) (2) Age (young/old)

Lee & Jun (2007)	M-commerce experience (mobile shopping, ticket purchasing, stock trading), n=296	Satisfaction; repurchase intention, perceived usefulness	Contextual perceived value (+/+/+)	—
Mallat, Rossi, Tuunainen, & Öörni (2009)	Mobile ticketing, n=360	Use context; use intention	Compatibility (+) and mobility (+)	—
Nysveen, Pedersen, & Thorbjørnsen (2005a)	Text messaging, contact, payment, and gaming mobile services, n=658; 684; 495; 201	(1) Attitude towards use; (2) intention to use	(1): Enjoyment (+), usefulness (+), ease of use (+), and expressiveness (n.s.) (2): Expressiveness (+), enjoyment (+), usefulness (+), ease of use (+), normative pressure (+), control (+), and attitude toward use (+)	Goal-directed vs. experiential mobile services; person vs. machine interactive mobile services
Nysveen, Pedersen, & Thorbjørnsen (2005b)	Contact (mobile chat services), n=684	(1) Attitude towards use; (2) intention to use	(1): Enjoyment (+/+), usefulness (+/+), ease of use (n.s./+), and expressiveness (+/n.s.) (2): expressiveness (+/+), enjoyment (+/+/), usefulness (n.s./+), ease of use (n.s./n.s.), normative pressure (+/n.s.), and attitude toward use (+/+)	Gender (f/m)
Wang, Malthouse, & Krishnamurthi (2015)	Internet grocer, n=3,086 m-shoppers; n=13,212 non-adopters	M-shopping	Familiarity (previous shopping behavior): products (+) and provider (+)	—
Wang, Lin, & Luarn (2006)	M-transactions and m-services, n=258	Behavioral intention	Perceived financial resources (+), self-efficacy (+), and perceived credibility (+)	—
Yang (2010)	Mobile services users, n=400	Behavioral intention	Social influence (+) and facilitating conditions (+)	—

Notes. The determinants and effects of baseline models such as TAM 1–3, UTAUT 1–2, etc. are not reported.

Table 2. Sample description with regard to gender, income, and mobile shopping usage

	Sample	
	(n)	(%)
Sample size	410	100
Gender		
Female	193	47.1
Male	217	52.9
Income (in pounds)		
0–999	76	18.5
1,000–1,999	170	41.5
2,000–2,999	88	21.5
3,000–3,999	50	12.2
4,000+	26	6.3
Type of internet (connection)		
Wifi-connection	359	87.6
LTE	6	1.5
3G mobile connection	43	10.5
GPRS connection	2	.5
Websites/apps		
(Mobile) websites	246	59.9
Apps	164	40.1
Type of product		
Fashion	186	45.4
Luxury	47	11.5
Mass merchants	25	6.1
Travel services	135	32.9
Sporting goods	101	24.6
Health & beauty	142	34.6
Home	163	39.8
Books	152	37.1
Financial services	58	14.1
Entertainment	212	51.7
Other	21	5.1
Time ago of shopping experience		
0–7 days	179	43.7
2–4 weeks	130	31.7
1–2 months	83	20.2
3 months	18	4.4
Habit of shopping		
Alone	331	80.7
With a friend/partner	75	18.3

Table 3. Reliability and validity of constructs

Scale/item	Alpha	CR	AVE
DETERMINANTS OF MOBILE SHOPPING ACCEPTANCE			
Instant connectivity *(adapted from Ko et al., 2009; Lu & Yu-Jen Su, 2009; Mathwick et al., 2001; Kleijnen et al., 2007)*	***.93***	***.93***	***.61***
At this instance, mobile shopping with my smartphone…			
…enabled me to confirm my order processing in real time.			
…provided real-time and updated information about the products I was interested in.			
I found the mobile shopping application was easy to access with my smartphone.			
I found it easy to connect and get mobile internet.			
Accessing mobile shopping with my smartphone did not require a lot of mental effort.			
Doing the shopping via smartphone was an efficient way to manage my time.			
Doing the shopping via smartphone was convenient for me.			
Doing the shopping via smartphone allowed me to save time.			
Using the smartphone made shopping less time consuming.			
Contextual value *(adapted from Lee & Jun, 2007)*	***.82***	***.82***	***.54***
When I had the mobile shopping experience, having been offered...			
…timely information was valuable to me (e.g., information about a limited-time promotion).			
…with information I was interested in was useful to me.			
…location-specific information on my smartphone improved my performance on the purchase.			
…optimal information or a service that was contextually relevant to me, based upon where I am and what I am interested in, enabled me to accomplish a purchase more effectively.			
Hedonic motivation *(adapted from Kaltcheva & Weitz, 2006)*	***—***	***.66***	***.50***
When I had the experience, I primarily wanted to have fun.			
When I had the experience, I primarily wanted to relieve boredom.			
Habit *(adapted from Venkatesh et al., 2012)*	***.85***	***.85***	***.59***
The use of mobile Internet with my smartphone has become a habit for me.			
I am addicted to using my smartphone for mobile Internet.			
I must use my smartphone for mobile Internet.			
Using mobile Internet with my smartphone has become natural to me.			
Financial risk *(adapted from Stone and Grønhaug, 1993; Kleijnen et al., 2007)*	***.86***	***.87***	***.69***
When I had the mobile shopping experience I became concerned…			
…that the financial investment I would make would not be wise.			
…that I really would get not my money's worth.			
…that this could involve important financial losses.			
Performance risk *(adapted from Stone & Grønhaug, 1993; Kleijnen et al., 2007)*	***.96***	***.95***	***.84***
When I had the mobile shopping experience I became concerned…			
…about whether the mobile shopping application will really perform as well as it is supposed to.			
…for how really reliable the mobile shopping application will be for the level of benefits I was expecting.			
…that the application will not provide the level of benefits I was be expecting.			
…for how really dependable the application would be.			
Security risk *(adapted from Kleijnen et al., 2007)*	***.96***	***.96***	***.74***
When I had the mobile shopping experience I became concerned…			
…in the security of mobile shopping with my smartphone.			
…that the private information I provided during mobile shopping with my smartphone will only reach the relevant persons, and nobody else.			

…that the information I provided would not be manipulated by inappropriate parties.			
…that inappropriate parties may store the information I provided.			
…that the information I provided would not be exposed to inappropriate parties.			
…about the security of financial transactions via my smartphone.			
…making use of mobile payments with my smartphone.			
…that the transmission of data over my smartphone was unsafe.			
…that information on my smartphone will be delivered to wrong persons.			
MEDIATIORS/OUTCOMES			
Ease of use *(adapted from Chong, 2013; Chan & Chong, 2013)*	***.94***	***.94***	***.80***
Learning how to shop mobile with my smartphone was easy for me.			
I found it easy to use mobile shopping with my smartphone to do what I wanted to do.			
It was easy for me to become skillful at shopping mobile.			
I found it easy to shop mobile.			
Usefulness *(adapted from Chong, 2013; Chan & Chong, 2013)*	***.88***	***.89***	***.67***
Shopping with my smartphone improved my performance regarding my shopping tasks.			
Shopping with my smartphone improved my productivity.			
I find that shopping with my smartphone was more convenient than online shopping via computers and notebooks.			
Shopping with my smartphone enhanced my effectiveness in my shopping tasks.			
Usage intention *(adapted from Dabholkar & Bagozzi, 2002)*	***.93***	***.93***	***.74***
Please evaluate your intention to shop mobile with your smartphone for the particular product category in the future using the following scale:			
Unlikely - Likely			
Definitely would not use - Definitely would use			
Improbable - Probable			
Uncertain - Certain			
Impossible - Possible			
Usage behaviour *(adapted from Wulf, Odekerken-Schroeder, &Iacobucci, 2001)*	***—***	***.73***	***.58***
Of the 10 times you buy something via online channels, how many times do you do so via mobile shopping with your smartphone for the chosen category?			
How often do you shop mobile with your smartphone for the chosen category compared to buying online in general?			
Favorable experience response *(adapted from Speed &Thompson, 2000)*	***.95***	***.95***	***.86***
The experiences I have made making this purchase make me feel more favourable toward shopping via smartphone in general			
My experiences improve my perception of mobile shopping via smartphone.			
My experiences make me like shopping via smartphone in general more.			
Cross-category usage intention *(adapted from Dabholkar & Bagozzi, 2002)*	***—***	***.94***	***.88***
When I think about my specific shopping experience with regard to ___, I can imagine using mobile commerce with my smartphone also for other product categories.			
Unlikely - Likely			
Definitely would not use - Definitely would use			
CFI = .931; TLI = .924; RMSEA = .044; SRMR = .054			

Table 4. Correlations between latent constructs

	1	2	3	4	5	6	7	8	9	10	11	12
1. Instant connectivity	1.00											
2. Contextual value	.25	1.00										
3. Hedonic motivation	.00	.26	1.00									
4. Habit	.40	.31	.33	1.00								
5. Functional risk	-.30	.24	.18	.01	1.00							
6. Performance risk	-.36	.15	.24	.04	.60	1.00						
7. Security risk	-.30	.05	.16	-.02	.45	.68	1.00					
8. Ease of use	.72	.19	.03	.38	-.28	-.33	-.31	1.00				
9. Usefulness	.44	.42	.20	.54	-.05	.01	-.06	.47	1.00			
10. Usage intention	.58	.22	.09	.45	-.20	-.25	-.23	.57	.45	1.00		
11. Usage behavior	.33	.33	.26	.57	-.01	-.03	-.05	.28	.50	.47	1.00	
12. Favorable experience response	.51	.39	.23	.55	-.05	-.05	-.07	.47	.70	.58	.63	1.00
13. Cross-category usage intention	.50	.26	.07	.47	-.15	-.12	-.17	.44	.50	.63	.47	.59
AVE	.61	.54	.50	.59	.69	.84	.74	.80	.67	.74	.59	.86

Table 5. Results of the structural equation model

Relationship	**beta**	**t**	**p**	**R^2**
Usage intention → Usage behavior (H1a)	.26	3.976	<.05	44.8
Usefulness → Usage behavior	.22	2.937	<.05	
Ease of use→ Usage behavior	-.14	-1.986	<.05	
Instant connectivity → Usage behavior	-.01	-.099	.46	
Contextual value → Usage behavior	.10	1.542	.06	
Hedonic motivation → Usage behavior	.07	1.013	.16	
Habit → Usage behavior	.35	4.674	<.05	
Financial risk → Usage behavior	.01	.168	.43	
Performance risk → Usage behavior	-.09	-.945	.17	
Security risk → Usage behavior	.04	.531	.30	
Controls				
Service/product → Usage behavior	-.07	-1.468	.07	
Monetary value → Usage behavior	-.02	-1.390	.08	
Wifi/non-wifi → Usage behavior	.01	.103	.46	
App/non-app → Usage behavior	.06	1.129	.13	
Alone/non-alone → Usage behavior	.01	.269	.39	
Usage intention → Experience response (H1b)	.23	5.026	<.05	63.2
Usefulness → Experience response	.45	7.365	<.05	
Ease of use→ Experience response	-.03	-.528	.30	
Instant connectivity → Experience response	.15	2.615	<.05	
Contextual value → Experience response	.08	1.630	.05	
Hedonic motivation → Experience response	.04	.836	.20	
Habit → Experience response	.14	2.622	<.05	
Financial risk → Experience response	.04	.854	.20	
Performance risk → Experience response	-.06	-.921	.18	
Security risk → Experience response	.07	1.326	.09	
Controls				
Service/product → Usage behavior	-.11	-3.318	<.05	
Monetary value → Usage behavior	-.04	-4.187	<.05	
Wifi/non-wifi → Usage behavior	-.04	-1.322	.09	
App/non-app → Usage behavior	.03	.885	.19	
Alone/non-alone → Usage behavior	-.04	-1.262	.10	
Usage intention → Cross-category usage (H1c)	.44	7.164	<.05	51.0
Usefulness → Cross-category usage	.19	3.071	<.05	
Ease of use→ Cross-category usage	-.10	-1.594	.06	
Instant connectivity → Cross-category usage	.17	2.578	<.05	
Contextual value → Cross-category usage	.03	.514	.30	
Hedonic motivation → Cross-category usage	-.07	-1.378	.08	
Habit → Cross-category usage	.17	2.589	<.05	
Financial risk → Cross-category usage	-.04	-.751	.23	
Performance risk → Cross-category usage	.11	1.548	.06	
Security risk → Cross-category usage	-.09	-1.554	.06	
Controls				
Service/product → Usage behavior	-.06	-1.585	.06	
Monetary value → Usage behavior	.03	.436	.33	

Wifi/non-wifi → Usage behavior	.06	1.381	.08	
App/non-app → Usage behavior	-.05	-1.170	.12	
Alone/non-alone → Usage behavior	-.07	-2.067	<.05	
Usefulness → Usage intention (H2a)	.12	1.842	<.05	44.1
Ease of use→ Usage intention (H2b)	.23	2.715	<.05	
Instant connectivity → Usage intention	.24	2.140	<.05	
Contextual value → Usage intention	.01	.271	.39	
Hedonic motivation → Usage intention	.03	.573	.28	
Habit → Usage intention	.19	2.708	<.05	
Financial risk → Usage intention	-.01	-.094	.46	
Performance risk → Usage intention	-.08	-1.151	.13	
Security risk → Usage intention	-.03	-.559	.29	
Ease of use→ Usefulness (H2c)	.25	3.231	<.05	44.5
Instant connectivity → Usefulness (H3a)	.08	1.051	.15	
Contextual value → Usefulness (H3b)	.26	4.108	<.05	
Hedonic motivation → Usefulness (H3c)	.01	.163	.44	
Habit → Usefulness (H3d)	.32	5.122	<.05	
Financial risk → Usefulness (H3e)	-.10	-1.764	<.05	
Performance risk → Usefulness (H3e)	.14	1.888	<.05	
Security risk → Usefulness (H3e)	-.02	-.351	.36	
Instant connectivity → Ease of use (H3a)	.62	7.127	<.05	54.8
Contextual value → Ease of use (H3b)	.01	.218	.41	
Hedonic motivation → Ease of use (H3c)	.01	.288	.39	
Habit → Ease of use (H3d)	.13	2.601	<.05	
Financial risk → Ease of use (H3e)	-.05	-.814	.21	
Performance risk → Ease of use (H3e)	-.03	-.522	.30	
Security risk → Ease of use (H3e)	-.08	-1.515	.07	
CFI = .928; TLI = .920; RMSEA = .043; SRMR = .051				

Table 6. Testing predictor x mobile shopping application type interactions on usefulness and ease of use

	DV Ease of use		DV Usefulness	
Independent variable	beta	p	beta	P
Instant connectivity	.55*	.00	.34*	.00
Contextual value	.03	.25	.23*	.00
Hedonic motivation	.02	.31	.02	.31
Habit	.15*	.00	.32*	.00
Financial risk	-.04	.20	-.08	.07
Performance risk	-.07	.12	.18*	.00
Security risk	-.07	.10	-.06	.13
Location sensitivity	.01	.37	.03	.24
Time criticality	-.03	.20	-.01	.43
Extent of control	.03	.23	.02	.33
Controls				
Service/product	-.06	.07	.02	.29
Monetary value	-.03	.23	.00	.46
Wifi/non-wifi	.05	.09	-.03	.25
App/non-app	-.05	.07	-.02	.33
Alone/non-alone	-.05	.09	-.04	.15
Application Type-Interactions				
Location sensitivity x Instant connectivity	.03	.28	.04	.25
Location sensitivity x Contextual value (H4c)	-.01	.41	.02	.31
Location sensitivity x Hedonic motivation	-.01	.40	-.03	.23
Location sensitivity x Habit	-.10*	.01	-.05	.16
Location sensitivity x Financial risk (H5a)	-.03	.25	.03	.27
Location sensitivity x Performance risk (H5a)	-.02	.37	-.08	.10
Location sensitivity x Security risk (H5d)	.13*	.01	.11*	.03
Time criticality x Instant connectivity (H4a)	.01	.45	-.12*	.01
Time criticality x Contextual value	.09*	.02	.02	.37
Time criticality x Hedonic motivation	-.01	.40	.02	.32
Time criticality x Habit	-.04	.17	.03	.28
Time criticality x Financial risk (H5b)	-.02	.32	-.09*	.03
Time criticality x Performance risk (H5b)	-.05	.17	.09	.07
Time criticality x Security risk (H5e)	.05	.16	-.04	.25
Extent of control x Instant connectivity (H4b)	-.05	.17	.18*	.00
Extent of control x Contextual value	-.01	.38	-.03	.26
Extent of control x Hedonic motivation	-.01	.45	-.01	.39
Extent of control x Habit	.03	.23	-.02	.37
Extent of control x Financial risk (H5c)	-.03	.26	-.05	.14
Extent of control x Performance risk (H5c)	-.01	.39	.16*	.00
Extent of control x Security risk (H5f)	-.03	.30	-.02	.38
R^2	50.0		36.8	
MAX VIF = 2.581				

* $p < .05$-level (one-tailed)

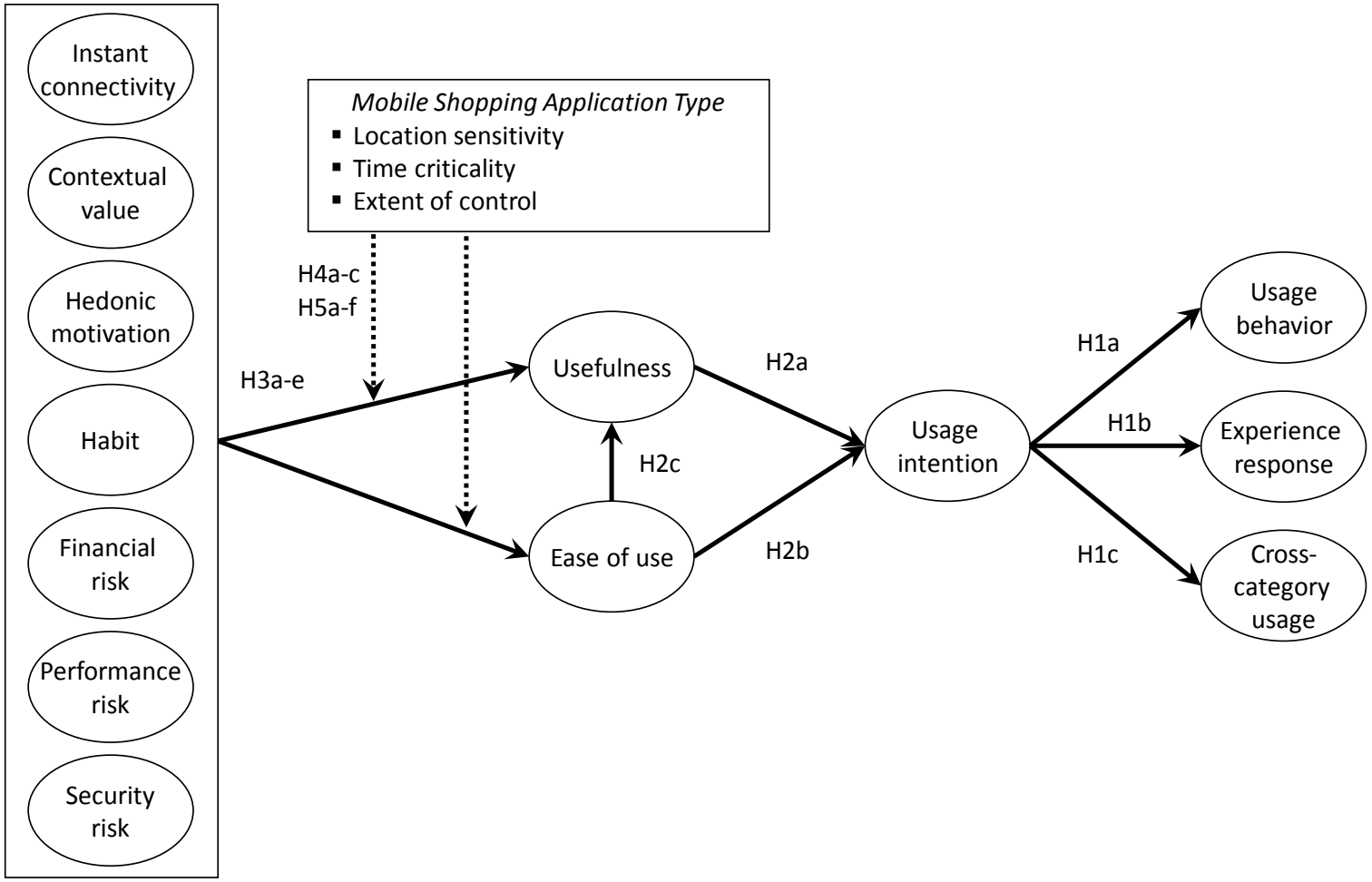

Figure 1. Conceptual model and hypotheses

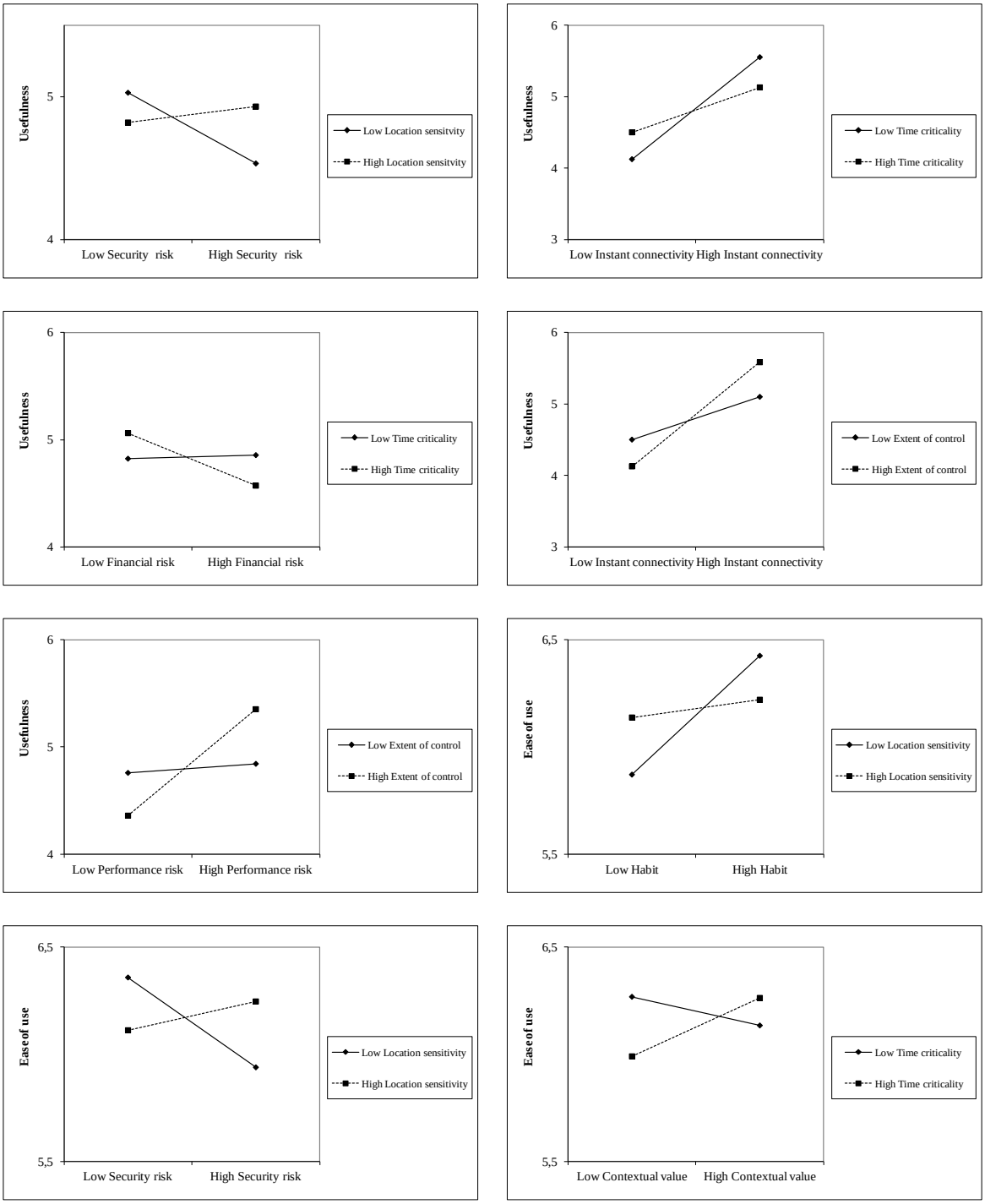

Figure 2. Plotting of predictor x mobile shopping application type interactions