What drives consumers to shop on mobile devices? Insights from a Meta-Analysis

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1. Introduction

Mobile devices' penetration has grown at an exceptional rate, thus reshaping consumers' experiences and habits. The number of smartphone users worldwide has surpassed 4 billion and is forecasted to grow further by several hundred million in the next few years (Statista 2021a). Most of the mobile market expansion can be attributed to advances in telecommunication technology, such as the launch of 5G, which have led to an unprecedented level of connectivity, changing the way in which individuals interact, communicate, and shop. By 2021, mobile commerce (m-commerce) is expected to account for 72.9% of total retail e-commerce sales worldwide (Statista 2021b). The value of m-commerce is projected to increase by 250% over a period of 5 years, increasing from US$1.9 trillion in 2018 to US$4.3 trillion by 2023. The advantages of mobile shopping (hereinafter referred as m-shopping) over online shopping on desktops, laptops, or tablets consist of ubiquity, instantaneity, interactivity, localization, personalization, and identification (Shankar et al. 2016; Zhang et al. 2012). Thus, it is not surprising that m-shopping is affecting consumers' habits and boosting the number of orders placed per year as well as the amount per order (Wang et al. 2015).

In light of its growing relevance in practice, m-commerce has captured the attention of scientific researchers. Over the last two decades, a rich strand of empirical studies has been conducted on the adoption of m-shopping by consumers (Li et al. 2012; Yang 2010; Yang and Kim 2012). However, the empirical findings are often contradictory. For example, some studies state that hedonic motivations are more important than utilitarian ones in stimulating m-shopping (Li et al. 2012), while other authors conclude that m-shopping is driven primarily by utilitarian aspects, such as convenience and accessibility (Holmes et al. 2014). There are also studies showing that both utilitarian and hedonic motivations, such as efficiency and enjoyment, contribute to consumers' intentions and motivations to adopt and use mobiles for shopping (Yang and Kim 2012). The fact that existing studies show

inconsistent results concerning the drivers of m-shopping might be due to the testing of only a few drivers, without considering the direct or indirect effects of other determinants and potential mediators (Hubert et al. 2017).

Several qualitative and quantitative literature reviews on m-shopping adoption have been published (e.g. Groß 2015; Natarajan et al. 2017; Zhang et al. 2012). Zhang et al. (2012) provided the first quantitative meta-analysis on this topic, analyzing studies published mostly in the information systems field and focusing on the moderating effect of culture. However, there is no recent and comprehensive study generalizing the empirical evidence from a wide range of scientific disciplines and for a broad range of drivers of m-shopping and potential moderators.

Given the importance of m-commerce, our work integrates, updates and expands the existing knowledge on m-shopping behavior to provide an interdisciplinary and comprehensive review leading to theoretical and managerial insights. For that purpose, we conduct a meta-analysis in which we accumulate prior empirical research. As stated by the review of the meta-analysis in marketing by Grewal et al. (2018), this method is the most useful and dominant research synthesis tool to aggregate evidence from a growing body of research. In particular, we develop a theoretical framework for the drivers of m-shopping and investigate the effect of multiple antecedents simultaneously using meta-analytic structural equation modelling (MASEM) (Landis 2013). To highlight the contribution of our work for retailers and academics, we propose the key takeaways and implications of our meta-analysis as well as a future research agenda.

Our study contributes to m-commerce research in three important ways. First, we synthesize and consolidate previously fragmented findings from twenty years of contributions on this topic from 2000 to the first half of 2020. Compared with the first meta-analysis conducted by Zhang et al. (2012), our work includes a wider range of empirical findings and provides a more comprehensive understanding of the antecedents of m-shopping behavior by extending the theoretical foundations and applying meta-analytic structural equation modelling (MASEM). In addition, we

formulate an improved Unified Theory of Acceptance and Use of Technology (UTAUT) framework, adapted to m-shopping behavior.

Second, we identify the key drivers of m-shopping considering all the phases of the consumer's journey. In particular, we enhance the literature by considering the key drivers of both consumers' initial adoption and their continuance intention and usage of m-shopping. Most of the studies on m-commerce focused on consumer intention to use mobile for shopping for the first time and its key drivers (Wong et al. 2015; Groß 2015; Agrebi and Jallais 2015). Conversely, little attention has been devoted to investigate continuance behaviors and repeat purchase behavior of individuals via mobile devices (Gao et al. 2015). Given the importance to retain mobile consumers over time (Lee et al. 2015), our framework considers drivers of initial adoption and continued usage of mobile devices for shopping and five outcome variables, listed as corresponding steps of the customer m-shopping journey – attitude (toward m-shopping), intention to purchase, actual purchase, satisfaction, intention to continue purchasing with respect to mobile purchase.

Third, we assess the effects of moderating factors affecting the relationships among antecedents of m-shopping, Importantly, our work expands the literature by exploring new moderators of the m-shopping behavior. The rapid evolution of the technology and its impact on the mobile devices' performance, suggest to explore new factors that may influence the m-shopping experience in terms of usability and convenience. Thus, our framework considers a broad range of moderators to explore the potential generalizability of drivers of m-shopping across different contexts.

The paper is organized as follows. In the subsequent section, we present the theoretical framework and the conceptual model. Next, we introduce the methodology, including the data collection, data coding, and meta-analytic procedures. Then, we present the results of the meta-analysis. Finally, we discuss the findings and the implications for theory development, managerial insights and future research directions.

2. Theoretical background and conceptual model

2.1. M-shopping

For this study, we adopt the following definition of m-shopping: "the activities of consumers who use wireless Internet service when shopping and purchasing via a mobile phone" (Ko et al. 2009), such as searching, comparing, buying, or evaluating (Lai et al. 2012). As such, m-shopping is considered to be an application bundle of m-commerce (Groß 2016) and a part of mobile marketing. According to this perspective, m-commerce is an extension of e-commerce, and it is considered to be a separate channel that creates new value for customers (Choi 2018; Kleijnen et al. 2007). Its main differentiating characteristic is its flexibility in terms of time and location (Yun et al. 2011), made possible by the nature of mobile devices, which allows consumers to use them ubiquitously, that is, anywhere and at any time (Rodríguez-Torrico et al. 2019). Consistent with the definition by Ko et al. (2009) and the specific mobile characteristics, we consider only the shopping via a mobile phone, and not shopping via a laptop or a tablet.

Given the definition, we build a framework for m-shopping based on various aspects of the mobile customer journey, as presented in the next section (2.2). The following subsections discuss the outcome variables of the m-shopping journey (2.3), its antecedents (2.4), the moderating conditions of the relationships analyzed (2.5), and the conceptual model proposed (2.6).

2.2. A framework for the m-shopping journey

Whereas most studies on m-shopping focus on consumers' intention to use mobiles for shopping for the first time (Agrebi and Jallais 2015; Groß 2015; Wong et al. 2015), some scholars have turned their attention towards other elements of m-shopping, for example its continued use (Gao et al. 2015; Hung et al. 2012; San-Martin and López-Catalán 2013). In line with this development, and based on the general customer journey concept (Lemon and Verhoef 2016), we propose a framework for the m-shopping journey based on five steps: attitude, intention, purchase behavior, satisfaction, and continued usage intention (Figure 1).

[Insert Figure 1 about here]

2.3. The outcome variables of the m-shopping journey

Based on the framework presented in Figure 1, we consider as outcome variables all the constructs that represent the five steps of the m-shopping journey: attitude, intention, purchase behavior, satisfaction, and continuance intention.

Attitude (ATT) is defined as a person's positive or negative feeling and a learned disposition to respond in a favorable or unfavorable manner with respect to a given object or to the perceived outcomes of performing a behavior (Ajzen 1991; Fishbein and Ajzen 1975; Hew et al. 2016; Wei et al. 2009). With reference to a new technology, it reflects a person's evaluative feelings towards that new technology (Hew et al. 2016; Swilley and Goldsmith 2007). A positive attitude towards m-commerce is a good predictor of the intention to shop via this channel (Cheong and Park 2005; Hew et al. 2016; Park and Kim 2013, 2014).

Intention to adopt (INT) refers to the first time an individual considers using a technology or a channel. In particular, it represents the motivational components of a behavior, a measure of the strength of one's intention to perform a specified behavior and the degree of conscious effort exerted to perform a behavior, such as making future purchases through the mobile channel (Davis et al. 1989; Fishbein and Ajzen 1975). Used in both the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TBP), these constructs are interpreted similarly in the literature: the likelihood that consumers will use the channel to make a product purchase, their willingness to purchase products through the channel, or the perceived likelihood that they will adopt m-shopping (Mathwick et al. 2001; Natarajan et al. 2017). According to the TAM, intention is the most important determinant of one's actual behavior (Zhang et al. 2012).

In the m-commerce context, the actual behavior is defined as *purchase behavior* (PURCH), used to describe consumers' decision to complete their transactions through the mobile channel (Groß 2018). Thus, it is the probability that a channel has been used to make the actual product purchase (Pavlou and Fygenson 2006; Thomas and Sullivan 2005). Knowing why and how

consumers use their mobile devices to shop is fundamental to a better understanding of how to encourage them to make repeat purchases through their mobile devices (Lee et al. 2015).

Satisfaction (SAT) is defined as a psychological or emotional state resulting from a cognitive assessment of the gap between expectations and actual performance after an experience with a product or service (Falk et al. 2007; Oliver 1981). Here, SAT refers to the summary of the emotional response following the m-shopping experience (Agrebi and Jallais 2015; Groß 2018). The more satisfied consumers are, the greater the consumer trust and the probability of continuing to use m-shopping in the future (Chen and Demirci 2019; Rodríguez-Torrico et al. 2019).

Continuance intention (CONT) concerns customers' intention to continue using and to increase their use of m-commerce services after the initial usage (Andrews and Bianchi 2013; Chang and Chou 2011; Rodríguez-Torrico et al. 2019). Different names are used to identify the continuance intention: intention to continue shopping, continuance intention, continued usage intention, and repurchase intention (Andrews and Bianchi 2013; Chang and Chou 2011; Groß 2016; Rodríguez-Torrico et al. 2019).

2.4. The antecedents of the m-shopping journey

The five steps of the m-shopping journey might be affected by a wide range of antecedents. We base the framework for these antecedents on the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Information System success model (IS) by DeLone and McLean (1992, 2004) – extending them with other influential constructs. Specifically, the antecedents are classified into seven categories: (a) internal factors, (b) external factors, (c) utilitarian and (d) hedonic variables, (e) mobile-specific aspects, (f) consumer reactions, and (g) quality aspects. These will be discussed in the next subsections.

Internal factors

The TAM has been considered one of the most influential models of technology adoption, with two primary factors influencing individuals' intention to use a new technology: perceived usefulness and perceived ease of use (Davis, 1989). Thus, for our research, TAM suggests these two perceptual factors of individuals that affect m-shopping.

Perceived usefulness (PU) denotes "the degree to which an individual believes that using a new technology would enhance his/her performance" (Davis 1989). It is often considered to be an extrinsic and utilitarian motivation that emphasizes the valuable outcomes of mobile technologies rather than their usage (Choi 2018; Davis et al. 1992).

Perceived ease of use (PEOU) applies to individuals' belief that using the technology would require less real and mental effort (Davis 1989; Groß 2018). It reflects the utilitarian value related to enhancing users' performance (Choi 2018; Tojib and Tsarenko 2012). PEOU is suggested as a predictor of PU; specifically, the easier the mobile technology is to use, the greater the opportunity to benefit from it (Agrebi and Jallais 2015; Pipitwanichakarn and Wongtada 2019). Based on these theories and empirical findings (e.g. Natarajan et al. 2017; Wei et al. 2009; Wu and Wang 2005; Zhang et al. 2012), PU and PEOU are expected to be positive predictors of m-shopping dimensions like attitudes towards m-shopping and intention to adopt m-shopping.

External factors

The TPB posits that the human behavior is planned and determined by a set of factors based on perceptions and motivations of individuals that make reasoned decisions to engage in specific behaviors by evaluating all the information available (Ajzen 1991). Specifically, according to the TPB (Ajzen 1991), the behavioral intention to perform an activity is influenced by two constructs: subjective norm and perceived behavioral control.

Subjective norm (SN) represents individuals' perceptions and perceived social pressure that most of the people who are important to them think that they should approve or disapprove of a behavior (Ajzen 1991; Fishbein and Ajzen 1975; Ghazali et al. 2018), including mobile technology adoption (Ghazali et al. 2018). Several studies indeed find that SN is an influential factor for the

adoption of mobile technologies in various contexts and application settings (Nysveen et al. 2005; Yang et al. 2012). Therefore, we expect that SN is an antecedent of m-shopping.

Perceived behavioral control (PBC) refers to the perceived ease or difficulty of performing the behavior (Ajzen 1991) or perceptions of internal and external constraints on behavior (Taylor and Todd 1995). In other words, it indicates individuals' belief that the specific behavior is under their control versus determined by external factors. With reference to the m-shopping context, PBC pertains to the extent to which consumers own sufficient knowledge and capabilities about smartphones, mobile services, mobile applications, or m-shopping transactions and use (Yang 2012). When consumers are able to control an activity, they develop positive feelings that stimulate their acceptance of a new technology (Bateson and Hui 1987). Conversely, when consumers perceive a lack of control when using a new technology, their negative feelings reduce their tendency to accept it (Hoffman et al. 1999). Thus, we expect that PBC is positively correlated with m-shopping (Nysveen et al. 2005; Yang 2012).

Utilitarian variables

The UTAUT model (Venkatesh et al. 2003, 2012) adds new constructs to the TAM and TPB, such as utilitarian vs. hedonic orientations to explain the users' technology acceptance and usage intention. According to Chen and Demirci (2019), the utilitarian aspects of shopping orientation result from a conscious pursuit of an intended outcome and are task oriented, efficient, and rational values. They are extrinsic motivators that refer to shopping as a transaction that needs to be completed. Among the utilitarian aspects, we consider the constructs of performance expectancy, effort expectancy, and perceived risk.

Performance expectancy (PERF) indicates the degree to which individuals believe that using a particular system will help them to accomplish tasks with good performance (Venkatesh et al. 2012). Regarding m-shopping, PERF reflects the degree to which customers consider that using this channel can help them to purchase a product while saving costs, time, and effort (Celik 2016;

Chang et al. 2016). According to prior studies, it is a strong predictor of the intention to use mobile technologies for shopping (e.g., Blaise et al. 2018; Zhang et al. 2012).

Effort expectancy (EFF) is the extent to which consumers believe that a (new) technology would be effort free and easy to learn and use (Venkatesh et al. 2003). In relation to m-shopping, it refers to the ease associated with using the mobile to purchase a product (Celik 2016; Chang et al. 2016). Hence, based on this reasoning and the existing empirical findings (e.g. Hsu and Yeh 2018; Tarhini et al. 2019), EFF is expected to have a positive impact on m-shopping.

Perceived risk (RISK) indicates uncertainty about the potential outcomes of a behavior and the possible associated unpleasantness of these outcomes (Chang et al. 2005; Gensler et al. 2012; Kim et al. 2009; Verhoef et al. 2007; Wu and Wang 2005). For the mobile channel, it represents consumers' perceived uncertainty about buying products through a specific channel due to problems such as payment issues, a lack of privacy, and potential uncertain negative outcomes from the mobile transaction (Chang et al. 2016; Chopdar and Sivakumar 2018, 2019). Therefore, due to the initial uncertainty about m-shopping activities, perceived risk is found to be an important (negative) predictor of m-shopping (Chopdar and Sivakumar 2018, 2019; Zhang et al. 2012).

Hedonic variables

Hedonic aspects are subjective and personal, with a focus on fun and playfulness (Babin et al. 1994; Chen and Demirci 2019). Hedonic shopping orientation is connected to surprise, excitement, and the desire to be entertained and to have fun during the purchasing activity (Chen and Demirci 2019; Groß 2015). Here, we consider the flowing hedonic aspects of m-shopping: innovativeness, hedonic value, and enjoyment.

Innovativeness (INNO) is defined as individuals' tendency to seek novelty or to be more receptive to new ideas in general or within a particular product field (Cha 2011; Chang et al. 2005). Since m-shopping is a relatively new concept, its adoption might be influenced by the tendency to seek new ideas actively, that is, personal innovativeness (Lee et al. 2012).

Hedonic value (HEDO) refers to the implicit entertainment and emotional (subjective and self-oriented) value of shopping, more specifically m-shopping (Chang et al. 2016; Hubert et al. 2017). Prior research states that the hedonic value that motivates individuals is a well-established predictor of customers' behavior and decision making (Hubert et al. 2017; Venkatesh et al. 2012). Therefore, it is expected to affect positively the intention to use a mobile for buying-related activities.

Enjoyment (ENJOY) signifies the intrinsic reward derived from the technology use or the perceived shopping experiences derived from purchasing through a channel (Cha 2011; Lu and Su 2009; Verhoef et al. 2007). As far as the mobile channel is concerned, ENJOY reflects consumers' direct experience of pleasure and joy from using their mobile for shopping (Agrebi and Jallais 2015; Chong 2013). The literature on technology acceptance suggests that enjoyment is a significant predictor of behavioral intentions (Pipitwanichakarn and Wongtada 2019). As shown in previous studies on m-shopping (e.g. Chong 2013; Pipitwanichakarn and Wongtada 2019; Rodríguez-Torrico et al. 2019; Tarhini et al. 2019), higher levels of enjoyment may lead to positive attitudes towards m-shopping, increased satisfaction, and a higher likelihood of engaging in m-shopping in the future.

Mobile-specific aspects

Given the innovative nature of mobile technology, we include specific additional antecedents in the model predicting m-shopping. First, *previous digital experience* (EXP) could be important, as it indicates individuals' prior user experience with mobile phones and familiarity with buying products online through a PC, tablet, smartphone, or apps (Swilley and Goldsmith 2007). Experiences with another technological system are expertise and skills that encompass users' past exposure to a particular technology and create a baseline for comparison for the future usage of related systems (Swilley and Goldsmith 2007). In the digital shopping environment, experience with e-commerce (Chopdar and Sivakumar 2018, 2019) is positively associated with involvement in m-commerce, leading to greater levels of intention to use it (Swilley and Goldsmith 2007). Therefore, EXP with online shopping may be an antecedent of m-commerce attitudes, intentions, and behavior.

Second, *ubiquity* (UBI) concerns time and spatial flexibility that allows consumers to be connected at any time and in any place (Rodríguez-Torrico et al. 2019), which is a key characteristic of mobile technology. For m-shopping, it deals with the extent to which users can conduct smartphone-based m-shopping anytime and anywhere, accessing necessary information and services, not only moving seamlessly between different devices but also using several devices simultaneously (Choi 2018). This brings high levels of convenience to mobile users' life, which in turn enhances m-shopping adoption and behavioral intentions to use mobiles for purchases (Choi 2018; Kourouthanassis and Giaglis 2012; Li et al. 2012).

Consumer reactions

In the context of m-shopping, *trust* (TRU) represents the extent to which one believes that mobile usage for shopping will be reliable, credible, secure, and exempt from privacy threats (Chang et al. 2005, 2016; Falk et al. 2007; Groß 2018). Furthermore, TRU may deal with the confidence in the mobile channel as a whole or in a particular mobile vendor (Chang et al. 2005; Groß 2018; Wei et al. 2009). It is one of the variables that most influence consumers' repurchase intention (Chong 2013; Köster et al. 2016). Therefore, we expect that TRU is positively associated with m-shopping continuance intention (Gao et al. 2015; Hung et al. 2012; Pipitwanichakarn and Wongtada 2019).

Quality aspects

The quality of the mobile channel may have an impact on m-shopping (Gao et al. 2015), and quality has three components – system quality, information quality, and service quality (Hew et al. 2016).

Information quality (INFOQ) pertains to the content of the information displayed by the system, measuring the channel's quick access to low-cost and useful information (Aladwani and Palvia 2002; Petter and McLean 2009). In relation to the mobile channel, it refers to the accuracy, completeness, understandability, timeliness, and availability of information provided by the mobile site or app (Gao et al. 2015; Hew et al. 2016; Petter and McLean 2009). INFOQ plays a crucial role

in developing a positive attitude towards the benefits of using a specific information technology, and it is considered to be a key antecedent of users' satisfaction (Tam and Oliveira 2016).

System quality (SYSTMQ) refers to the technical and functional characteristics of an information system pertaining to reliability, flexibility, accessibility, and timeliness (Aladwani and Palvia 2002; Petter and McLean 2009). As far as the mobile channel is concerned, it deals with consumers' perceptions of the general and common support functions of information searching provided by the mobile in terms of query and search supporting functions and mobile reliability (Hew et al. 2016; Tarhini et al. 2019). SYSTMQ is expected to have a direct and positive effect on mobile users' satisfaction (Hew et al. 2016; Petter and McLean 2009; Tarhini et al. 2019; Wang 2008).

Service quality (SERVQ) stands for a global judgement about the superiority or excellence of the service provided due to the comparison of expectations and performance (Chang et al. 2005; Parasuraman et al. 1988; Verhoef et al. 2007). It is the extent to which consumers perceive the system to be secure, credible, and reliable (DeLone and McLean 2004). Regarding the mobile channel, SERVQ indicates consumers' subjective evaluation of the perception of the services delivered through the channel during the purchase in terms of their tangibility, reliability, empathy, responsiveness, and assurance (Hew et al. 2016; Tarhini et al. 2019). Therefore, SERVQ could positively influence mobile users' satisfaction and m-shopping in general (Hew et al. 2016; Wang 2008).

2.5. Moderators

The impact of the antecedents on the m-shopping journey outcomes might be dependent on additional factors. In particular, based on the reviews by Groß (2018), Hubert et al. (2017), and Zhang et al. (2012), we consider moderators related to the empirical context and study characteristics (Table 1), namely year, app, product type, culture, and several general background and methodological control variables.

[Insert Table 1 about here]

In the course of the last two decades, mobile devices have increased their functionality and convenience. In addition, companies have created mobile apps and mobile-compatible websites, providing consumers with additional shopping platforms (Marriott et al. 2017). As a result, m-shopping has become an alternative and improved option for searching, browsing, comparing, and purchasing products and services on the Internet (Groß 2014; Holmes et al. 2014; Lu and Su 2009; Marriott et al. 2017; Yang and Kim 2012). To capture these developments, we examine the moderating role of the *year of publication*. Based on the penetration of mobile devices and the diffusion of mobile connectivity (Statista 2021b), we segment the analysis period from 2000 to 2020 into three time slots: 2000–2007 (the initial phase based on traditional technology), 2008–2015 (the advent of the iPhone, smartphones, and 4G), and 2016–2020 (the new generation of mobile devices, mobile apps, and mobile-compatible websites).

The proliferation of *mobile apps* has changed the way in which consumers interact and shop. Apps let mobile users shop easily and quickly and offer them a more accessible and customized shopping experience (Chopdar and Sivakumar 2018, 2019; Kim et al. 2013; McLean et al. 2020). Thus, we expect that whether or an app is used may moderate the impact exerted by the antecedent variables on the outcome variables. For these reasons, we identified studies that investigate m-shopping via mobile apps versus studies investigating m-shopping via mobile internet sites.

The type of product influences both the channel choice (Bouwman and Van de Wijngaert 2003) and the transaction process in the digital environment. Hence, *product type* may moderate the relationships in our conceptual model, for example the role of perceived risk (Hassanein and Head 2004) or trust in the retailer (Hassanein and Head 2004). The most commonly used classification distinguishes products into tangible and intangible goods (Lal and Sarvary 1998) according to their characteristics and the possibility of inspecting them physically. Another relevant classification is based on the nature of the search and evaluation process and categorizes products into search, experience, and credence goods (Cha 2011). Here, we examine the moderating role of the two product type classifications on the impact exerted by the antecedent variables.

Human perceptions of and reactions to new technologies could be influenced and shaped by the *cultural environment* (Hofstede 1984; Zhang et al. 2012). In line with this, the role of various antecedents of m-shopping may vary across cultures (Baptista and Oliveira 2015; Hung and Chou 2014; San-Martín et al. 2016). Consistent with prior research (e.g. Baptista and Oliveira 2015; Chopdar and Sivakumar 2018, 2019), we apply the six cultural dimensions of Hofstede (1984) (see Table 1) to determine the impact of cultural values on m-shopping.

Finally, we test for several general background and methodological moderators, namely the research stream (marketing and communication, economics, business and management, information technology, computer science, psychology, general engineering, and arts and humanities), the journal ranking (top journals versus non top journal, based on the ABS journal ranking), the discipline of the journal (i.e., marketing versus other fields), and the type of subject (whether the respondents are only students or all non-students or not only students). For descriptive statistics for the moderators see the "Web Appendix B".

2.6. Conceptual model

Based on the discussions in the previous subsections, we propose a conceptual model for the m-shopping journey and its antecedents. Figure 2 shows the conceptual model for empirical testing with all the relationships that we include in the meta-analysis. For each relationship, we indicate the positive (+) or negative (-) value of the correlation. All the constructs considered are described in Table A3 in Web Appendix A.

[Insert Figure 2 about here]

3. Research method

To investigate the conceptual framework presented in Figure 1 and the relationships presented in Figure 2, we conduct a meta-analysis to obtain generalizations based on the existing literature (Grewal et al. 2018; Kirca and Yaprak 2010). Specifically, we follow three phases – data collection, data coding, and data analysis – in accordance with the previous meta-analysis studies in

marketing (e.g. Arts et al. 2011; Bijmolt et al. 2005; Blut et al. 2018; Brown and Lam 2008; Floyd et al. 2014; Sethuraman et al. 2011).

3.1 Data collection

An overall search of the literature on m-shopping from 2000 to 2020 was conducted to identify empirical research on consumer behavior on mobile devices. Specifically, we adopted a series of search strategies with the aim of collecting and obtaining a comprehensive set of both published and unpublished studies related to different disciplines. First, we searched full-text electronic databases such as Business Source Complete, ScienceDirect, JSTOR, Web of Science, Scopus, ProQuest, and EBSCO. Second, to increase the sample size and to attenuate publication bias (Rosenthal 1979), we searched Google Scholar and the World Wide Web. This enabled us to include sources of grey literature and to identify relevant working papers, books, dissertations, and conference proceedings. Third, we screened the references of literature reviews, meta-analyses, and empirical papers according to several keywords related to m-shopping and combinations of them (i.e. mobile shopping, mobile commerce, m-shopping, m-commerce driver, factor, determinant, antecedent, predictor, intention, continuance, trust, behavior, choice, acceptance, risk, involvement, and purchase).

To be included in the meta-analytic database, a study had to meet several inclusion criteria. Specifically, the study must empirically investigate consumer shopping behavior on mobile devices (smartphone and not laptops or tablets), and have been published between 2000 and 2020. In addition, as we will examine Pearson's product–moment correlation coefficient *r* as the effect size, correlation coefficients or other metrics that can be converted into correlations have to be reported. Finally, when the full text was not available or information was missing, we contacted the authors of the manuscript. Thus, studies were excluded because they focused on e-commerce, mobile payments or gaming, shopping via laptops or tablets or because they did not report the statistics necessary for the meta-analysis or only contained results from qualitative studies or literature reviews.

Initially, we obtained a sample of 465 sources, including 363 journal articles and 102 conference proceedings or working papers. Next, each article was reviewed to determine whether it met the criteria for inclusion in this meta-analysis and to evaluate the availability of data and relevant effect sizes, such as correlation coefficients, or other metrics that could be converted into correlations. In the end, the number of valid sources for the analysis reduced to 207 articles (190 journal articles and 17 conference proceedings), with 228 studies, 4,354 effect sizes, a total sample size of 68,944 shoppers, and the timespan January 2000–February 2020. A complete list of all publications included in the meta-analysis is provided in Table A1 in the Web Appendix A.

The number of contributions has increased considerably in the last 5 years, with 62.3% of the articles from 2016 to 2020 (see Table B5 in Web Appendix B), confirming the relevance of the m-shopping phenomenon in recent years (see Figure B1 in Web Appendix B). Furthermore, the majority of the contributions pertain to business and management (27.1%) and marketing (26.1%) followed by information systems (13.0%). Other relevant research streams are arts and humanities (6.3%), economics (5.3%), general engineering (5.3%), social sciences (4.3%), communication (2.4%) and psychology (1.4%), thus confirming the interdisciplinary nature of the topic (see Table B1 in Web Appendix B). For journal articles, a large number of the contributions are published in the Journal of Retailing and Consumer Services (16 articles), International Journal of Mobile Communications (15 articles), and Computers in Human Behavior (12 articles).

3.2 Data coding

After the data collection phase, we carried out systematic coding of the 207 articles according to the coding protocol and coding manual established at the beginning of our research project, which we checked and tested on a sample selection of manuscripts to minimize ambiguity in the coding process. Table A2 in Web Appendix A shows the structure of the coding manual and the information included.

Each paper was examined to collect all the information needed for the meta-analysis (variables and effect sizes; see Table A2 in Web Appendix A). We identified the useful variables for the research and included them in the coding manual based on their operationalization. Furthermore, when different names were used for highly similar constructs, we considered them to be equal and included them as such in the proposed framework (Figures 1 and 2). Besides information on publication characteristics, effect sizes, and key variables, additional data on moderators were included in the coding manual.

As mentioned when discussing the inclusion criteria, *Pearson's r* was used as the effect size. When a correlation is not reported in the paper, other statistical indexes (e.g. the regression coefficient β, χ^2, and t) were transformed into *Pearson's r* (Gelbrich and Roschk 2011; Hunter and Schmidt 2004; Rosenthal 1991). Standardized regression coefficients were included in the analysis after being transformed into *Pearson's r* following Peterson and Brown's (2005) formulas. Finally, *Pearson's r* was transformed into *Fisher's Z* before conducting the analyses.

3.3 Data analysis

To assess the framework of antecedents and moderators of the m-shopping journey presented in Figures 1 and 2, we apply meta-analytic methods. In particular, we conduct the analysis in three steps. First, we examine the bivariate relationships between the antecedents and the outcomes of the m-shopping journey. Second, to assess the strength and generalizability of the antecedent–outcome relationships, we conduct meta-analytic regressions estimating the moderator effects. Finally, we examine the entire proposed framework for m-shopping (Figure 2) using meta-analytic structural equation modelling (MASEM) (Becker 2001; Bergh et al. 2016; Cheung 2015; Cheung and Chan 2005; Cooper et al. 2009; Jak 2015; Viswesvaran and Ones 1995).

3.3.1 Bivariate relationships

First, we examine the bivariate relationships between the antecedents and the outcomes of the m-shopping journey and compute various descriptive statistics for each relationship (Table 2).

[Insert Table 2 about here]

For each relationship, we conduct a random-effect model and inverse variance weighting for pooling effect sizes, and we use the restricted maximum likelihood method (REML) to estimate the between-study variance (Raudenbush 2009; Viechtbauer et al. 2015). These models without any explanatory variables yield estimates for the average effect size for each relationship. In addition, heterogeneity is evaluated considering the *I-squared* (i.e. the percentage of variance that is due to study heterogeneity rather than chance) and the related *Cochran's Q* (which is distributed as the *Chi-square* and indicates the probability that the observed between-study heterogeneity is attributable to chance) (Cooper et al. 2009; Higgins et al. 2003; Huedo-Medina et al. 2006). If $I^2 = 0$, the results show perfect homogeneity, while, if I^2 is large, it is reasonable to consider meta-regression to explain the potential causes of the variance (Higgins et al. 2003; Huedo-Medina et al. 2006). Finally, publication bias is addressed by computing the *fail-safe N* for each relationship, which provides the number of studies that report non-significant zero results to be included in the sample to change a result from significant to non-significant (Hunter and Schmidt 2004; Rosenthal 1979).

3.3.2 Moderation analysis

Next, we examine the effects of the moderators on the antecedent–outcome relationships (Tables C1, C2 and C3 in Web Appendix C). Here, we limit the moderator analysis to relationships with at least ten observed effect sizes, which leads to the exclusion of two relationships in this stage ($k < 10$), which are UBI-CONT and EXP-CONT. When the moderators are continuous (e.g. Hofstede's cultural dimensions), meta-regressions are performed to estimate and test the linear effect of the moderator on the considered effect size. When the moderators are categorical, Q-tests are used to test whether the effect size varies significantly across the groups defined by the moderator. The Q-test is similar to ANOVA as it compares the between-study heterogeneity with the within-study heterogeneity and supplies the related probability that differences in heterogeneity across studies are due to chance (Wilson and Lipsey 2001). A significant Q-test indicates that heterogeneity between

levels of moderators is sufficiently large not to be caused entirely by chance alone, and then the effect size is assumed to differ between levels of the moderator. Furthermore, interactions between moderators were not considered, because of reasons of parsimony and the lack of theory supporting interactions between the moderators.

3.3.3 Structural equation modelling

In the third analysis step, we test the framework for m-shopping (Figure 2), for which we adopt the two-stage approach (TSSEM) to MASEM (Cheung and Chan 2005; Jak 2015), using both R and LISREL 8.80. Specifically, MASEM is the combination of meta-analysis and structural equation modelling with the aim of testing hypothesized models based on combined data from several studies. Information from multiple studies is combined to test a single model and to explain the relationships between a set of variables (Bergh et al. 2016; Jak 2015; Viswesvaran and Ones 1995), even if few or none of the studies report all the relationships in the framework (Jak 2015). By combining data on a large number of relationships and from a large number of studies, the findings from MASEM provide a more powerful and in-depth basis for a quantitative synthesis of research findings than those obtained through traditional meta-analysis or traditional SEM (Bergh et al. 2016; Cheung and Chan 2005; Jak 2015).

The TSSEM approach consists of two stages. In stage 1, correlation coefficients are combined to develop a pooled correlation matrix. In stage 2, a structural equation model is fitted to the pooled correlation matrix from stage 1 using weighted least squares (WLS) estimation methods (Cheung and Chan 2005; Jak 2015). As suggested by Jak (2015), for stage 1, we use the R-package metaSEM (Cheung 2015) to form the pooled correlation matrix (Table C4 in Web Appendix C).

For stage 2, one can use basically any SEM program. Again following the suggestions by Jak (2015), we apply LISREL 8.80 as it can read the weight matrix in addition to the pooled correlation matrix formed in stage 1. Furthermore, it automatically adds smoothing solutions to maintain the positive matrix without affecting the data and relationships (Eby et al. 1999; Jöreskog and Sörbom 1989; Wothke 1993).

The basis for the MASEM analysis is the results from the analysis of the bivariate relationships. For the sample size in the MASEM estimation, we use the harmonic mean sample size as input, n = 1,127 (Bergh et al. 2016; Landis 2013; Viswesvaran and Ones 1995) as it limits the influence of very large values and is smaller than the arithmetic mean (Johnson et al. 2001; Landis 2013; Viswesvaran and Ones 1995).

As far as the fit of the MASEM model is concerned, we consider a range of multiple fit indices, namely the chi-squared value (χ^2), the comparative fit index (*CFI*), the goodness of fit index (*GFI*), the standardized root mean residual (*SRMR*), and the root mean square error of approximation (*RMSEA*) (Bergh et al. 2016; Cheung and Chan 2005; Jak 2015).

4. Results

4.1 Bivariate meta-analytic correlations

For each relationship between an antecedent and an outcome variable, Table 2 reports the number of observed effect sizes (*k*), cumulative sample size (cumulative *N*), average *Pearson's r*, *r-to-Z* transformation and its standard error, 95% confidence interval for *Z*, I^2 and the related *Q* for heterogeneity, and *fail-safe N*. As shown in Table 2, the number of observed effect sizes for each pair of variables ranges from 5 (PURCH–SAT) to 72 (PEOU–PU), with a median value of 18.50. The cumulative sample size ranges from 1,799 to 25,187, with a mean value of 7,926. The average correlation ranges from 0.40 to 0.69, except for the correlation between EXP and INT *(r* =.264), and between INT and RISK (*r* = -.016). Importantly, all these bivariate relationships are positive and significant except for the INT–RISK relationship, which is negative but not significant. For the antecedents of intention to adopt m-shopping from the most cited theories (TAM, TPB, and UTUAT), all the relationships are relatively large and significant ($r > 0.4$; $z >= 0.5$; $p < 0.001$). As regards the nature of the variables – utilitarian versus hedonic – all the relationships except for RISK show significance without substantial differences in the terms of *Fisher's z* value ($r > 0.4$; $z > 0.5$; $p <$

0.001). Among the mobile-specific aspects, ubiquity is the variable that shows the largest correlation with intention ($r = 0.689$; $z = 0.846$; $p < 0.001$).

As far as the antecedents of continuance are concerned, all the relationships of the triad SAT–TRU–CONT show large correlations ($r > 0.4$; $z > 0.6$; $p < 0.001$). Specifically, SAT shows large correlations with ENJOY ($r = 0.466$; $z = 0.505$; $p < 0.001$) and with the three quality variables – INFOQ, SYSTMQ, and SERVQ ($r > 0.4$; $z > 0.5$; $p < 0.001$).

All the bivariate effects show strong heterogeneity (all the I^2s are greater than 0.80 and most of them are greater than 0.90), which is not due only to chance, as indicated by the values and significance of *Cochran's Qs*. This indicates that moderation should be examined for all the considered relationships. Finally, all the relationships have a very high *fail-safe N*, which passes Rosenthal's (1979) tolerance level (i.e. $5 \times k + 10$, where k is the number of correlations), suggesting little to no publication bias.

4.2 Analysis of moderation

Table C1 in Web Appendix C shows the effects of the continuous moderators (Hofstede's dimensions) on each pair of considered variables. For example, power distance influences the relationship between INT and INNO, so that it increases as the power distance increases (accounting for 20.15% of the heterogeneity). Individualism affects the relationship between INT and EFF: the relationship increases as cultural individualism increases (accounting for 18.68% of the heterogeneity). Uncertainty avoidance acts on the PU–ATT relationship: this relationship decreases as uncertainty avoidance increases (accounting for 26.74% of the heterogeneity). The long-term orientation is the only dimension that exerts an impact on many aspects of m-shopping. As shown in Table C1 (in Web Appendix C), it shapes several relationships: as long-term orientation increases, the relationships between INT and ATT (20.58% of the heterogeneity), INT and HEDO (27.91% of the heterogeneity), INT and EFF (52.70% of the heterogeneity), INT and PERF (24.29% of the heterogeneity), and SAT and TRU (18.62% of the heterogeneity) decrease. On the contrary, the

relationship between ENJOY and SAT increases as cultures are more long-term oriented (accounting for 32.06% of the heterogeneity).

In general, apart from the moderator effects by long-term-orientation, relatively few of the moderator effects are significant, suggesting that cultural dimensions have little or no systematic influence on the relationships. Therefore, opposite to previous contributions (Zhang et al. 2012), our results indicate that the relationships considered are hardly affected by the cultural context, as shown by the non-significant impact of most of Hofstede's cultural dimensions on most bi-variate relationships.

As regards the effect of categorical moderators (Tables C2 and C3 in Web Appendix C), our findings show that m-shopping behavior is most influenced by year, that means the variables reflecting the evolution of technological innovations and the consequent improvement of the functionality and convenience of mobile devices. Year has the greatest impact on the relationships investigated (eight relationships), specifically those related to hedonic aspects, quality, satisfaction, and previous experience. As time passes, consumers gain more experience with mobile devices and start to give importance to hedonistic aspects in addition to utilitarian ones. The third phase (2016–2020), related to the diffusion of the new generation of mobile devices, mobile apps, and mobile-compatible websites, is the most relevant in moderating the relationships. Previous experience with digital tools for shopping is important in the initial phase (2000–2007) and in the second phase (2008–2015), referring to the advent of the iPhone and smartphones, while it loses its influence in the third phase (2016–2020) as users have become more familiar with the new technologies.

App usage, versus online shopping on a website using a mobile, does not significantly affect most relationships in the m-shopping journey. However, it does enhance the strength of the relation between intentions and perceived behavioral control, hedonic value (at $p < .10$), and previous digital experience (at $p < .01$). In addition, the app strengthens the relationship between quality of the system and satisfaction (at $p < .01$).

Regarding the effect of the product type, services and credence goods influence the actual behavior of consumers more than the other product types. Thus, the nature of the goods and the possibility of inspecting them physically influence m-shopping behavior. Both service and credence goods, in fact, are products that consumers can evaluate only after the purchase and consumption.

The type of research, the type of respondents and the journal ranking do not significantly influence the relationships between the antecedents and the dependent variables, which signals generalizability of the bivariate relationships across various methodological conditions. Finally, only the associations between subjective norm and intention and innovativeness and intention are affected by the discipline of the journal: these effects are stronger when obtained from marketing journals.

4.3 Structural equation modelling

In the third analysis step, we conduct a MASEM analysis of the framework in Figure 2. The proposed model shows a moderate to good fit comparable to previous meta-analyses (e.g., Hogreve et al., 2017): χ^2 (93) = 1772.530 ($p < .001$), χ^2/df = 19.05; *RMSEA* = 0.115; *AGFI* = 0.724; *CFI* = 0.849; *SRMR* = 0.105; *NFI* = 0.843; *GFI* = 0.889. Figure 3 shows the final structural model with all the path coefficients and the significance level for each of the 26 relationships.

[Insert Figure 3 about here]

In general, the MASEM results (Figure 3) confirm the results of the bivariate analyses. Specifically, of the 26 bivariate relationships tested again using METASEM, 22 effects are positive and significant at the 0.05 level. The results show strong relationships between most antecedents and outcome variables and highlight a clear pattern of relationships between the subsequent steps of the m-shopping journey, as proposed by several theories related to m-shopping (namely the TAM, TPB, UTAUT, and IS success model).

Specifically, the positive influence of attitude and its antecedents (perceived usefulness and perceived ease of use) on m-shopping intention is supported (Cheong and Park 2005; Hew et al. 2016; Park and Kim 2013, 2014). However, the impact of external factors on the intention to adopt

m-shopping is found not to be significant (i.e., perceived behavioral control) or significant only at $p<0.05$ (i.e., subjective norm) in our meta-analytic structural equation model. This is contrary to the results of the bivariate meta-analysis, which were in line with previous literature (Blaise et al. 2018; Nysveen et al. 2005; Yang 2012). The divergence in the results obtained from the two methods is because the SEM considers the effects of multiple antecedents simultaneously while the meta-analytic model studies the correlations between two variables individually.

Mobile-specific variables also emerge as relevant to the various steps of the m-shopping journey. More precisely, ubiquity impacts both behavioral intention and continuance intention, confirming the importance of being connected everywhere and at all times in stimulating m-shopping adoption. This result strengthens prior studies (Choi 2018; Kourouthanassis and Giaglis 2012; Li et al. 2012) that focus on the relationship between convenience enabled by ubiquity and behavioral intention to use mobiles for purchases.

As far as the nature of the variables (utilitarian versus hedonic) is concerned, all the relationships – except for perceived risk (Chang et al. 2005; Gensler et al. 2012; Verhoef et al. 2007; Wu and Wang 2005) – show comparable significant effects. Hedonic aspects act on mobile consumers' intention to use m-commerce (Groß 2015; Yang et al. 2015): the perceived enjoyment and the hedonic value are key drivers of adoption (Tarhini et al. 2019; Zheng et al. 2019).

Satisfaction is affected by enjoyment and by the three components of quality, namely system quality, information quality, and service quality. Next, these quality dimensions and enjoyment are also important for continuance, based on the indirect influence through the mediating effect of satisfaction (Hew et al. 2016; Kim et al. 2009; Pipitwanichakarn and Wongtada 2019). Our results confirm that satisfaction is a predictor of continuance behavior and an essential driver of repurchase intention via mobile devices (Chong 2013; Gao et al. 2015; Hew et al. 2016; Hung et al. 2012; Lee et al. 2015; Rodríguez-Torrico et al. 2019). Moreover, in line with prior studies, trust is one of the variables that most influence consumer repurchase intention (Chong 2013; Köster et al. 2016) and is positively associated with m-shopping continuance intention (Gao et al. 2015; Hung et

al. 2012; Pipitwanichakarn and Wongtada 2019). Therefore, as regards the antecedents of continuance, all the relationships of the triad satisfaction–trust–continuance show large correlations.

In addition, in our meta-analytic structural equation model, previous digital experience is found to act significantly on continuance intention, opposing prior research on this relationship (Swilley and Goldsmith 2007). Thus, prior m-commerce experience is important for consumers when deciding to continue using mobile devices to make purchases (Gao et al. 2015; Okazaki and Mendez 2013).

5. Conclusion and Discussion

5.1 Key findings and implications

Over the last two decades, a rich strand of empirical studies has been conducted on the drivers of m-shopping by consumers. Our research integrates the existing empirical findings and thereby provides comprehensive insights into the five steps of the m-shopping journey: attitude, intention, purchase behavior, satisfaction, and continuance usage intention. Given the importance to retain mobile consumers over time (Lee et al. 2015), we consider both drivers of initial adoption and continued usage of mobile devices for shopping. In addition, we investigate the moderators of the antecedent relationships of the m-shopping journey, while embedding them in a new framework (Figure 1). Finally, we extend the meta-analysis by Zhang et al. (2012), investigating literature on the topic of m-shopping published in eight more years. Thus, our meta-analytic findings integrate, update and expand the knowledge on m-shopping behavior, providing an interdisciplinary and comprehensive view that offers theoretical and managerial insights. To highlight the contribution of our work for retailers and academics, we summarize the key takeaways and implications of our meta-analysis in Table 3.

[Insert Table 3 about here]

5.2 Theoretical implications

From a theoretical perspective, our meta-analysis contributes to the m-shopping literature by providing empirical generalizations on the strength of the key drivers and the conditions that moderate these relationships (see Table 3). Specifically, our work contributes to the m-shopping literature in five ways.

First, we show that m-shopping literature has been effective in identifying key drivers of m-shopping journey confirming the validity of the most cited theories (TAM, TPB and UTAUT) in m-commerce adoption research, as almost all the relationships are found to be relatively large and statistically significant. Consistent with TAM (Davis 1989), PU and PEOU are confirmed to be positive predictors of m-shopping attitudes which in turn is a good predictor for the intention to shop via this channel (Cheong and Park 2005; Hew et al. 2016; Park and Kim 2013, 2014). Consistent with the TPB (Ajzen 1991), the behavioral intention to adopt m-shopping is influenced by the subjective norm. Furthermore, in line with UTAUT (Venkatesh et al 2012), the utilitarian aspects of m-shopping orientation are extrinsic motivators for m-shopping. In addition, hedonic aspects are confirmed to be important predictors (Hubert et al. 2017; Venkatesh et al. 2012): the emotional (subjective and self-oriented) value of m-shopping and higher levels of enjoyment lead to higher levels of intention towards m-shopping, increased satisfaction, and a higher likelihood of engaging in m-shopping in the future. Overall, our results confirm that knowing why consumers use their mobile devices to shop is fundamental to a better understanding of how to encourage them to make repeat purchases through their mobile devices (Lee et al. 2015).

Second, in addition to the drivers of m-shopping based on TAM, TPB and UTAUT, we demonstrate the influence of variables related to the innovative nature of mobile technology (Choi 2018; Kourouthanassis and Giaglis 2012; Li et al. 2012). Among the mobile specific aspects, ubiquity shows the largest relationship with m-shopping adoption: the time and spatial flexibility that allows consumers to access smartphone-based m-shopping information and services anytime and anywhere is confirmed to be a key driver in the m-shopping journey. Our results show that previous digital experience acts significantly on continuance intention. Familiarity with digital shopping is a kind of

expertise and skill that encompasses users' past exposure to a digital technology and creates a baseline for the future usage of mobile systems. Finally, consistent with the IS success model by DeLone and McLean (1992, 2004), the three quality components of the mobile channel – system quality, information quality, and service quality – strongly influence mobile users' satisfaction and progress through the m-shopping journey.

Third, we deepened the role of changes over time and whether or not an app was used as indicators of the technological evolution and the improvements of the functionality and convenience of mobile devices. The influence of hedonic aspects, quality, satisfaction, and previous experience on m-shopping changes significantly over time. Specifically, in recent years (2016–2020), technologies related to the diffusion of the new generation of mobile devices, mobile apps, and mobile-compatible websites have become more important for m-shopping. However, previous experience with digital tools for shopping was important in the early days of m-shopping, in the periods 2000–2007 and 2008–2015, compared to recent years (2016–2020). Whether or not an app is used for m-shopping moderates the importance of hedonic aspects, quality for satisfaction as well as the relationship between previous digital experience and intention. This confirms the importance of mobile apps for allowing consumers to shop easily and quickly and offer them a more accessible and customized shopping experience with reduced cognitive, physical, and psychological efforts (Chopdar and Sivakumar 2018, 2019; Kim et al. 2013; McLean et al. 2020).

Fourth, we examined the role of cultural values, in particular Hofstede's (1984) cultural dimensions. We find a systematic and significant influence of long-term orientation: cultures scoring high on this cultural value emphasize the utility of m-shopping as they adopt a pragmatic approach to life and give priority to both monetary and time savings. However, contrary to previous studies (Zhang et al. 2012), we find that the drivers of m-shopping are not or hardly influenced by the cultural environment. This finding suggests that m-shopping is becoming a global phenomenon, where the drivers of m-shopping by consumers do not vary strongly across different cultural contexts.

Fifth, our findings underline the importance of mobile shoppers' trust and satisfaction: all the relationships of the triad satisfaction–trust–continuance show large and statistically significant relationships. Consumer trust in m-shopping is demonstrated to be one of the key drivers of m-shopping continuance intention (Rodriguez-Torrico et al. 2019), and, consequently, the success of m-shopping. Also, our results confirm that satisfaction is a fundamental predictor of continuance behavior and an essential driver of repurchase intention via mobile devices: the more satisfied consumers are, the greater the consumer trust and the probability of continuing to use m-shopping in the future. Next, our meta-analysis finds that enjoyment and the three components of quality (information quality, system quality, service quality) are the key drivers of satisfaction and trust, and thereby of continued usage of m-shopping by consumers.

5.3 Managerial implications

From a managerial perspective, our work offers relevant insights for m-commerce practitioners as it identifies the most effective variables in stimulating m-shopping throughout the customer journey (for an overview of the key findings and implications, see Table 3).

First, companies should focus on factors that increase consumer willingness to adopt mobile technology and to make purchases through m-shopping. In line with the innovative nature of mobile technology, our findings underline the relationship between convenience enabled by ubiquity and behavioral intention to use mobiles for purchases. Thus, companies should develop strategies and tactics (e.g. the app of an online shop) that make m-shopping more useful, easy to use, and convenient and that allow m-shopping anywhere and anytime.

Second, as both utilitarian and hedonic factors are important drivers of m-shopping, managers should pay attention to both utilitarian (performance expectancy and effort expectancy) and pleasure-seeking (hedonic value and enjoyment) aspects to stimulate the intention to use a mobile for purchasing, to gain new customers, and to keep existing customers. Thus, mobile websites and apps should be both suitable and pleasant to enhance the shopping experience.

Third, as social influence plays an important role, marketing managers could create social communities and stimulate a positive word-of-mouth among (potential) customers. Specifically, marketers may focus their attention on the rise of mobile social commerce, defined by Kucukcay and Benyoucef (2014) as "the set of e-commerce activities performed in a mobile environment and enhanced by user-generated content". Since social commerce has recently gained popularity among companies and customers, investing in social media to stimulate mobile social commerce intention and continuance usage behavior among customers could be a key driver for the success of m-shopping initiatives.

Fourth, regarding the role of culture in affecting m-shopping journey, we found relatively small to no systematic effects of cultural dimensions. As m-commerce is growing at an exceptional rate all over the world, without major and systematic differences among cultures, companies could take advantage of this and develop global strategies for m-shopping.

Fifth, as the effects of many antecedents change over time, managers should not rely too long on existing rules and routines. For example, hedonic value and the three dimensions of quality (information, service, and system) to increase satisfaction and consequently stimulate m-shopping continuance have become more important. Managers will need to redesign and update their strategies to continue meeting customers' needs and maintaining customer loyalty to the m-shopping channel.

Finally, our findings point out the importance of building satisfaction by leveraging enjoyment and quality aspects to increase the continuance intention. To reach this goal, companies need to recognize the importance of previous digital experience, which plays on important role for consumers when deciding to continue using mobile devices to make purchases (Gao et al. 2015; Okazaki and Mendez 2013). Managers in m-commerce should focus on both utilitarian (performance expectancy, effort expectancy and perceived risk) and hedonic variables (innovativeness, hedonic value, enjoyment) to stimulate the use the mobile for the first time. Next, companies in m-commerce should manage the factors that could increase satisfaction, namely quality in its three dimensions of information, service, and system to increase continuance intention to use mobile for shopping. Here,

apps could play a major role again, as apps let mobile users shop easily and quickly and offer them a more accessible, pleasant, and customized shopping experience reducing consumers' cognitive, physical, and psychological efforts.

5.4. Limitations and Directions for future research

Despite its contributions, our study has some limitations, which in turn suggest directions for future research about methodological aspects, variables and moderators as in Table 4.

[Insert Table 4 about here]

Most importantly, we narrowed the field of investigation to mobile purchases only, leaving aside shopping behavior across different devices and channels. Nowadays, consumers' behavior is heading towards an omni-channel. From this perspective, the sales channel could be considered in a seamless way, being careful not to overlook the specific characteristics of each channel type (Rodríguez-Torrico et al. 2017). Although cross-device studies are emerging (De Haan et al. 2018), the comparison of motivations in the consumer shopping process among different devices and touchpoints deserves further attention. Our research could be the first step of a comprehensive framework of shopping in an omni-channel context.

Although our meta-analysis study includes a wide range of drivers of m-shopping, researchers could investigate additional factors that may influence the m-shopping, e.g. based on the rapid evolution of the technology. New platforms and other channels may emerge which could be used through the customer shopping journey, for searching, browsing, comparing, and purchasing products and services (Groß 2014; Lu and Su 2009; Marriott et al. 2017; Yang and Kim 2012).

Regarding the research methodology, we recommend researchers to carry out longitudinal studies to examine the dynamic relationships among variables as we found substantial changes over time. Moreover, since the majority of the studies adopt surveys methods to collect data and test the key drivers, scholars may consider more experimental and observational approaches to investigate the effects of drivers of m-shopping.

Among all the drivers of m-shopping, our research confirms the validity of the constructs of TAM, TPB and UTAUT in stimulating m-shopping intention. Thus, given the important role of internal factors (usefulness and ease of use), further studies should investigate strategies and tactics by companies to make m-shopping more useful, easy to use, and convenient allowing purchasing anywhere and anytime.

Despite the advantages and the popularity of m-shopping, the conversion rate of mobile devices continues to lag behind that of desktops. According to the latest mobile statistics, the global retail conversion rate for shopping using mobile phones is 1.82 percent (Oberlo, 2020), which is lower than the desktops' conversion rate of 3.90 percent. While consumers enjoy browsing and carrying out product research on their mobile devices, desktops are still the preferred device for transactions (De Haan et al. 2018). How to improve the conversion rate of mobile devices is a fundamental topic to be explored in future research. In this context, an important role might be played by apps that are suitable and pleasant to enhance the shopping experience, including the final purchase. Consumers have to perceive the convenience and the advantages of shopping on the move, as well as the pleasure to shop anytime and anywhere, both when they use the mobile website and the app.

Since apps have become important moderators of the m-shopping journey (i.e., their usage affects the relationship between previous digital experience and intention), further studies may deepen the role and underlying mechanism of apps in terms of stimulating m-shopping. Specifically, since both utilitarian and hedonic factors are important drivers of m-shopping, scholars could investigate how companies can develop suitable and pleasant mobile tools to enhance the shopping experience and thereby stimulate the continuance intention to use a mobile for purchasing or gain new customers. Interestingly, from before to during the COVID-19 pandemic, the share of shoppers who purchase via mobile app increased by an average of 45 percentage points worldwide (Statista, 2022), which makes it even more important to understand the role of apps in the m-shopping journey. Future research could explore how mobile apps could offer a more convenient, accessible and customized shopping experience during all the phases of the m-shopping journey.

Moreover, since social influence plays an important role, marketing managers could create or exploit social communities and stimulate positive word-of-mouth. For future research, scholars could focus on the rising of mobile social commerce and analyze the role of social media in stimulating mobile social commerce intention and continuance usage behavior among customers.

Considering the rapid evolution of the topic, future studies may examine antecedents and moderators related to emerging innovative technologies that facilitate shopping via mobile (i.e., artificial intelligence, augmented reality, internet of things). It would be particularly interesting to assess the role of these new technologies throughout the different phases of the m-shopping journey.

To conclude, our work offers scientists and practitioners a comprehensive understanding of the determinants that most influence consumers' attitude and behavior during their m-shopping journey. As m-commerce is growing at an exceptional rate, companies could take advantage of m-shopping marketing opportunities to effectively compete in the global marketplace. Meanwhile, consumers could benefit from what m-shopping has to offer and marketing scholars could seize the opportunities to study phenomena related to the m-shopping journey.

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Figures

Figure 1 – Framework for the antecedents throughout the m-shopping journey

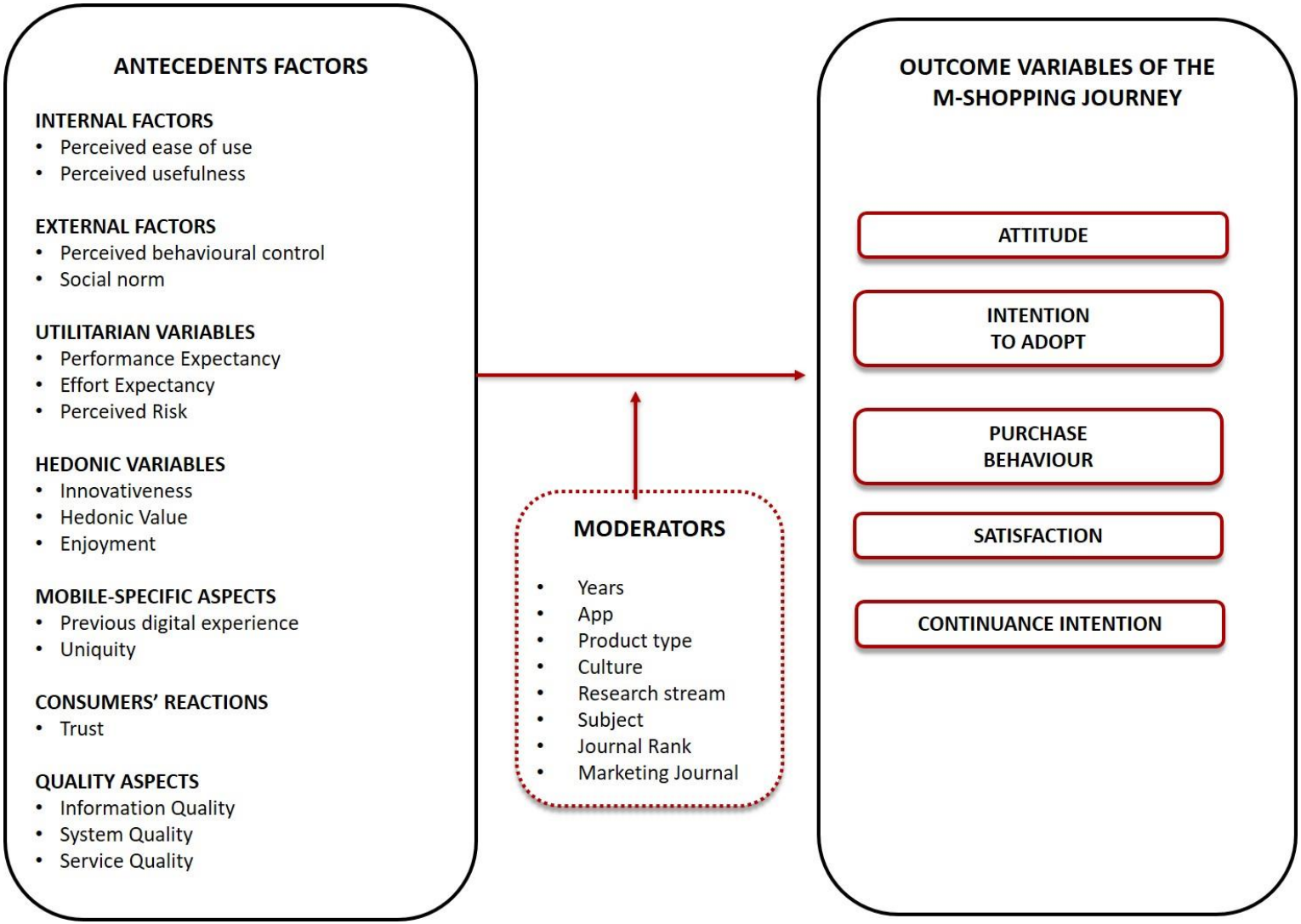


Figure 2 – Conceptual model – for empirical testing – of the m-shopping journey

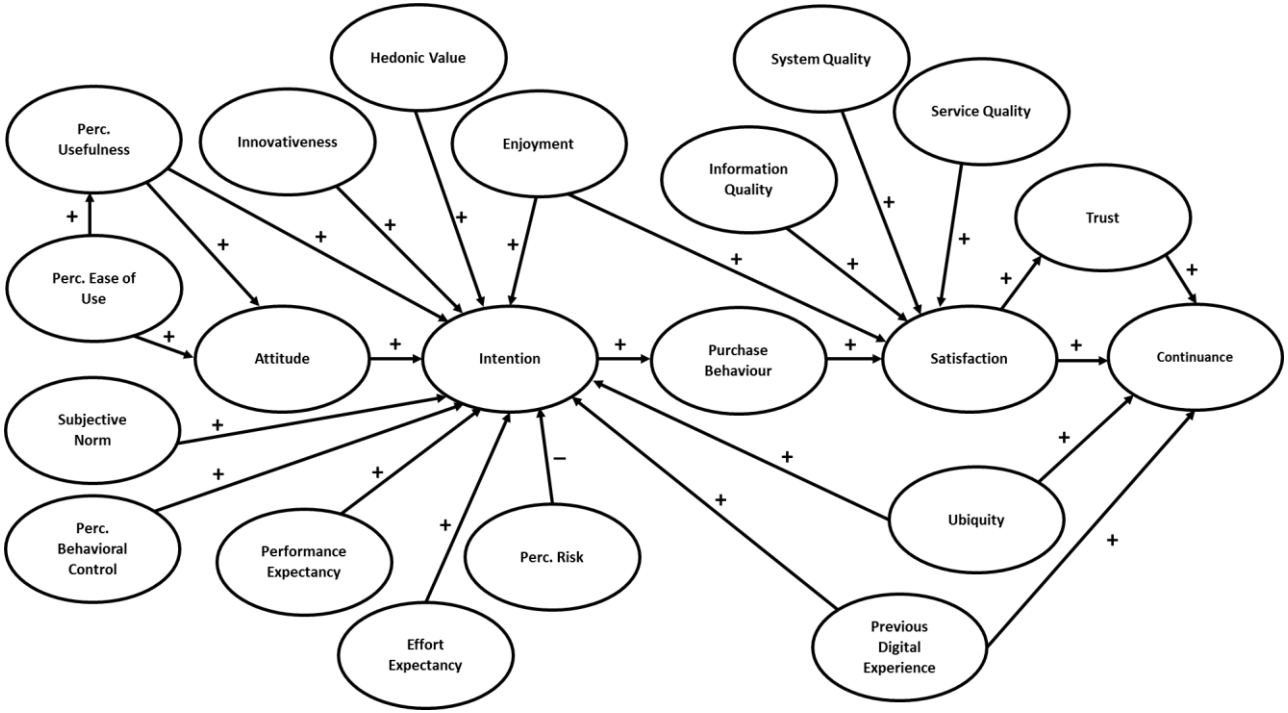
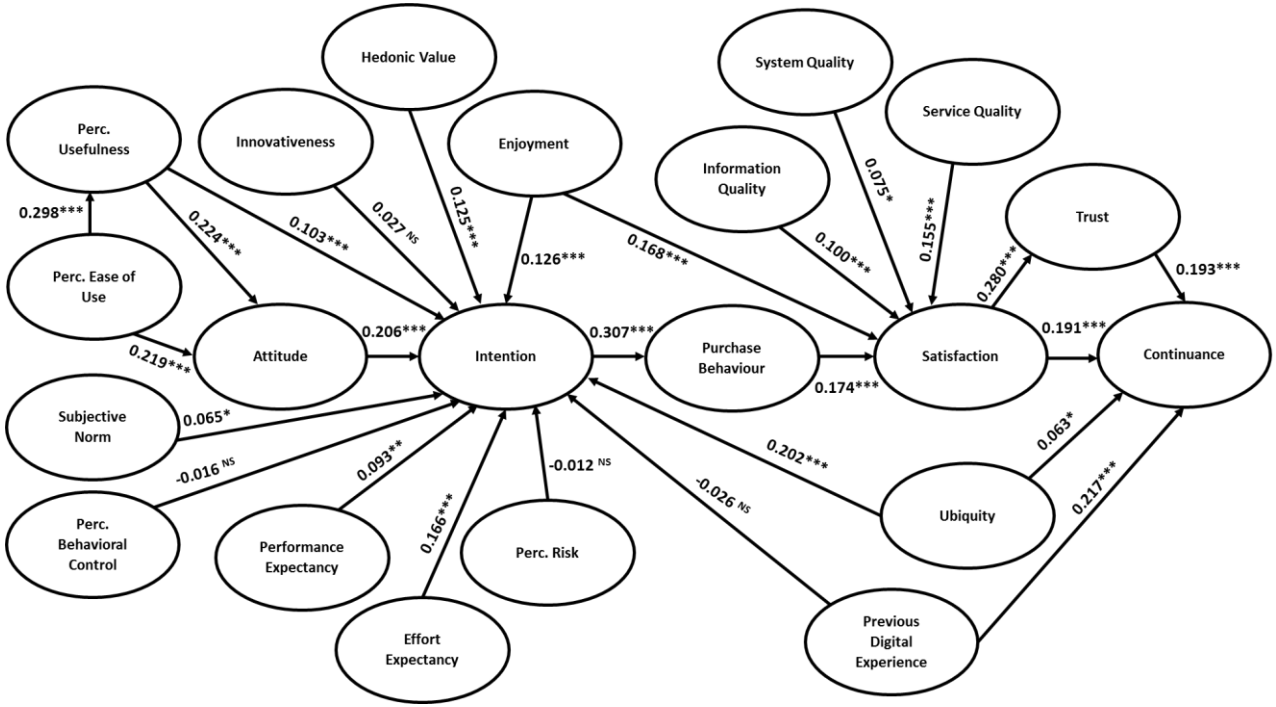


Figure 3 – Meta-Analytic Structural Equation Model



Notes: ***: $p < 0.001$; **: $p < 0.01$; *: $p < 0.05$; NS: $p > 0.05$

Tables

Table 1 – Definition of moderators

Moderator	Operationalization
Years	Three time periods that reflect different technological conditions related to m-shopping behavior: 2000–2007 (the initial phase based on traditional technology), 2008–2015 (the advent of the iPhone, smartphones, and 4G), and 2016–2020 (the new generation of mobile devices, mobile apps, and mobile-compatible websites).
App	M-shopping via mobile apps versus m-shopping via mobile sites.
Product Type 1	Tangible and intangible goods, services, mixed and unspecified, according to the product characteristics.
Product Type 2	Search, experience, and credence (SEC), according to the nature of the search process.
Subjects	Only students versus students and non-students or general public.
Research Stream	Area of research (marketing and communication, economics, business and management, information technology, computer science, psychology, general engineering, arts and humanities).
Journal Ranking	Studies published in top journals (ranked with 4 or 4 stars) versus studies published in other journals, based on the ABS journal ranking.
Marketing Journal	Studies published in marketing journals versus studies published in other journals.
Cultural Dimensions	Hofstede's six cultural dimensions (based on the country where the empirical study has been conducted): • Power distance; the equal or unequal distribution of power within organizations and the way in which individuals expect and accept it, and it is defined as "the extent to which the less powerful members of organizations and institutions accept and expect that power is distributed unequally" (Hofstede 1984); • Uncertainty avoidance; unexpected situations and the way in which a society reacts to them, and it is defined as "the degree to which societies accommodate high levels of uncertainty and ambiguity in the environment" (Hofstede 1984); • Individualism/collectivism; whether individual's behavior is dominated by self-centered (individualist) rather than group-related (collectivist) attributes, and it is defined as "the degree to which people derive their identity primarily from being an individual versus being a member of social groups" (Hofstede 1984); • Masculinity/femininity; the distribution of emotional roles between the genders and what motivates people in terms of wanting to be the best (masculine) or liking what one does (feminine) (Hofstede 2001); • Long-term orientation; societies preserving traditions and value compared with more future-oriented cultures (Hofstede and Bond 1988); • Indulgence; a society that allows individuals to seek enjoyment and pleasure (Hofstede et al. 2010).

Table 2 – Descriptive statistics on the bivariate relationships

Bivariate Relationship	K	Cumulative N	R	r-to-Z(se)	95%CI for r-to-Z	I^2	Q(df)	Failsafe N
Intention - Purchase Behavior	21	8168	0.569	0.645(0.049)***	0.549; 0.742	0.945	360.735(20)***	54036
Intention - Perc. Usefulness	58	18797	0.558	0.630(0.051)***	0.529; 0.731	0.974	2200.804(57)***	596012
Intention - Perc. Risk	25	7564	-0.016	-0.016(0.102)	-0.216; 0.183	0.985	1652.868(24)***	n.a.
Intention – Enjoyment	20	7046	0.547	0.614(0.078)***	0.461; 0.768	0.967	580.604(19)***	47780
Intention - Subjective Norm	37	13234	0.426	0.454(0.033)***	0.390; 0.519	0.924	472.473(36)***	56734
Intention - Perc. Behavioral Control	34	11372	0.445	0.478(0.053)***	0.374; 0.583	0.964	920.634(33)***	55005
Intention – Innovativeness	18	6732	0.483	0.527(0.039)***	0.451; 0.604	0.888	151.504(17)***	19220
Intention – Attitude	31	10699	0.614	0.715(0.062)***	0.594; 0.836	0.972	1085.547(30)***	184340
Intention - Hedonic Value	16	5308	0.497	0.545(0.085)***	0.378; 0.711	0.975	604.523(15)***	23464
Intention - Effort Expectancy	15	4936	0.474	0.515(0.064)***	0.389; 0.641	0.947	265.458(14)***	11790
Intention - Performance Expectancy	15	4936	0.563	0.637(0.084)***	0.472; 0.802	0.969	453.861(14)***	23981
Purchase Behavior - Satisfaction	5	1799	0.548	0.615(0.171)***	0.280; 0.950	0.972	140.902(4)***	3177
Perc. Ease of use - Perc. Usefulness	72	25187	0.586	0.671(0.034)***	0.605; 0.737	0.961	1825.734(71)***	720960
Perc. Ease of use – Attitude	28	11223	0.524	0.582(0.049)***	0.486; 0.677	0.959	658.511(27)***	70945
Perc. Usefulness – Attitude	29	11623	0.575	0.655(0.057)***	0.542; 0.767	0.971	961.614(28)***	128630
Information Quality - Satisfaction	12	4140	0.494	0.542(0.078)***	0.389; 0.694	0.957	252.901(11)***	10910
Service Quality – Satisfaction	8	2669	0.465	0.504(0.091)***	0.326; 0.682	0.957	163.154(7)***	3716
Enjoyment – Satisfaction	13	4616	0.466	0.505(0.079)***	0.351; 0.659	0.949	233.047(12)***	10683
Satisfaction – Trust	20	7829	0.567	0.643(0.096)***	0.454; 0.831	0.985	1265.362(19)***	77655
Satisfaction - System Quality	9	2896	0.522	0.579(0.078)***	0.425; 0.732	0.937	127.806(8)***	6209
Satisfaction – Continuance	19	6674	0.594	0.683(0.046)***	0.594; 0.773	0.918	220.844(18)***	45216
Trust – Continuance	16	6319	0.430	0.460(0.062)***	0.338; 0.583	0.967	449.460(15)***	15449
Previous Digital Experience - Intention	10	3195	0.264	0.270(0.059)***	0.154; 0.386	0.910	100.533(9)***	1068
Ubiquity – Intention	10	3270	0.689	0.846(0.187)***	0.479; 1.213	0.988	740.160(9)***	116111

Note: ***: significant at p<.001

Table 3 - Key findings and managerial implications

Key Findings and Theoretical implications	Managerial implications
ANTECEDENTS	
Internal and External Factors	
• TAM, TPB and UTAUT are valid for research on drivers of m-shopping. • Perceived usefulness and perceived ease of use positively influence m-shopping. • Subjective norms enhance the intention to adopt m-shopping.	• Companies should focus on internal factors (usefulness and ease of use) to stimulate m-shopping intentions. • Marketing managers should create or exploit social communities and stimulate a positive word-of-mouth and focus on mobile social commerce initiatives.
Utilitarian and Hedonic Variables	
• Utilitarian (performance and effort expectancy) and hedonic (innovativeness, hedonic value and enjoyment) aspects are key drivers of m-shopping.	• Managers should pay attention to both utilitarian (performance expectancy and effort expectancy) and pleasure-seeking (hedonic value and enjoyment) aspects to stimulate m-shopping. • Mobile website and app should be both suitable and pleasant to enhance the shopping experience.
Mobile-Specific Aspects	
• Ubiquity shows the largest correlation with m-shopping adoption. • Previous digital experience acts significantly on continuance intention.	• Marketing strategies should allow anywhere and anytime purchases, leveraging the convenient and distinctive features of m-commerce (mobile website and apps). • Companies need to reduce entry barriers to stimulate digital consumer behavior.
Consumers' Reactions	
• Trust is one of the variables influencing consumer repurchase intentions and is positively associated with m-shopping continuance intention. • The variables of the triad satisfaction–trust–continuance are highly interrelated.	• M-commerce operators and mobile application developers need to create a positive customer experience to gain trust and stimulate continuance intention.
Quality Aspects	
• Quality of the mobile channel positively influences mobile users' satisfaction.	• Companies have to focus on the factors that could increase satisfaction, namely the three dimensions of quality (information, service, and system).

MODERATORS	
Years • The relationships related to hedonic aspects, quality, satisfaction and previous experience) change considerably over the years. • In recent years (2016–2020) modern mobile technologies (e.g. shopping apps) have become more important moderators of the m-shopping journey. • Previous experience is important in the initial phase (2000–2007) and in the second phase (2008–2015), but less important in recent years. ***App*** • App usage improves convenience, allowing easy shopping and reducing consumers' cognitive, physical, and psychological efforts. • Whether or not an app is used, affects the role of hedonic aspects, quality, and satisfaction. • App usage affects the relationship between previous digital experience and intention. ***Culture*** • Drivers of m-shopping do not vary strongly across different cultural contexts. • Hofstede's cultural dimensions have little to no influence on the relationships, except for long-term orientation.	• Companies should invest in hedonic value and quality variables to improve satisfaction and m-shopping continuance. • Apps should offer a more accessible and customized shopping experience. • Mobile strategies should allow consumers to perceive the convenience and the advantages of shopping on the move, as well as the pleasure to shop anytime and anywhere, both when they use the mobile website and the app. • Apps should be both suitable and pleasant to enhance the shopping experience. • Companies could take advantages of m-shopping marketing opportunities by developing global strategies.

Table 4 - Future research directions

Methodology
• Comparison of motivations in the consumer shopping journey among different devices. • Role of new platforms and other channels, that could be used throughout the m-shopping journey. • Longitudinal studies to examine the dynamic relationships between variables. • Experimental and observational study designs to investigate causal effects of drivers of m-shopping.
Drivers of m-shopping
• Strategies and tactics of companies to make m-shopping more useful, easy to use, and convenient. • How to improve the conversion rate of shopping using mobile devices. • Impact of emerging innovative mobile technologies on the m-shopping journey. • Design of suitable mobile tools to enhance the shopping experience. • The role of mobile social commerce and social media throughout the m-shopping journey.
Moderators
• Impact of social media and innovative technologies on the role of other antecedents in various stages of the m-shopping journey. • Changes over time with respect to the impact of antecedents of m-shopping