

# ***Antecedents of consumers' mobile shopping expenditures and the intention-behavior gap***

*Navid Bahmani<sup>1</sup>, Amit Bhatnagar<sup>2</sup>*

A large body of research has been devoted to uncovering the drivers of consumers' mobile shopping intention. However, recent work has begun to suggest that behavioral intention does not necessarily translate into actual purchase behavior – a concept known as the “intention-behavior gap”. This study applies an extended unified theory of acceptance and use of technology framework to review determinants of intention to purchase in the context of mobile commerce, and then empirically verifies whether these antecedents influence actual purchase behavior. A survey was distributed to participants who have engaged in mobile shopping in the past, gauging their perceptions regarding various factors (performance expectancy, effort expectancy, image, facilitating conditions, price value, hedonic motivation, trust) and recording the total dollar amount that they have spent when mobile shopping in the last six months. Confirmatory factor analysis was then conducted to produce factors that were used as explanatory variables in an ordinal logit regression model. We find that although a variety of factors appear to influence consumers' mobile shopping intention, most of them do not appear to influence actual purchase behavior. This finding, along with many others in the same vein, raises the question of whether researchers should continue to model purchase intentions and rather focus more on exhibited behaviors. We discover the only factor which affects actual purchase behavior, in the context of mobile shopping, is consumers' perceived trust in the vendor/mobile channel. This barrier is consistent across gender, experience, and accessibility levels. Managers should be aware that trust continues to be a strong consumer issue which inhibits customers' propensity to spend more when mobile shopping.

**Keywords:** Unified theory of acceptance and use of technology, Technology acceptance model, mobile shopping, intention-behavior gap, trust.

## **Introduction**

The percentage of smartphone owners in the United States has dramatically increased in the last several years. As depicted in Figure 1, while desktop/laptop ownership has remained nearly flat in the last ten years, smartphone ownership has grown consistently, reaching 85% of the U.S. population in 2021 (Pew Research Center, 2022). Smartphone ownership now surpasses that of traditional Internet devices, and is considered an essential item (Reyes, 2016) as consumers are becoming increasingly mobile. Even though smartphones are more widely adopted and used far more than traditional computers for most Internet-based activities (e.g., nearly half of smartphone owners check their devices at least 25 times every day) (Deloitte, 2017; Sciandra et al., 2019), when it comes to shopping the majority of retail electronic sales (e-commerce) continues to take place over traditional fixed devices (Groß, 2018). E-commerce sales in the United States totaled nearly \$1 trillion in 2022, with only about 40% of it being mobile commerce, i.e., m-commerce (Toplin 2022; Statista 2023). Although retailers consistently enhance their mobile shopping platforms

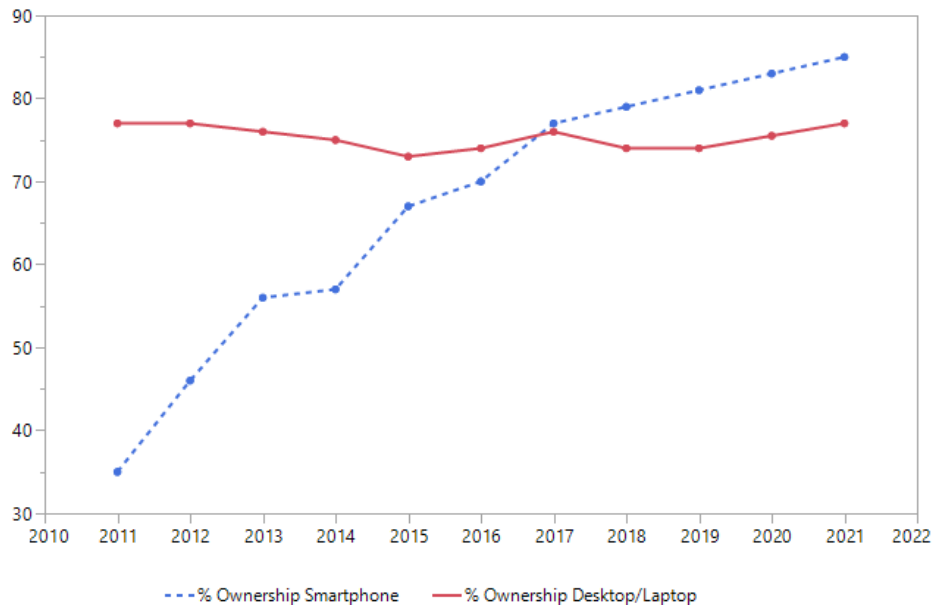
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<sup>1</sup> *Rohrer College of Business, Rowan University, Glassboro NJ, United States. Email [bahmani@rowan.edu](mailto:bahmani@rowan.edu)*

<sup>2</sup> *Lubar College of Business, University of Wisconsin-Milwaukee, Milwaukee WI, United States. Email [amit@uwm.edu](mailto:amit@uwm.edu)*

(Lin et al., 2021) to be more user-friendly, efficiently announce new products, send promotional offers (Natarajan et al., 2017), and offer personalization options to improve the customer shopping experience (Huang and Zhou, 2018), most smartphone owners remain reluctant to make more purchases from their mobile devices.

**Figure 1: Smartphone vs. Desktop/Laptop Ownership in the United States**



In the last two decades, researchers have exerted a considerable amount of effort to understand the factors that may affect consumers' propensity to shop with their mobile devices. This body of research (to be discussed in depth in subsequent sections) has applied the Technology Acceptance Model (TAM; Davis 1989) and the unified theory of acceptance and use of technology (UTAUT; Venkatesh et al., 2003), which essentially theorize that consumers' actual usage of a technological system (e.g., using their mobile phones for shopping) is a function of their underlying intention to use it, which is affected by a variety of different demographic, psychological, and behavioral factors (Chopdar et al., 2018). While this research has led to important findings, it has largely focused on *intention* as the primary outcome of interest, thereby relying on the theoretical assumption that intention ultimately translates to actual behavior. A growing body of work, however, has begun to question whether this theoretical link reasonably holds true, terming it the "intention-behavior gap" (Sheeran and Webb, 2016). This gap has been found, through several meta-analyses, to be quite large – intentions "get translated into action approximately one-half of the time" on average (Sheeran and Webb, 2016), with the correlation between these two constructs reaching levels as low as 0.18 in the context of new-to-market innovations (Morwitz, 2012). Our study examines the intention-behavior gap in the context of purchases made through mobile devices.

The intention-behavior gap may be due to several reasons, which raises issues with extant work in the mobile shopping domain. First, it has been found that the simple act of posing intention-based questions to consumers, rather than inferring intention without measuring it directly, can artificially boost the strength of the relationship between intention and behavior since such questions may impose social desirability biases (Morwitz and Fitzsimons, 2004; Morwitz and Munz, 2021). This therefore calls into question the external predictive accuracy of intention-based studies (Chandon et al., 2005) of mobile shopping that do not study behavioral outcomes, since consumers may perceive mobile shopping as an activity they should aspire towards. Second, research has found that properties of

intention itself can widen the intention-behavior gap. For example, intention stability can fluctuate significantly over time (Morwitz and Munz, 2021) due to changes in the environment. As seen in Figure 1, smartphone adoption was in its extreme infancy in 2011, then rapidly increased in the next five years, with a diminishing level of increase in the following five years. It is reasonable to assume that consumers' intention to engage in mobile shopping has fluctuated as well over the years, as they began to learn more about mobile technology, value its features to changing extents, and form more accurate expectations and perceptions (Tyrvaainen and Karjaluoto, 2019). This is in addition to the fact that retailers have consistently adjusted their mobile channel strategies and shopping platforms over time (Halibas et al., 2023). Therefore, the translation of intention to behavior has likely changed over time as well, calling into question the reliability of mobile shopping research studies from vastly different periods in time.

In 2021, the editors of the Journal of the Academy of Marketing Science wrote an editorial dedicated to the fact that “one of the major frustrations that we far too frequently encounter in our initial review is the authors' sole use of intentions as the dependent variable(s) in their empirical research” (Hulland and Houston, 2021). Citing the intention-behavior gap, they implore researchers to go beyond designing and conducting research studies that focus on intention and concentrate, instead, on directly measuring outcome behaviors of interest. Our research addresses this suggestion and joins a growing body of work dedicated to understanding the antecedents of actual purchase behavior (Morwitz et al., 2007; Sun and Morwitz, 2010) rather than intentions. We adopt an extended UTAUT framework to collect factors that have been found to affect consumers' intention to engage in mobile shopping, and test whether these factors indeed relate to actual purchase behavior. Rather than applying UTAUT theory to model intention (as many existing studies have), we therefore model behavior, which was the original goal of the framework that has been largely ignored. We specifically study a group of consumers that have engaged in mobile shopping in the past and avoid the use of intention-based measures in order to accurately understand what leads consumers to spend *more* (in dollars) when mobile shopping, which is our behavioral outcome of interest. Data was collected by conducting a survey, and then analyzed through confirmatory factor analysis and an ordinal logit regression model.

Our results suggest that although factors such as performance expectancy, effort expectancy, image, facilitating conditions, price value, hedonic motivation, and trust have been found to affect consumers' intention to engage in mobile shopping, the only antecedent that affects actual purchase behavior is trust. This may be due to the fact that although retailers have been innovating their mobile shopping platforms for more than ten years with a variety of features which consumers have come to expect, perceptions of trust are continuing to worsen (Gramling, 2021) as technology expands and consumers worry about how their personal information is being handled. In light of the fact that retailers have introduced opt-out data policies and now more clearly explain how consumer data is handled, trust remains a large issue to overcome, which mobile software giants Apple and Google are now trying to address themselves in order to steer the industry and its players towards a consumer-first mindset (Graham and Alcantara, 2022). From a theoretical standpoint, our work suggests that the intention-behavior gap is indeed a prevalent issue (Hulland and Houston, 2021) which should continue to be addressed by researchers. Although the UTAUT framework has been used in the past to identify hurdles that must be overcome to increase consumers' intention to engage in mobile shopping, studies of actual purchase behavior can produce contrasting results, as mobile technology, retailers' strategies, and consumers' perceptions change over time. Therefore, frameworks such as TAM and UTAUT should be used to study actual behavioral outcomes as originally proposed, especially in situations where the behavior of interest (e.g., mobile shopping) has become more commonly accepted.

The current study is organized as follows. First, the UTAUT framework is introduced and reviewed to motivate several hypotheses based on factors which may affect consumers' actual purchase behavior. Next, measures and methods are discussed, followed by a review of the results. Finally, the study concludes with a discussion of the results along with theoretical and managerial implications, in addition to research limitations and ideas for future research within the mobile shopping domain.

## Theoretical Development

### Technology Acceptance and Use Models

The Technology Acceptance Model (TAM), originally theorized by Davis (1989) has been used widely in information systems and marketing literature to explain the acceptance of, and intention to use, an information system (Natarajan et al., 2017). This model essentially states that an individual's actual usage of a system is affected by their behavioral intention to use that system, which itself is a function of the individual's perceptions of how easy the system is to use (i.e., perceived ease of use) and how useful the system is (i.e., perceived usefulness). As subsequent research has found additional variables that influence intention, several extensions to the TAM have been proposed, with the most comprehensive being the unified theory of acceptance and use of technology (UTAUT) conceptualized by Venkatesh et al. (2003). UTAUT was proposed with the goal of merging the original TAM model with several other prominent theories and acceptance models (Yang, 2010; Hubert et al., 2017). The UTAUT model, which the current study adopts as its theoretical framework, includes perceived usefulness within a component termed "performance expectancy", perceived ease of use within a component termed "effort expectancy", and introduces two new components ("image" [embedded within social influence] and "facilitating conditions") as additional drivers of an individual's intention to use a system. These components influence an individual's behavioral intention, which is theoretically expected to directly explain the individual's actual usage behavior. In what follows, these components will be discussed within the context of mobile shopping, in order to arrive at the hypotheses of the current research.

Performance expectancy (PE) directly relates to the utilitarian benefits of mobile shopping, or how useful an individual believes mobile shopping to be in terms of enabling them to accomplish their goal-oriented tasks (Venkatesh et al., 2003). Adapted from the TAM's perceived usefulness construct (see Yuan et al., [2014] and Agrebi and Jallais, [2015] for examples of studies demonstrating its effect within the mobile commerce landscape), PE incorporates the productivity and efficiency benefits that consumers look for when interacting with a mobile shopping platform, and has been found to have strong effects on consumers' intention to use mobile shopping apps (Chopdar et al., 2018) and mobile shopping continuance intention (Lu et al., 2017). As mentioned earlier, the current study aims to understand whether PE affects actual purchase behavior, rather than intention. Therefore, it draws from the aforementioned studies to argue that as consumers find the activity of mobile shopping to be useful, as it provides them with efficiency and shopping effectiveness benefits, they are likely to spend more money. Retailers in recent years have rapidly expanded the types of strategies they use to enhance consumers' shopping effectiveness on mobile shopping platforms, by incorporating product recommendation algorithms and cookie tracking and reducing checkout times (Alaimo, 2018), which can make the shopping journey more efficient for consumers and increase the likelihood that they purchase more or even re-purchase in the future. Thus, this study posits the following:

**Hypothesis 1 (H1):** Performance expectancy (PE) has a significant positive effect on consumers' total amount spent when mobile shopping

The next component of the UTAUT model, Effort Expectancy (EE), refers to the degree of ease associated with the use of a system, which as mentioned earlier is directly related to the perceived ease of use component of the TAM model (Venkatesh et al., 2003). Consumers' perception of the ease of use of mobile shopping has extensively been found to influence their satisfaction, attitude, and intention towards the activity (Yang, 2010; Agrebi and Jallais, 2015; Chen et al., 2018; Groß, 2018) and has also recently been found to influence cross-category usage intention (Hubert et al., 2017). Over time, retailers have worked diligently to make their mobile shopping platforms easy to navigate and use, by incorporating features such as "how-to" screens after their mobile app is downloaded, building user-friendly interfaces that are responsive and seamless, and including speech recognition capabilities for users who prefer to lead the shopping journey with their voice rather than with their fingertips (Forbes, 2021). With such innovations, it is expected that consumers may perceive the activity of mobile shopping to be increasingly easy, thereby requiring less effort on their part, and may purchase and spend more when doing so. Thus,

**Hypothesis 2 (H2):** Effort expectancy (EE) has a significant positive effect on consumers' total amount spent when mobile shopping

Image (IM), a contributing component to the social influence-related benefits that consumers seek, was a significant addition to the theoretical development of technology adoption and the UTAUT model. Image relates to the fact that individuals assess how others may view them as a result of using a system or technology, and therefore takes into account the ways in which an individual's image or status may be perceived (Venkatesh et al., 2003). For example, individuals may want to signal themselves to others in a certain way (Park et al., 2019), such as simply making a positive impression (Huang et al., 2019) or even positioning themselves as being tech-savvy innovators (Koenigstorfer and Groeppel-Klein, 2012). This has been found to not only affect consumers' intention to engage in mobile shopping (Lu et al., 2017; Groß, 2018), but also the word of mouth they subsequently spread (San-Martin et al., 2015). In the current research context, as mobile shopping offers consumers an opportunity to identify with others who engage in the activity and have enhanced status or prestige as a result, they may be more likely to purchase and spend more when doing so, as larger expenditures would allow them to signal a more significant dedication to the activity. Many mobile shopping platforms now even allow customers to share information about their purchases after they're completed by pressing social share buttons (BigCommerce, 2022), which allow customers to show their social media followers what they bought, when they made their purchase, and where the purchase was made. Thus, as consumers may place value on the image-enhancing benefits afforded to them as they continue to engage in mobile shopping, the following is proposed:

**Hypothesis 3 (H3):** Image (IM) has a significant positive effect on consumers' total amount spent when mobile shopping

The fourth and final component of the original UTAUT model is Facilitating Conditions (FC), which relates to the degree to which an individual believes that some form of infrastructure exists to support use of the system (Venkatesh et al., 2003). The current study focuses on the compatibility component of FC, as it directly encompasses the degree to which a consumer believes that mobile shopping is compatible, or consistent, with the way they shop (Moore and Benbasat, 1991), thus reflecting a consumer's own needs. For example, a consumer's typical shopping journey may include analysis of product information and packaging, a search for alternative options, and price comparison (Eastman et al., 2020). Mobile shopping infrastructure would likely be compatible with, and facilitate, this consumer's way of shopping as it offers such abilities. Prior research has demonstrated this component's influence on mobile shopping attitude (Yang, 2010) and intention (Yang, 2010; Yang and Forney, 2013; Lu et al., 2017), but has not directly studied its effect on actual behavioral outcomes. As many retailers have begun to incorporate multimodal features such as 3D interactive displays and virtual fitting rooms (Biron, 2020; Chidambaram et al., 2023) within their mobile shopping platforms, this has likely enhanced consumers' perceptions that mobile shopping, as a technological infrastructure, is

compatible with the ways in which they like to shop. Therefore, consumers who place importance on such facilitating conditions may spend more when mobile shopping. Following this logic:

**Hypothesis 4 (H4):** Facilitating conditions (FC) has a significant positive effect on consumers' total amount spent when mobile shopping

While the four aforementioned components of the original UTAUT framework have clearly demonstrated its explanatory capabilities, subsequent research has discovered a variety of other factors that influence consumers' attitude and intention and has proposed extensions to the original framework. Therefore, the current study adopts an extended UTAUT framework to include three additional variables whose explanatory value has been proven in the context of behavioral intention. This is done in order to study whether these variables, in addition to the four variables reviewed in the previous section, indeed have an effect on consumers' actual purchase behavior or if the intention-behavior gap is apparent. In the next section, these variables are introduced.

### Extended UTAUT framework

While the UTAUT model includes PE as a strong example of a utilitarian benefit that consumers aim to attain when mobile shopping, one question that remains is whether this form of shopping is financially feasible for them. Although access to home and public WiFi networks has grown dramatically in recent years, consumers still incur costs when using their mobile devices when disconnected from such networks, typically through 3G, 4G, or more recently 5G networks. Indeed, Venkatesh et al. (2012) define price value (PV) as "consumers' cognitive trade-offs between the perceived benefits and cost of using various applications", which can include data costs and other types of service charges when using a mobile device (Chopdar et al., 2018). While Venkatesh et al. (2012) and others (Deng et al., 2014; Liu et al., 2015) validated this construct and showed that it was a significant predictor of intention to use mobile commerce and shopping apps, subsequent research has uncovered contradictory findings. For example, Baptista and Oliveira (2015) found that PV does not have a significant effect on consumers' intention to use mobile banking services in Mozambique; additionally, Hew et al. (2015) found that PV does not significantly affect consumers' intention to use mobile applications in Malaysia. Within the context of mobile shopping, using survey data from both India and the United States, Chopdar et al. (2018) recently found that PV has an effect on consumers' intention to use shopping applications on their mobile devices in India but not in the United States, likely due to large differences in data access costs and subsequently consumers' perceptions of those costs in relation to the benefits received. In line with Chopdar et al. (2018)'s findings in the United States, it is reasonable to expect that PV's effect on the actual dollar amount that consumers spend through their mobile devices is insignificant. Since more than 85% of individuals in the United States currently own a smartphone (Pew Research Center, 2022), this indicates that many people have already come to terms with the financial costs associated with purchasing and owning such a device. And, as opposed to fixed data plans which dominate in most countries, consumers in the United States have overwhelmingly adopted unlimited data plans, which tend to have the largest financial costs; over 43% of Americans subscribe to such plans (Statista, 2022). Clearly, consumers recognize the value that their mobile devices provide them, and the activities they perform with these devices (e.g., mobile shopping) likely are not affected by costs that have already been overwhelmingly accepted. Therefore:

**Hypothesis 5 (H5):** Price value (PV) has an insignificant effect on consumers' total amount spent when mobile shopping

As has been demonstrated in a variety of consumer contexts, consumers consistently evaluate and choose products and services that not only offer them functional (i.e., utilitarian) benefits, but also hedonic ones as well. This experiential aspect of shopping is

something that the original UTAUT does not include. Consumers are interested in pursuing mobile shopping for enjoyment purposes (Yang and Kim, 2012), an example of a hedonic motivation (HM) which draws attention to the sensational and entertainment-related aspects of shopping that consumers seek (Arnold and Reynolds, 2009). In the context of mobile shopping, the coexistence of utilitarian and hedonic benefits is quite apparent, as consumers use their mobile phones not only to get information about products and make their shopping journey more efficient, but also to have fun in the process (Yang, 2010). Indeed, consumers' hedonic motivations have been found to influence their propensity to engage in mobile shopping (Yang and Forney, 2013; Lee, 2016) and their specific use of dedicated mobile shopping apps (Chopdar et al., 2018). In fact, mobile apps routinely include certain technological elements aimed at enhancing experiential aspects, such as personalization abilities (Chopdar et al., 2018). Encompassing these findings, and because mobile devices allow for a seamlessly integrated shopping experience without any interruption (Hubert et al., 2017), it is expected that consumers will purchase and spend more when mobile shopping, as hedonic features may motivate them to do so. Consumers are increasingly valuing the mood-boosting benefits of mobile shopping, and now enjoy window-shopping online more so than in-store (Danziger, 2021). Building off this logic:

**Hypothesis 6 (H6):** Hedonic motivation (HM) has a significant positive effect on consumers' total amount spent when mobile shopping

While all of the aforementioned constructs focus on positive (i.e., beneficial) antecedents, impediments to mobile shopping have recently been researched as well, addressing a need to look into potentially problematic aspects (Fuentes and Svingstedt, 2017). One of the strongest examples is the level of consumers' trust (TR) in mobile services, which has been found to be the primary obstacle preventing consumers from using mobile services (Lu et al., 2011). Since mobile channels involve wireless transactions which may be prone to information interception and are more uncertain as compared to traditional channels (Lu et al., 2011; Delgado-Ballester and Hernandez-Espallardo, 2014), this raises concerns with respect to both the technology itself and the vendor running the channel or service. Trust relates to a consumer's confidence in a vendor's (or service's) specific attributes with regards to benevolence, competence, and integrity. Once this is established, a positive relationship can begin and flourish continually, resulting in the sharing of personal information and generation of additional transactions (Groß, 2018). Trust reduces the uncertainty and complexity that consumers face in an uncertain situation, which can help them be more optimistic and engage positively in mobile shopping situations (Groß, 2016). Following this framework and extant research which has established the effect of trust on attitudinal and intentional outcomes (Yang et al., 2015; Groß, 2016; Marriott and Williams, 2018; Groß, 2018), it is expected for trust to have a positive effect on how much consumers spend when mobile shopping. Recent research has found that 70% of consumers today believe that trusting a brand is more important now than in the past, and 53% believe that trust is the most important factor they consider after price (Kushmaro, 2021). Many companies have recognized these facts by introducing opt-out data policies, clearly explaining how consumers' data will be used, and showing consumers the value they can expect to receive in return for sharing personal information (Morey et al., 2015). As trust is built and a deeper connection is formed with consumers, engagement is likely to increase, leading to benefits on the purchasing side. Thus, the following final hypothesis is proposed:

**Hypothesis 7 (H7):** Trust (TR) has a significant positive effect on consumers' total amount spent when mobile shopping

## Measures

A survey questionnaire was developed and distributed to undergraduate students at a major university in the United States. While experimental research studies have occasionally

called into question the reliability of student samples (Bahmani et al., 2019), the current research benefits from such a sample since these younger and typically more tech-savvy individuals are the heaviest users of mobile technology (Bigné et al., 2007; Chau et al. 2018). After eliminating 11 incomplete questionnaires, 192 questionnaires were used for analysis purposes. The survey response rate was excellent (82%) and checks for non-response bias revealed no concerns (p-values > .64). Participants were told that the survey would take approximately ten minutes to complete and were allowed to refer to their mobile devices to accurately respond to any survey questions that they could not accurately answer based on memory alone (such as previous mobile purchases), thus avoiding potential recall inaccuracies.

In addition to answering questions regarding which types of (and how many) mobile apps they own and how long they have owned a smartphone, participants responded to 5-point Likert measures (1 = strongly disagree, 5 = strongly agree) gauging their perceptions of performance expectancy (PE), effort expectancy (EE), image (IM), facilitating conditions (FC), price value (PV), hedonic motivation (HM), and trust (TR) with regards to mobile shopping. The dependent variable of interest asked participants “How much (in dollars) have you spent shopping on your mobile phone in the last six months?”, with six ordinal category options ranging from “less than \$10” to “more than \$100”. Categorical options were devised rather than asking participants to indicate an exact dollar amount (i.e., a continuous variable), to provide participants with ease of mind in case they preferred not to make an exact, definitive calculation. Any participants who indicated they have never shopped on their mobile phone were eliminated from the analysis, as the current research is interested in studying consumers who have already demonstrated and established their intention to purchase through the mobile channel. Table 1 depicts a list of all the hypothesized constructs and the scales employed, which were adapted from prior literature.



**Table 1: Hypothesized Constructs and Scales with Factor Loadings and Reliability Estimates**

| Construct   | Item | Mean (SD)        | Standardized factor loading | Cronbach's Alpha |
|---|------|------------------|-----------------------------|------------------|
| <b>Performance expectancy (PE)</b><br>(Hubert et al., 2017; Groß, 2018; Natarajan et al., 2018) |      |                  |                             | 0.8007           |
| Shopping on my mobile phone enhances my effectiveness at shopping                               | PE1  | 2.895<br>(1.162) | 0.761*                      |                  |
| Shopping on my mobile phone increases my shopping productivity                                  | PE2  | 2.914<br>(1.246) | 0.784*                      |                  |
| Shopping on my mobile phone improves my shopping abilities                                      | PE3  | 2.842<br>(1.157) | 0.731*                      |                  |
| <b>Effort expectancy (EE)</b><br>(Yang, 2010; Lu et al., 2017; Chopdar et al., 2018)            |      |                  |                             | 0.766            |
| Learning to shop on my mobile phone is easy for me  | EE1  | 4.015<br>(1.050) | 0.649*                      |                  |
| Overall, I believe that shopping over my mobile phone is easy to do                             | EE2  | 3.494<br>(1.153) | 0.747*                      |                  |
| Shopping on my mobile phone is clear and understandable   | EE3  | 3.268<br>(1.106) | 0.762*                      |                  |
| <b>Image (IM)</b><br>(Venkatesh et al., 2003; Nysveen et al., 2005; Huang et al., 2019)         |      |                  |                             | 0.7465           |
| People who shop on their mobile phones have a high profile                                      | IM1  | 2.869<br>(1.337) | 0.561*                      |                  |
| Shopping on my mobile phone improves my image with those around me                              | IM2  | 2.177<br>(1.116) | 0.782*                      |                  |
| People who shop on their mobile phones have greater prestige than those who do not              | IM3  | 2.083<br>(1.145) | 0.8*                        |                  |

**Table 1 cont'd**

|                                     |  |  |  |        |
|-------------------------------------|--|--|--|--------|
| <b>Facilitating conditions (FC)</b> |  |  |  | 0.7799 |
|-------------------------------------|--|--|--|--------|

|  |     |                  |        |        |
|--|-----|------------------|--------|--------|
| (Mallat et al., 2008; Lu and Su, 2009; Chopdar et al., 2018)   |     |                  |        |        |
| Shopping on my mobile phone fits into my shopping style  | FC1 | 2.813<br>(1.296) | 0.755* |        |
| Shopping on my mobile phone is completely compatible with my current situation                       | FC2 | 3.010<br>(1.104) | 0.698* |        |
| Shopping on my mobile phone is compatible with all aspects of the way I shop                         | FC3 | 2.719<br>(1.194) | 0.741* |        |
| <b>Price value (PV)</b><br>(Venkatesh et al., 2012; Baptista and Oliveira, 2015; Liu et al., 2015)   |     |                  |        | 0.7204 |
| Shopping on a mobile phone requires me to purchase a mobile phone which is beyond my financial means | PV1 | 2.005<br>(1.190) | 0.646* |        |
| Shopping on a mobile phone is expensive since it requires me to pay for cell phone charges           | PV2 | 2.278<br>(1.195) | 0.866* |        |
| <b>Hedonic motivation (HM)</b><br>(Ko et al., 2009; Hubert et al., 2017; Huang and Zhou, 2018)       |     |                  |        | 0.6579 |
| Window-shopping is usually a pleasant experience for me  | HM1 | 3.421<br>(1.141) | 0.452* |        |
| I like to shop around and look at displays   | HM2 | 3.713<br>(1.061) | 0.902* |        |
| I never feel bored when I go shopping  | HM3 | 3.182<br>(1.199) | 0.448* |        |
| <b>Trust (TR)</b><br>(Hubert et al., 2017; Groß, 2018; Marriott and Williams, 2018)                  |     |                  |        | 0.8412 |
| Shopping over my mobile phone is a safe way to shop  | TR1 | 2.817<br>(1.074) | 0.849* |        |
| I trust online vendors enough to feel safe shopping on my mobile phone                               | TR2 | 3.031<br>(1.170) | 0.818* |        |
| I would trust transmitting personal information necessary for me to shop over my mobile phone        | TR3 | 2.781<br>(1.190) | 0.882* |        |

\*  $p < 0.001$

## Methods and Results

Reliability estimates and the results of a confirmatory factor analysis (CFA), which produced standardized factor loadings to be used for the study's final model, are summarized in Table 1. Nearly all the standardized factor loadings reflect either excellent

or adequate validity scores (Marriott and Williams, 2018). The CFA showed that the overall model is robust (Chi-square = 295 [ $p < 0.001$ ], CFI = 0.917, TLI = 0.894, RMSEA = 0.0714), and that the loading factors are all statistically significant, thus confirming convergent validity (San-Martin et al., 2015). Correlations between the factors, along with squared root average variance extracted (AVE) values, are available in Table 2.

**Table 2: Discriminant Validity**

|    | PE   | EE   | IM   | FC   | PV  | HM   | TR  |
|----|------|------|------|------|-----|------|-----|
| PE | .75  |      |      |      |     |      |     |
| EE | .37* | .72  |      |      |     |      |     |
| IM | .60* | .12  | .72  |      |     |      |     |
| FC | .77* | .49* | .52* | .73  |     |      |     |
| PV | .23* | -.16 | .41* | .10  | .76 |      |     |
| HM | -.01 | .02  | -.10 | -.08 | .04 | .73  |     |
| TR | .48* | .49* | .37* | .61* | .03 | -.05 | .85 |

Squared root average variance extracted (AVE) values are displayed on the diagonal, with correlations between factors displayed underneath. \*  $p < .001$

Based on the validated factors from the CFA, an ordinal logit model was fit to the data, due to the dependent variable's categorical, ordered nature. The ordinal model is able to assess the effects of the factors on the likelihood of an individual falling into a higher estimated total purchase amount category. The results of the statistically significant model (Chi-square = 54.78,  $p < 0.0001$ ), including parameter estimates with their standard errors, chi-square values, p-values, and variance inflation factors, are presented in Table 3. While prior research has found that the benefits stemming from effectiveness and productivity (H1), ease of use (H2), image (H3), personal compatibility (H4), price value (H5), and hedonics (H6) have a positive effect on consumers' intention to engage in mobile shopping, the model reveals that none of these factors lead to an increase in the actual total dollar amount spent by consumers. In other words, while these factors may influence consumers' *intention* to engage in mobile shopping, they do not influence consumers' actual behavior (spending more money). The only statistically significant predictor of a consumer's total dollar amount spent is trust, thus supporting H7. These findings hold after controlling for gender (Kim et al., 2017; Chopdar et al., 2018), the amount of experience (in months) the respondent has had with their mobile phone (Kim et al., 2017), and the number of mobile applications the respondent has on their device (to hold accessibility levels constant).

**Table 3: Ordinal Logit Model Results**

| Term         | Parameter estimate | S.E.   | Chi-square | p-value | Variance inflation factor |
|--------------|--------------------|--------|------------|---------|---------------------------|
| Intercept(1) | 0.5845             | 0.1749 | 11.16      | 0.0008  | -----                     |
| Intercept(2) | 1.0857             | 0.1878 | 33.39      | <.0001  | -----                     |
| Intercept(3) | 1.8681             | 0.2220 | 70.8       | <.0001  | -----                     |
| Intercept(4) | 2.3259             | 0.2501 | 86.48      | <.0001  | -----                     |
| Intercept(5) | 2.7070             | 0.2791 | 94.03      | <.0001  | -----                     |
| PE           | -0.4117            | 0.2970 | 1.92       | 0.1658  | 2.9182                    |
| EE           | -0.2122            | 0.2540 | 0.70       | 0.4033  | 1.5754                    |
| IM           | -0.0204            | 0.2216 | 0.01       | 0.9266  | 1.9292                    |
| FC           | -0.4279            | 0.3158 | 1.84       | 0.1755  | 3.3375                    |
| PV           | 0.0838             | 0.2043 | 0.17       | 0.6815  | 1.3203                    |
| HM           | 0.0919             | 0.1603 | 0.33       | 0.5662  | 1.0409                    |
| TR           | -0.6047            | 0.2211 | 7.48       | 0.0062  | 1.7834                    |

TR (trust) is found to be the only statistically significant predictor of total purchase amount. Note: due to ordinal model specification, negative parameter estimates imply an *increase* in likelihood (e.g., increased likelihood of a respondent spending more money when mobile shopping).

## Discussion

While existing research in the area of mobile shopping has predominantly been concerned with the antecedents of behavioral intention, the current study addresses the intention-behavior gap (Sheeran and Webb, 2016) by studying the effects of intentional antecedents on a more managerially relevant factor: the *actual* amount that consumers spend. By studying this relationship, the current research finds that while performance expectancy, effort expectancy, image, facilitating conditions, price value, hedonic motivation, and trust have been found to significantly affect consumers' intention to engage in mobile shopping, the only factor that affects actual behavior (*how much* a consumer spends when mobile shopping) is the trust that they have in the mobile shopping vendor/channel. This finding supports prior suggestions that lack of trust is one of the primary obstacles that consumers perceive when shopping in a virtual environment, since they may not be confident in a shopping system's, or a vendor's, competency and integrity. In a modern technological era where privacy and trust concerns are consistently being echoed, such as a poll that found that 60% of Americans do not trust Facebook in how it handles their personal information (Murray, 2019), a recent survey that found that a large majority of retail shopping applications unintentionally leak sensitive customer data such as credit card or social security numbers (Langone, 2019), and research noting the downsides of geo-tracking (Ryu 2023), the current research relays important theoretical and managerial implications.

From a theoretical perspective, this study supports the notion that behavioral intention and its drivers do not necessarily translate into actual purchase behavior. As previous scholars

have stated, this could be due to differences between true and stated intent, or the fact that intent may under- or over-state actual purchase (Morwitz and Schmittlein, 1992). Intention can also change over time (Morwitz and Munz, 2021), as environmental changes can affect consumers' expectations and needs. Therefore, although UTAUT theory has been used by numerous scholars to get a foundational idea of the factors that affect consumers' intention to engage in mobile shopping, the current study finds that these factors, in the context of actual purchase behavior, do not necessarily hold up, which may be due to the fact that many intention-based studies were conducted across drastically different periods of time. After more than fifteen years since the introduction of smartphones, consumers now find mobile shopping more useful (e.g., product recommendation algorithms), easier to use (e.g., user-friendly interfaces), shareable (e.g., social share buttons), compatible (e.g., virtual fitting rooms), valuable, and entertaining than ever before. This may be the reason why many of the UTAUT components do not have an effect on consumers' actual purchase behavior, since retailers have been innovating their mobile shopping platforms for more than a decade and consumers' reception to innovation has decreased as they are no longer "wowed" as much. However, the component which does indeed affect actual behavior is trust. This is an extremely difficult barrier for retailers to overcome as consumers' concerns have gotten worse and worse each year (Gramling, 2021). Thus, from a theory standpoint, the current research suggests that the hurdles or barriers presented by PE, EE, IM, FC, PV, and HM have been overcome and do not lead consumers to spend more or less when mobile shopping, whereas TR continues to present a challenge, and opportunity, for retailers to address. Additional factors may be discovered in the future, as researchers begin to address the intention-behavior gap further by establishing a renewed focus on behavioral outcomes rather than intention (Hulland and Houston, 2021).

From a managerial perspective, brands, vendors, and application developers should be aware that while consumers may *intend* to shop through mobile channels due to the various utilitarian, hedonic, financial, and social benefits they provide, these factors should not be assumed to lead to an actual increase in the total dollar amount spent by consumers. The primary factor that affects a consumer's propensity to spend *more*, and therefore invest further into the mobile channel relationship and the act of mobile shopping, is the trust and safety that they perceive when doing so. These perceptions likely lead consumers to feel at ease when purchasing larger-ticket items or when purchasing more frequently in general, which can help raise low levels of confidence in mobile shopping platforms (Groß, 2016). It is also possible that consumers who shop more through their mobile devices (i.e., past behavior) build greater levels of trust over time, as the number of consumer-retailer interactions rises and these consumers become increasingly more comfortable with the process. Therefore, this study recommends that managers of m-commerce channels or businesses continue to think about how to enhance the trust of their customers. For this, additional research is needed in order to understand which implicit factors influence consumers' trust in a mobile channel or business (Kaushik et al. 2020). Once the relevant factors have been identified, appropriate commerce strategies can then be built around them.

### **Limitations and future research directions**

One limitation of the current study is its use of a student sample. While undergraduate students are indeed young, tech-savvy consumers who are extremely relevant to mobile shopping research (Bigné et al., 2007; Chau et al. 2018), surveying respondents from a wider variety of backgrounds could result in additional novel findings. For example, deeper research into the effects of age (San-Martin et al., 2015; Natarajan et al., 2018) could be possible.

Another limitation of the current research is that it focuses on consumers who have engaged in mobile shopping in the past and have spent money when doing so, and therefore does not include individuals who have never engaged in mobile shopping. While most extant

research also focuses on a specific segment of individuals (e.g., mobile shoppers or mobile non-shoppers), a direction for future research, which to our knowledge has not yet been done, is to comprehensively study the effects of various mobile shopping antecedents for *both* mobile shoppers and non-mobile shoppers using one model, rather than separately estimating multiple models and then comparing their parameter estimates. Mathematically, a zero-inflated model could accomplish this, by simultaneously estimating and comparing the factors that affect both an individual's propensity (i.e., probability) of being a mobile shopper *and* the estimated amount they are predicted to spend.

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