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Examining the role of consumer impulsiveness in multiple app usage behavior among mobile shoppers

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ABSTRACT

Building on the stimulus-organism-response (S-O-R) theory, this study identifies and empirically tests the prominence of various technology-related, consumer characteristics, and situational variables (Stimuli) on fostering impulsive habits among mobile shoppers. We further examine the direct and indirect effects of consumer impulsiveness on the use of multiple shopping applications for online purchases. Data collected from 275 mobile shopping application (app) users through an online survey were analyzed using partial least square structural equation modeling (PLS-SEM). Results confirm the significant impact of mobility, personalization, product assortment, and hedonic motivation on impulsiveness, except the app's visual appeal. Impulsiveness was found to be strongly correlated with users' intention to install another shopping app, whereas consumers behavioral intention was a significant precursor of their multiple app usage behavior. The findings apprise managers of the role of impulsiveness in encouraging split loyalty among mobile shoppers and prescribe new strategies for sustained use of shopping platforms.

1. Introduction

Increased access to internet-enabled smartphones and mobile devices has redefined millions of consumers' shopping habits worldwide (Mehra, Paul & Kaurav, 2020; Kasilingam & Krishna, 2021). Mobile apps are becoming a go-to tactic for retailers because they provide convenient digital engagement (Van Heerde, Dinner & Neslin, 2019; Reinartz, Wiegand, Imscloss, 2019). Worldwide consumer spending on mobile applications (Apps) are expected to reach 160 billion US dollars shortly (Statista, 2020b). The availability of mobile devices supporting faster connectivity has altered the consumer decision-making process regarding shopping (Faulds et al., 2018; Jebarajakirthy et al., 2021; Cavalinhos, Marques & Salguero, 2021). A recent report by QZ (2020) has highlighted consumers preference for mobile app-based shopping over other online forms, as the number of app installations has grown significantly. Retailers with online marketplaces like Amazon, Flipkart and Snapdeal are taking advantage of India's hyper-growing market by offering a variety of products and services on their mobile app platforms (Kalia & Paul, 2021).

Despite the enormous proliferation and significance, early scholarly research in this domain is somewhat limited and geographically constrained (Groß, 2015; Marriott et al., 2017). It is observed that there is inadequate literature examining consumer characteristics that may influence mobile shopping and a lack of studies in the context of developing economies (Chopdar and Sivakumar, 2019). Further, empirical research, particularly regarding shopping apps, is limited and mostly based on consumers' early adoption, use, and engagement (Natarajan et al., 2017; Kim et al., 2017; Thakur, 2016 Huang and Korfiatis, 2015). The ubiquitous nature of mobile shopping, convenience, ease of use, and speed can trigger impulsiveness among consumers (Drossos et al., 2014). Ubiquity offers mobile shoppers the ease of use and convenience of ordering from anytime anywhere (Chopdar and Balakrishnan, 2020). Besides, it allows users to access real-time information and transact in a swift manner (Kim et al., 2013). Considering the growth in popularity of mobile-based shopping, a thorough cognizance of consumers' impulsiveness and its consequent impact on their future behavior in the mobile context would be advantageous for both researchers and managers. This will assist app developers and retailers in designing and delivering

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offers to induce impulsiveness among shopping app users. Moreover, it will encourage marketers to initiate creative strategies to deal with the consequent behaviors of m-shoppers.

An extensive analysis of past studies indicated factors influencing consumer impulsiveness, which are identified as follows: shopping enjoyment (Floh and Madlberger, 2013), internet addiction, need for arousal, materialism (Sun and Wu, 2011), conscientiousness, extraversion (Dinsmore et al., 2017), positive affect, normative evaluation (Chih et al., 2012), and hedonic shopping motivations (Ozen and Engizek, 2014). Innovativeness and involvement were found to be significant predictors of impulsiveness of m-shoppers (San-Martin & López-Catalán, 2013). The studies mentioned above have primarily focused on internal consumer traits as drivers of impulsiveness, thereby completely neglecting other possible antecedents like technology-related factors and external and situational factors. Substantiating this assertion, Kim et al. (2017) have also suggested incorporating marketing-related and app-specific factors to examine mobile consumer behavior. Thus, the key objective of this research is to discover various app-related variables, situational variables, and internal consumer characteristics and map their effects on impulsiveness of m-shoppers.

Notwithstanding 204 billion mobile apps downloaded worldwide in 2019 (Statista, 2020a), the key challenge for mobile marketers and retailers is to retain their user base. Users stickiness with the app has been noted to be a key indicator of mobile app success (Mashable, 2013). Encouraging impulsiveness among its shopping app users may boost the sales and revenues of online retailers. Nevertheless, it is highly likely to trigger consumers' desire to try another app from numerous other competitors. Hence, in the long run, impulsiveness with a specific shopping app may hamper its regular usage and aid in consumer defection. Academic research is yet to investigate these issues, specifically with regard to shopping with mobile apps. Thus, to explore these likely consequences of consumer impulsiveness with mobile shopping apps, we have proposed two outcome variables: users' intention to install another shopping app and the use behavior of multiple shopping apps in this study. Based on the scenario discussed above, some interesting questions arise: (a) *What are the key antecedents driving consumer impulsiveness with mobile shopping applications?* (b) *Does consumer impulsiveness associated with a specific mobile shopping application affect their intention to install another shopping app?* and (c) *Does consumer impulsiveness encourages mobile shoppers to use multiple apps for their online purchases?* Thus, the current study addresses these fundamental questions that will shed light on the impact of consumer impulsiveness on their intention to install another shopping application and use multiple apps for shopping purposes. It extends the theory and engenders fresh insights for mobile retailers and app developers to deal with the potential impact of impulsiveness, which weakens app loyalty and switching behavior among m-shoppers.

The contributions of this work to the current literature on mobile shopping are manifold. Firstly, this study is a novel effort to identify various antecedents of consumer impulsiveness and figure out their impact on mobile shopping applications. The novelty lies apparently on identifying a comprehensive set of precursors of consumer impulsiveness with mobile shopping apps that are not limited to internal consumer characteristics only, thereby examining the role of various app-specific and situational variables on the studied phenomenon. Secondly, this paper is one of the earliest attempts to assess whether consumers' impulsiveness with a particular shopping application affects their intention to install another app. Thirdly, it examines the impact of consumer impulsiveness and intention on the consequent use of multiple shopping apps. Finally, it contributes significantly to both theory and practice by shedding light on impulsive usage of shopping apps and its subsequent effect on app loyalty.

Considering the gaps identified from an extensive appraisal of previous studies and ensuing discussions, we apply the S-O-R framework to find a set of variables that drive consumer impulsiveness and elucidate their impact on it. Afterwards, the role of impulsiveness as a predictor of consumers' intention to install another shopping application and use behavior is examined. The remainder of the paper is structured as follows: The next section presents the theoretical background, followed by the conceptual model and ensuing hypotheses. Next, the data collection and sampling process are elucidated, followed by the results. Discussions of findings and implications of the study are furnished next. Finally, various limitations and future research paths are suggested, followed by conclusions.

2. Theoretical background

2.1. The stimulus-organism-response (S-O-R) model

Built on the environmental psychology theory, the S-O-R framework presents a mechanism that describes the impact of external conditions on an individual's emotional state (Mehrabian and Russell, 1974). It extends the S-R framework and elucidates a process where a stimulus from the environment arouses consumers, leading to internal evaluation and consequently resulting in their reaction (Sadiq, Adil & Paul, 2021). Consumer emotional conditions (organism) function as mediating variables in the model. Thus, the SOR model is a refinement of the S-R framework, which suggests that when a person is exposed to external stimuli, "*inner organism changes*" precede behavioural responses.

The S-O-R framework has remained as one of the most prominent models in the study of online consumer behavior, and several studies in the literature have examined its usefulness in explaining consumer behavior in an online retail environment (See for instance, Kim, Yang, and Yong Kim, 2013; Ha and Lennon, 2010; Wu, Lee, Fu and Wang, 2013 inter alia). More specifically, the S-O-R framework is the most widely adopted theoretical approach for studies on online impulse buying when it comes to impulsiveness. A stream of research has highlighted the significance of impulsiveness in consumers' online buying behavior. Wells et al. (2011) have reported robust effect of consumers' impulsiveness on impulse buying behavior in the online setting. Similarly, Floh and Madlberger (2013) revealed impulsiveness (organism) as a crucial driver of consumers' online impulse buying behavior (response). Liu et al. (2013) further substantiated that personality factors like impulsiveness are a key determinant of consumers' response to their urge to buy on impulse. Chih et al. (2012) showed situation-specific positive affect and normative evaluations as significant influencers of consumer impulsiveness on a travel website. In a recent empirical work, the perceived value of technological advancement along with consumer self-control, and retailer's love were found to be significant enablers of impulsiveness (Farah and Ramadan, 2017). Based on prior studies, impulsiveness is operationalized as an *organism* in this study.

Recent researches have extended the S-O-R framework to describe and predict user behavior on the mobile-based platform. Li et al. (2012) observed that hedonic factors positively affect consumers' emotions and mobile commerce experience. In their recent empirical work, Zheng et al. (2019) observed the significant impact of portability and visual appeal (stimuli), on hedonic and utilitarian browsing (organism) and subsequent urge to buy on impulse (response) among m-commerce users. Attributes related to app design and performance were noted to be significant contributors to customer engagement with mobile travel applications (Fang et al., 2017).

In contrast to stationary digital gadgets, smartphone-based applications facilitate mobility, by allowing users to perform multivariate functions irrespective of place or time constraints. Further, compared to the online and mobile web shopping mode, mobile applications provide a more dynamic platform with geo-targeted notifications, personalized and real-time contextual offers that present unique opportunities and challenges for marketers. Mobile applications also tend to attract users through visual stimuli like colors, multi-dimensional images and other tools by creating an enjoyable experience for them (Silvennoinen et al., 2014). Despite the growing body of S-O-R-based literature in both online and mobile settings, limited attention has been given to the role of these

variables in fostering impulsiveness among mobile shopping applications users (Chopdar and Balakrishnan, 2020). Hence, the authors believe that there is a need to identify and examine the effects of specific mobile app-based dimensions to deepen our understanding of consumers psychological states and their consequent response behavior in the mobile environment. The SOR model is an apt theoretical foundation in the context of this research, which allows us to bring in various app and consumer related factors (stimuli) as drivers of consumer impulsiveness (organism), and model its impact on their intention to install another shopping application, and use of multiple shopping applications (response). Thus, this study aims to consolidate both the theoretical understanding of the phenomenon under study and contribute towards a refined managerial perspective in handling the emerging challenges of the app-based mobile commerce.

3. Research model and hypotheses development

In our S-O-R based model, various app-specific attributes and user characteristics such as mobility, personalization, visual appeal, product assortment, and hedonic motivation act as stimuli or environmental cues. They are posited to influence consumers internal state of impulsiveness (Organism) due to their engagement with those attributes. Finally, response is outlined by two behavioral reactions: behavioral intention to install another shopping app, and use of multiple apps. Age, experience, and application used are further included as control variables in the study. Fig. 1. depicts the conceptual framework of our research.

3.1. Stimuli (S)

The stimuli in the S-O-R framework are the originating point of consumers' eventual reaction in a consumption context. A set of attributes that may influence consumers' impulsiveness related to mobile shopping apps are outlined in the following sections.

3.1.1. Mobility

Mobility entails time and location-independent access to communication, information, and services (Kim et al., 2010). Mobility enables a user in an instant, simple, and ubiquitous access to various online services wirelessly and is noted to be one of the significant benefits of m-commerce over e-commerce (Wang and Li, 2012). Sharma (2017), suggested that mobility could be an essential value proposition for users to engage in transactions over the mobile platform. The mobility of mobile technology significantly influenced the perceived usefulness of mobile payment services among its users (Kim et al., 2010). Marinkovic et al. (2017) confirmed mobility as the strongest predictor of customer satisfaction with m-commerce. Mobility is an important technology-related attribute that increases consumers' ability to shop anytime, anywhere, whether at home or traveling. Perceived mobility had a significant positive impact on customer perceived enjoyment with mobile financial services (Yen and Wu, 2016). Similarly, the mobility of m-shopping significantly affected the hedonic value associated with it (Kim et al., 2015).

Nonetheless, there is minimal attention in the literature on evaluating the direct impact of mobility on consumer impulsiveness with mobile shopping apps. Thus, given the past findings discussed above, it is assumed that mobile shopping apps may stimulate a higher level of impulsiveness among its users due to improved connectivity to shopping services when they desire to buy. Hence, it is proposed that:

H1. Mobility positively relates to impulsiveness with mobile shopping application.

3.1.2. Personalization

Personalization refers to "*tailoring content and services to match the buyer's personal interests or preferences*" (Xu et al., 2011, p.43). Setyani et al. (2019) posited that the modern digital world offers personalized advertising that influences users' perception and motivates them to behave hedonically, which in turn affects their impulsive urges. Kim, Lin and Sung (2013) noted that mobile app involves permission-based marketing with consumers making opt-in choices. Perceived personalization was noted to be a significant predictor of usefulness and playful engagement with mobile apps (Kim et al., 2016). Huang (2017) revealed that personalized mobile services arouse customers and help to create an

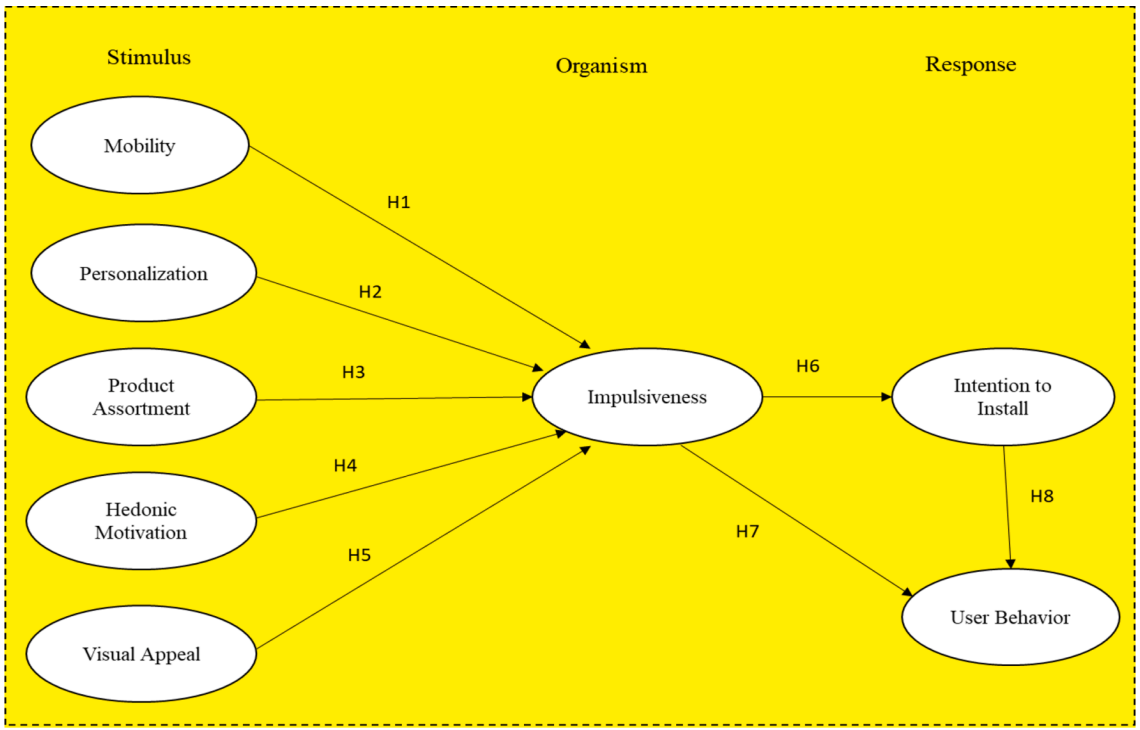


Fig. 1. Research model.

enjoyable experience for users, and makes them intrinsically motivated to use them. In a study in China, users found e-commerce recommender systems helpful, which significantly affected their unplanned purchase behavior (Ying et al., 2018).

Retailers offering mobile shopping application can make product recommendations based on past choices of consumers, provide coupons, and time-dependent deals based on their location, thereby enhancing the shopping experience of users. It is expected that personalized offers delivered by m-retailers on their apps would increase the impulsiveness of consumers while using mobile shopping applications. Thus, it is hypothesized that:

H2. Personalization positively relates to impulsiveness with mobile shopping application.

3.1.3. Product assortment

Product assortment describes "*the breadth and depth of merchandise offered by an online retailer*" (Nguyen et al., 2018, p.262). Product availability or the variety of selection was noted to be a critical situational stimulus affecting consumers impulsive buying responses online (Chan et al., 2017). Product assortment on the website encourages consumers to collect more information, resulting in impulse buying behavior (Park and Kim, 2008; Park et al., 2012). An assortment of products stimulates online consumers to pleasurable browsing and enhance their hedonic shopping experience (Mazaheri et al., 2010). In generalized e-commerce settings, product assortment factors were found to be a more potent driver of consumer impulse purchases than retailing factors (Kacen et al., 2012).

Availability of various products and brands at different price points on mobile shopping applications is expected to increase consumer impulsiveness. Thus, the following hypothesis examines the effect of product assortments on consumer impulsiveness with mobile shopping apps:

H3. Product assortment positively relates to impulsiveness with mobile shopping application.

3.1.4. Hedonic motivation

Hedonic motivation deals with getting pleasure out of using technology and is a significant predictor of consumers' acceptance and usage of technology (Brown and Venkatesh, 2005). Consumers hedonic motivations can be fulfilled on the mobile platform, as it can provide an enjoyable, seamless shopping experience. Yang and Kim (2012) stated that hedonic motivation fosters mobile shopping behavior. In their empirical findings, Palos-Sanchez et al. (2019) indicated that smartphones with fun tools and applications drive users' mobile app adoption intention. However, increasing the enjoyment quotient may not necessarily lead to repeated use of mobile apps (Tam et al., 2018). It is well-accepted that hedonic motivations affect consumers' impulse buying behavior (Yu and Bastin, 2010). Consumers make purchases to seek pleasure/enjoyment when driven by hedonic motivations (Gültekin & Özer, 2012). Hedonic browsing was noted to be a key driver of impulse buying behaviors of e-shoppers (Park et al., 2012). Ozen and Engizek (2014) further confirmed that hedonic shopping motivations drive online impulse buying tendencies. Similarly, Dey and Srivastava (2017) noted the significant association between hedonic motivation and impulse buying intention among Indian consumers.

Thus, it can be assumed that providing pleasurable and entertaining mobile shopping experiences on apps would satiate consumers' hedonic desires and act as a key driver of their impulsiveness with mobile shopping applications. Therefore, it is posited that:

H4. Hedonic motivation positively relates to impulsiveness with mobile shopping application.

3.1.5. Visual appeal

Visual appeal is defined as "*a customer's perception of the extent to which visual elements presented on a site induce the customer's positive affection*" (Zhang et al., 2015, p.470). Liu et al. (2013) illustrated that visual appeal of websites positively influences the instant gratification of consumers, thereby increasing their urge to buy on impulse. In their experimental study, Wu, Won Ju, et al. (2013) observed a significant increase in consumers' pleasure and patronage intention towards virtual fashion stores by altering the color, visual texture, and style coordination. In another study, visual aesthetics was found to be positively associated with the usefulness and ease of use of a mobile website (Li and Yeh, 2010). Due to the small screens and inconvenient input mechanisms of m-devices, a visually appealing interface is crucial to driving user engagement with m-payment (Kapoor et al., 2015). Visual appeal was a significant predictor of users' perceived enjoyment, which subsequently resulted in a greater urge to buy on impulse on social commerce platform (Xiang et al., 2016). Hence, it can be expected that when users of mobile shopping applications perceive the visual elements to be more attractive, it may result in higher impulsiveness. Therefore, it is posited that:

H5. Visual appeal positively relates to impulsiveness with mobile shopping application.

3.2. Organism (O)

Organism refers to individuals' internal conditions, which involve their cognition and emotion, including perceptions, experiences, and evaluations (Zhang et al., 2014). They serve as intervening variables in the S-O-R chain.

3.2.1. Impulsiveness

Impulsiveness is described as a psychological organism that directly seeks a response (Liu et al., 2013). Beatty and Ferrell (1998, p. 174) defined impulsiveness as "both the tendencies (1) to experience spontaneous and sudden urges to make on-the-spot purchases and (2) to act on these felt urges with little (conscious) deliberation or evaluation of consequence". Impulsiveness refers to "a consumer tendency to buy spontaneously, non-reflectively, immediately, and kinetically" (Rook and Fisher, 1995, p.306). Past researchers have widely studied this construct as a significant precursor of consumers' impulsive buying behavior in a store and an online setting.

As noticeable from a detailed appraisal of the literature, studies exploring the impact of impulsiveness on mobile shopping applications remain scarce. Recent studies have indicated consumers' preference for mobile shopping due to its nature, size, and physical characteristics aiding in anytime, anywhere shopping (Gao et al., 2015; Wang et al., 2015). Boeck et al. (2011) have suggested future researchers to explore the impact of impulsiveness on mobile app usage behavior. Impulsiveness was found to be connected with more frequent use of mobile platform vis-à-vis online channel (Rodríguez-Torrico et al., 2017). Chopdar and Sivakumar (2019) have further evinced the favorable effect of impulsiveness on adoption and use of mobile shopping applications. Tseng and Teng (2014) found that the perceived enjoyment of users significantly influenced their intention to adopt another auction site. Consumers' proneness towards deals and promotions significantly affected their switch to app-based shopping (Tak and Panwar, 2017).

Prior studies have referred to impulsiveness as a hedonic desire for immediate gratification among consumers (Puri, 1996; Floh and Madlberger, 2013). Technological innovations by online retailers have not only improved the shopping experience for consumers by making it more convenient and accessible but have also turned them more impulsive (Farah and Ramadan, 2017; Amos et al., 2014). In the context of mobile shopping, it is expected that consumers in a state of impulsiveness may enjoy using shopping apps more due to their convenience, speed, and in-app promotions. Sharma et al. (2010) have associated

impulsivity of retail with novelty-seeking, risk-taking and change-seeking behavior. An interesting research question germinating from the review of prior studies that necessitates further probing is the potential influence of consumers' impulsiveness on their behavioral intention to install another shopping app. Based on the past findings, it can be surmised that an impulsive shopping app user may exhibit a greater tendency to install another mobile shopping application. Hence, it is hypothesized that:

H6. Impulsiveness positively relates to the intention to install another mobile shopping application.

Further, impulsiveness has been noted to negatively affect store loyalty of consumers (Martos-Partal & González-Benito, 2013). In the context of mobile shopping, technological features may foster impulsiveness among consumers, but they can adversely impact the satisfaction of shoppers (San-Martin & López-Catalán, 2013). The recent findings by Farah and Ramadan (2020) indicate that impulsiveness reduces online shoppers continued interaction with technological innovations like Alexa and dash buttons for Amazon. It is also evident that impulsive shoppers make greater and more frequent use of mobile devices for purchase due to their mobility and convenience (Rodríguez-Torrico et al., 2017). Hu et al. (2017) have noted that consumers may opt to simultaneously use multiple competing mobile applications to satiate their need for diversity and as a variety-seeking tendency.

Making inference from the above findings, we argue that impulsiveness may significantly influence the use of multiple shopping applications among mobile shoppers. Thus, we propose the following hypothesis:

H7. Impulsiveness positively relates to the use behavior of multiple mobile shopping applications.

3.3. Response (R)

A response represents "*an outcome of consumers' reaction(s) to a set of stimuli and their internal evaluations*" (Chan et al., 2017). We hypothesize the response attributes in the section that follows.

3.3.1. Intention to install another mobile shopping application and use behavior

Intention indicates "how hard people try or how much effort they exert to perform a behavior" (Ajzen, 1991, p.181). Consumers' intention to install another mobile shopping application is chosen as one of this study's key outcome/response variables. It is operationalized as the degree to which a mobile shopper plans to install another mobile shopping applications in near future, in addition to the one already used.

System usage is a crucial variable in studies related to information systems, defined as "*a user's employment of a system to perform a task*" (Burton-Jones & Gallivan, 2007, p. 659), and is regarded as one of the most important measure of Information Systems success. In this study use behavior construct is operationalized as the use of multiple mobile shopping applications for shopping from online retailers. Prior studies have empirically validated consumers' behavioral intention as a significant predictor of their actual use behavior (Aldás-Manzano et al., 2009; Mishra et al., 2014; Oh and Yoon, 2014). The strong correlation between behavioral intention and actual use behavior has been further validated in the domain of mobile shopping as well (Chopdar et al., 2018). Grounded on the above discussions, the authors propose that when mobile shoppers have a greater intention to install mobile shopping applications of other retailers, it is likely to increase the actual usage of multiple shopping applications. Thus, it is hypothesized that:

H8. Intention to install another mobile shopping application positively relates to the use behavior of multiple mobile shopping applications.

4. Data and methods

4.1. Measures and instrument

The survey questionnaire administered for this research comprised of eight latent variables. All items measuring the various constructs were adopted from validated measures from prior studies, based on relevant literature review. Ahead of the survey, a few of the questionnaire items were modified slightly to suit the background of this study after consultations with two domain experts. A seven-point Likert scale (1 = strongly disagree, 7 = strongly agree) was adopted to measure the various indicators. Appendix I presents the details of the constructs measured.

4.2. Sampling and data collection process

An online survey methodology was adopted to gather data for this study. A database of verified e-commerce users purchased from a service provider in India was employed as a sampling frame to select respondents for the study, recruited via e-mails. The online survey enabled us in reaching the respondents at a low cost resulting in faster responses (Varela et al., 2017). To fulfil the aims of the study, the focus was on experienced users of mobile shopping applications. Thus, a screening question was administered at the start of the survey to ensure that respondents had used shopping apps before. The sample was primarily confined to Indian consumers who regularly purchase products and services from various online retailers like Amazon, Flipkart, Snapdeal Etc. by using their mobile shopping applications. We did not consider shopping on mobile web, social commerce, price comparison apps and others for the current study.

Further, e-mails were sent based on gender, age, and education to make it indicative of India's digital population. The whole process was carefully executed to match respondents with the demographics of mobile shoppers in India belonging to different age groups and gender. At the start of the survey, all the participants were informed about the study's objectives, definition of mobile shopping applications, and the study's scope. Further, they were instructed to fill out responses to the questionnaire, keeping in mind the shopping app they primarily/most often use. Attention checks questions were employed to filter out careless responses. Moreover, the items in the survey were segregated based on the measured constructs to get rid of proximity bias (Podsakoff et al., 2012). Out of 3000 e-mails sent, 326 responses were collected at the end of seven days during the data collection phase in the month of January 2020, amounting to a response rate of 10.86%. Out of 326 respondents, 19 were inexperienced with the use of mobile shopping applications, whereas 32 responses were partially filled, thus not considered for this study. Finally, 275 cases were kept for further analysis.

4.3. Data analysis

The partial least square structural equation modeling (PLS-SEM) approach was applied to analyze the conceptual framework. The measurement model (Outer model) tested the reliability and validity of measures of all the latent constructs, whereas the structural model (Inner model) assessed the relationships among the latent constructs for hypotheses testing. Smart-PLS 3 (Ringle et al., 2015) and SPSS 23.0 were employed as software tools to perform statistical analysis during March 2020. The PLS approach is preferable and suggested by Hair et al. (2014) due to the exploratory character of the current research. Moreover, due to its distribution free nature, PLS favors the non-parametric multi-group analysis for group comparisons (Henseler, 2012). The research methodology adopted for this study is presented in Fig. 2.

5. Results

Various details on the demographics of sample members and their

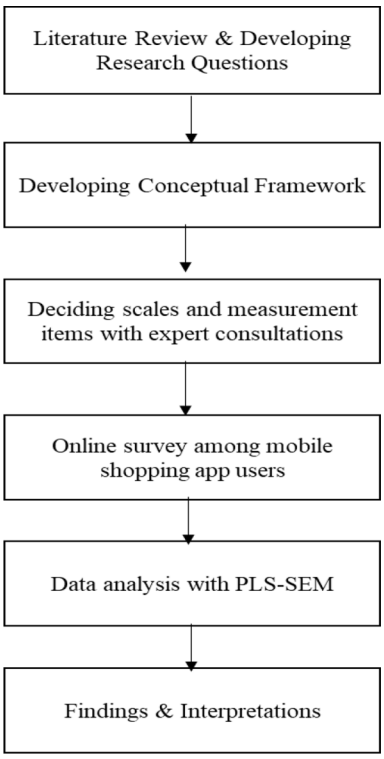


Fig. 2. Research methodology.

usage attributes are presented here. The sample included 63.3% of male and 36.7% of female respondents, respectively. The highest number of respondents belong to the 25–29 years of age group followed, by 20–24 years. Regarding their education, the majority of sample members were graduates (47.3%), followed by post-graduates (36.7%). All the respondents have prior experience of using shopping applications. Further, nearly 78% of respondents have been using shopping apps for one year or more, making our sample apt for the current study and contributing to the validity of the findings.

5.1. Outer model evaluation

The reliability and validity of various constructs employed are assessed first. The Cronbach's alpha values and composite reliability were greater than 0.70, demonstrating that constructs were reliable. The factor loadings and average variance extracted (AVE) values were checked to assess convergent validity. All loadings were reported to be more than 0.70, whereas the AVE scores were greater than 0.50 as suggested by (Hair et al. 2010). It can be inferred from Table 1, that all the measures employed in the study meet the criteria for the reliability and convergent validity. Following Fornell and Larcker (1981), the square root of AVE of each construct is compared with their correlations with other constructs to confirm discriminant validity. The heterotrait-monotrait ratio further substantiates the discriminant validity of all the constructs employed in the study, with all values below the threshold mark of 0.85 (Henseler et al., 2015). The results are presented in Table 2. Overall, the findings imply a satisfactory level of psychometric properties of scales employed in this study.

As per the recommendation of Pousttchi and Goeke (2011), variance inflation factor (VIF) values were checked to detect multicollinearities among constructs. VIF's below five and tolerance level above 0.20 indicates no multicollinearity (Hair et al., 2011). The VIF values for constructs used in this study ranged from 1.744 to 4.026. The tolerance values were all above 0.24, thereby indicating minimal chances of multicollinearity.

Common method bias (CMB) issue may be of some concern on account of data for both predictors as well as criterion variables being taken from the same subjects (Podsakoff et al., 2003). Hence, several procedural remedies were adopted to limit its impact. All the respondents were given assurance about anonymity and privacy for their responses. Moreover, participants were taken into confidence to answer as honestly as possible. To further control the impact of CMB, Harman's single-factor test was conducted (Podsakoff et al., 2003). An exploratory factor analysis consisting of all the variables was performed, and a single factor was selected that explained 32.04% of the variance. The results show that method bias is significantly controlled and unlikely to be a serious issue in the current study.

Table 1
Psychometric properties of measures.

Construct	Items	Loadings	AVE	CR	Cronbach's alpha
Mobility (MOB)	MOB1	0.859	0.689	0.899	0.851
	MOB2	0.841			
	MOB3	0.813			
	MOB4	0.808			
Personalization (PER)	PER1	0.890	0.719	0.927	0.902
	PER2	0.865			
	PER3	0.846			
	PER4	0.789			
	PER5	0.847			
Product Assortment (PAST)	PAST1	0.868	0.683	0.896	0.845
	PAST2	0.800			
	PAST3	0.855			
	PAST4	0.778			
Hedonic Motivation (HM)	HM1	0.869	0.763	0.906	0.846
	HM2	0.897			
	HM3	0.854			
Visual Appeal (VAP)	VAP1	0.876	0.765	0.907	0.847
	VAP2	0.874			
	VAP3	0.875			
Impulsiveness (IMP)	IMP1	0.851	0.733	0.916	0.878
	IMP2	0.843			
	IMP3	0.865			
	IMP4	0.864			
Intention to Install (INT)	INT1	0.888	0.800	0.923	0.875
	INT2	0.900			
	INT3	0.896			
Use Behavior (UB)	UB1	0.907	0.843	0.955	0.938
	UB2	0.935			
	UB3	0.920			
	UB4	0.909			

Notes: AVE = average variance extracted; HM = hedonic motivation; IMP = impulsiveness; INT = intention to install; PAST = product assortment; PER = personalization; MOB = mobility; VAP = visual appeal; UB = use behavior. CR: Composite reliability.

5.2. Inner model assessment

The PLS-SEM algorithm is executed to get the estimates for the testing of hypotheses. A non-parametric bootstrapping procedure was carried out to assess the significance of PLS-SEM results (Davison and Hinkley, 1997). The results are presented in Fig. 3. Mobility was found to be significantly associated with impulsiveness of mobile shopping application users ($\beta = 0.220$; $p < 0.000$), thus validating *H1*. Personalization revealed a highly significant relationship with the level of impulsiveness ($\beta = 0.411$; $p < 0.000$), thereby upholding *H2*. The next hypothesis explored the effects of product assortment on consumers' impulsivity with mobile shopping applications. Results demonstrated a significant association between the two constructs ($\beta = 0.133$; $p < 0.01$). Hence, *H3* is substantiated. Results further confirmed hedonic motivation as a significant driver of impulsiveness. The results showed positive association between hedonic motivation and impulsiveness ($\beta = 0.246$; $p < 0.000$), supporting *H4*. However, the association between visual appeal of apps and consumer impulsiveness could not be validated ($\beta = 0.070$; $p > 0.1$). Thus, *H5* is not supported. Next, *H6* predicts

Table 2
Correlation Matrix between constructs and discriminant validity.

	M	SD	HM	IMP	INT	MOB	PAST	PER	UB	VAP
HM	4.743	1.306	**0.874**	*0.637*	*0.388*	*0.441*	*0.352*	*0.476*	*0.132*	*0.212*
IMP	4.512	1.205	0.554	**0.856**	*0.638*	*0.602*	*0.509*	*0.749*	*0.221*	*0.326*
INT	4.430	1.227	0.339	0.560	**0.894**	*0.341*	*0.418*	*0.535*	*0.315*	*0.296*
MOB	5.065	1.207	0.373	0.531	0.300	**0.830**	*0.355*	*0.459*	*0.206*	*0.152*
PAST	5.072	1.161	0.300	0.446	0.368	0.311	**0.826**	*0.410*	*0.097*	*0.356*
PER	4.550	1.286	0.422	0.670	0.476	0.409	0.365	**0.848**	*0.196*	*0.272*
UB	3.710	1.360	0.117	0.201	0.291	0.187	0.071	0.182	**0.918**	*0.067*
VAP	4.756	1.222	0.189	0.284	0.253	0.132	0.303	0.239	**0.055**	**0.875**

Notes: Top diagonal values (Italic) refer to the Heterotrait-Monotrait Ratio between the variables; bottom diagonal values present the values of the correlation matrix; square root of AVE is presented in the diagonal (bold). M = Mean; SD = standard deviation; HM = hedonic motivation; IMP = impulsiveness; INT = intention to install; MOB = mobility; PAST = product assortment; PER = personalization; UB = use behavior; VAP = visual appeal; AVE = average variance extracted.

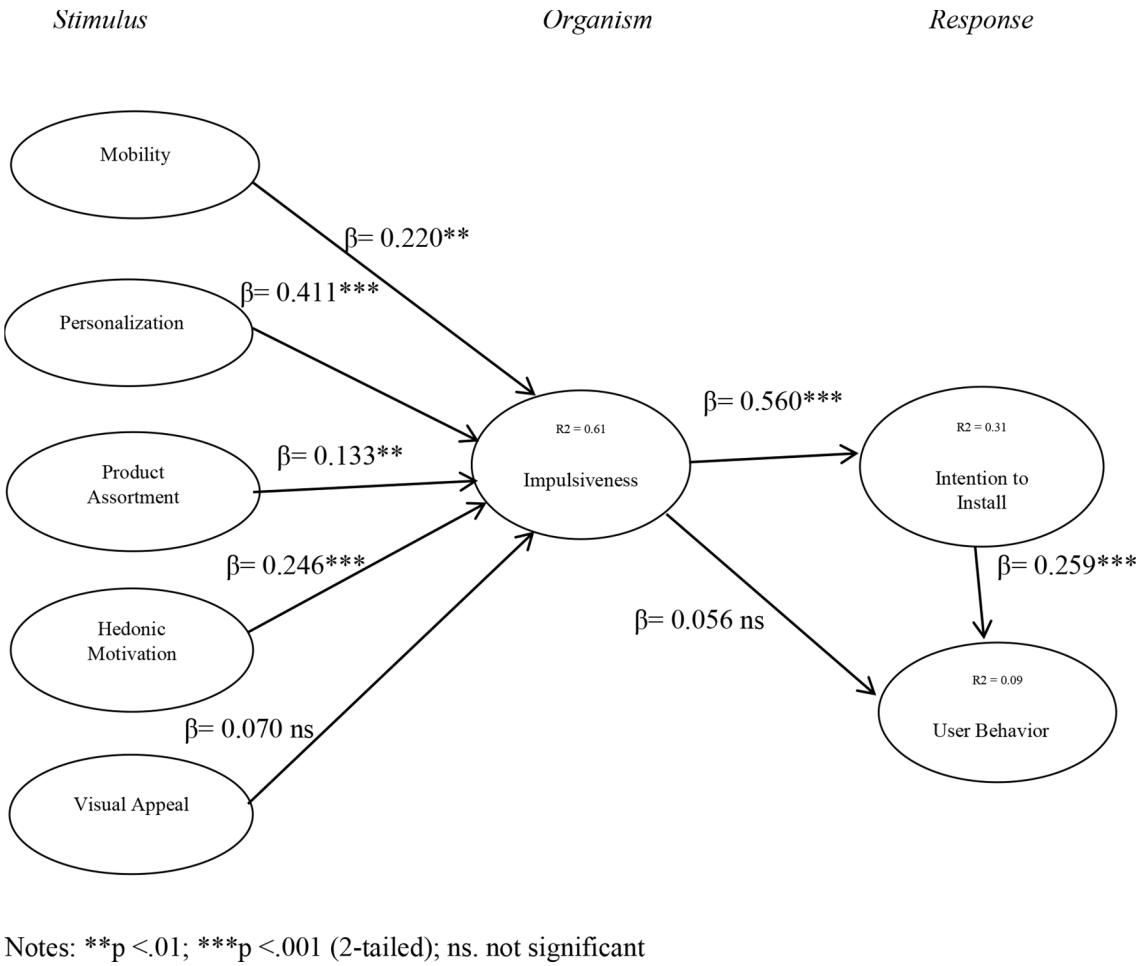


Fig. 3. Structural model results.

impulsiveness as a precursor of m-shoppers intention to install another shopping application. The relationship is found to be highly significant and positive ($p < 0.000$), with a high path coefficient ($\beta = 0.560$). Thus, *H6* is accepted. Impulsiveness did not directly influence multiple shopping app use ($\beta = 0.056$; $p > 0.1$), thereby contradicting *H7*. Lastly, intention to install another shopping application was noted to positively affect the use behavior linked with multiple shopping apps ($\beta = 0.259$; $p < 0.001$), supporting *H8*. Among all, personalization was observed to be the most potent driver of impulsiveness of app users. The impact of control variables, age ($\beta = 0.05$; $p > 0.1$, $\beta = 0.01$; $p > 0.1$), experience ($\beta = 0.03$; $p > 0.1$, $\beta = 0.07$; $p > 0.1$), and app use ($\beta = -0.04$; $p > 0.1$, $\beta = 0.06$; $p > 0.1$) on users' intention to install another app, and use behavior were found to be statistically insignificant, thereby negating possibility of any confounding effects on the results.

Further, mobility, personalization, product assortment, hedonic motivation, and visual appeal collectively explained 60.7% of the variance (R^2) in impulsiveness among app users. Thus, it indicates close to a substantial degree of explanatory power for the model. As per Chin (1998), R^2 value of 0.67 is regarded as substantial, 0.33 as moderate, and 0.19 as low level of predictive validity. Moreover, impulsiveness explained moderate level (31.4%) of R^2 in users' intention to install another shopping application. Thus, our proposed conceptual framework successfully predicts users' impulsiveness, and their intention to install another shopping app. Whereas the R2 value indicating variability in use behavior (UB) construct was observed to be low (8.7%). Next, the blindfolding procedure was performed to estimate the Stone-

Geisser's Q^2 value. The Q^2 values for both the endogenous construct impulsiveness and intention to install another shopping application were found to be 0.436 and 0.248, respectively, confirming the strong predictive relevance of the model. Meanwhile, the Q^2 value for UB was noted to be 0.070. The f^2 statistic is further calculated as $[R^2_{included} - R^2_{excluded}]/[1 - R^2_{included}]$ to examine the relationship strength between an exogenous and endogenous construct specified in the model. The effect size of impulsiveness on the intention to install another shopping application was found to be 0.457, thus indicating a large and robust impact. Among all the predictors of impulsiveness, personalization ($f^2 = 0.301$) was observed to be the strongest. The effect size of intention to install another app on use of multiple shopping apps was observed to be 0.050. Overall, we achieved a good model fit for our proposed framework, as evident from the standardized root mean square residual (SRMR) value of 0.058 (Henseler et al., 2014).

To summarize the results, personalization was found to be the most prominent driver of consumer impulsiveness with shopping apps, followed by hedonic motivation, mobility, and product assortment, except visual appeal. The results further indicate impulsiveness's direct and indirect influence in fostering a greater intent to install another app and multiple app use among m-shoppers.

6. Discussion and implications

6.1. Discussion

Our current inquiry built on the S-O-R theory explores the factors that arouse impulsiveness among m-shoppers and reports their subsequent engagement with multiple shopping applications. The strong association between personalization and impulsiveness implies that a higher incidence of personalized messages, notifications, and product recommendations leads to a greater level of impulsiveness among consumers using mobile shopping applications. This perspective confirms the previous results of Liu et al. (2019). Thus, mobile marketers and retailers can leverage mobile shoppers browsing, purchase and location-specific data to design and deliver personalized offerings as a prerequisite to stimulate impulsiveness among app users. Consistent with the findings from the earlier work of Ozen and Engizek (2014), hedonic motivation has significant positive effects on impulsiveness of app users. Hedonic orientation entails enjoyment, fun and delight associated with shopping activities and positively affects consumers impulsiveness (Park et al., 2012). This shows that hedonically motivated consumers want immediate gratification, which triggers their increased impulsiveness with mobile shopping applications.

Empirical evidence further confirmed the importance of mobility, and product assortment as significant predictors of impulsiveness. This is more likely, as mobility of shopping applications enhances consumers' ability to do shopping on the move, thereby acting as a catalyst of impulsiveness. Unlike traditional brick-and-mortar and online shopping, smartphone-empowered shopping applications provide a sense of convenience and allow users to browse and engage in purchase activities irrespective of their time and location constraints. This is a novel finding of our study, as extant literature has limited empirical evidence of the direct positive effect of mobility on consumers impulsiveness with shopping apps. However, Huang (2017) noted that smartphones' mobility and ubiquity increase users' perception of convenience, which can induce purchases on mobile websites.

Moreover, the results indicated that a multitude of products and brands available at different price points on the app platform encourages impulsiveness among app users. This is in line with the findings of Asuquo and Igbongidi (2015), who noted that a broad assortment of product triggers impulse purchase among consumers. However, alternative explanations of the relationship between product assortment and consumer impulsiveness cannot be ruled out. Park et al. (2012) noted that product assortment on the website encourages consumers to browse and engage in more information search, which consequently affects their impulse buying behavior. Thus, future research is needed to investigate possible mediating mechanisms for a more nuanced understanding of the phenomenon. Previously, Liu et al. (2013) observed that consumers buying on visually appealing sites derived more pleasure and displayed a stronger urge to buy on impulse. However, contrarily visual appeal had no significant positive effect on the impulsiveness of consumers shopping on mobile applications. One likely explanation for this result can be attributed to smartphones' small screen size, which does not make product viewing easy and enjoyable compared to desktops and tablets.

The study findings further revealed that impulsive consumers have a greater intention to install another shopping application. Notwithstanding that impulsiveness positively correlates with excessive use of mobile phones and initial adoption of mobile shopping apps (Vinayak and Malhotra, 2017; Chopdar and Sivakumar, 2019), it negatively affects users repeat purchase intention with apps (Chopdar and Balakrishnan, 2020). The results from our study not only vindicate the findings of Chopdar and Balakrishnan (2020) but also extends it by manifesting the favorable impact of impulsiveness on users' intention to install another app. It appears that variety-seeking consumers who are driven by their impulsiveness to shop on a specific mobile app, would exhibit a higher inclination to install another shopping app to further satisfy their impulsive shopping desires. This signifies that mobile shoppers may not feel committed to continue with their currently used retailers' app, guided by their desire for immediate gratification. Next, contrary to our hypothesis, the direct effect of impulsiveness on multiple app usage behavior was observed to be insignificant. This is a novel finding, as there is hardly any empirical examination of the association between consumer impulsiveness and multiple app usage in the extant literature.

Nevertheless, the recent findings by Hu et al. (2021) shows that intrinsic individual factors can explain users partial switching behavior with mobile apps. But, our findings indicate that impulsiveness influences use behavior of mobile shoppers by the indirect route through intention to install other apps. Thus, it can be concluded that impulsiveness and intention to install apps are crucial in promoting multiple app use among mobile shoppers. The probable reason for the insignificant effect of impulsiveness on multiple app usage behavior could be customers' past habits, inertia, switching cost, Etc. Hence, we urge scholars to investigate these possibilities in future researches. Lastly, behavioral intention was observed as a strong precursor to use behavior of m-shoppers. When app users have a higher inclination to install other shopping applications, they are more likely to use multiple apps for their online purchases. Although extant literature has shown behavioral intention as a key determinant of use behavior of mobile shopping apps (Chopdar et al., 2018), the current finding establishes the strong correlation between behavioral intention and multiple app use behavior among m-shoppers. Moreover, the results showed good predictive validity for our model, with nearly 61% of variance explained (R^2) for impulsiveness construct. However, in a recent study on mobile augmented reality app, Do et al. (2020) captured 52.2% variance in consumer impulse buying among tourists, using PLS-SEM method. The R^2 value of 31% for intention to install another app is comparable with findings of Iyer et al. (2018), who noted 34% R^2 for re-patronage intentions of users for a retailer's mobile app.

6.2. Implications

First, we enumerate various implication to theories that appears from the study findings. The current empirical work makes notable contributions to scholarly understanding of consumers post-adoption usage behavior with mobile shopping applications. It ratifies the applicability and validity of the S-O-R framework in explaining app shoppers' impulsiveness and successfully predicts their intention to install and use another shopping app. Even though prior literature is replete with studies utilizing the SOR theory for explaining consumer impulsiveness

in both online and mobile context, little research has examined it vis-à-vis mobile shopping apps in particular. Mobility, personalization, product assortment, and hedonic motivation have been identified as key variables promoting impulsiveness among shopping app users. These findings can aid in the initial understanding of shopper's impulsiveness in the current context, and could be broadened for a more holistic understanding in the future. Moreover, prior researches have reported the impacts of technological factors, consumer characteristics, and situational variables on impulsiveness of mobile shoppers in separate studies (Lee, 2018; San-Martin and López-Catalán, 2013; Zheng et al., 2019). Whereas, we have examined all these factors together in a unified model to validate their impact on impulsiveness of shoppers on mobile apps. It has further resulted in higher explanatory power of our model, where all the stimuli, namely: mobility, personalization, product assortment, hedonic motivation and visual appeal have been able to capture more than 60% of variance in consumer impulsiveness (Organism). This research further adds value, by being the first to explore and validate impulsiveness as a crucial predictor of users' intention to install another mobile shopping application. Prior research has discussed chiefly how online and mobile retailers have used impulsiveness to attract consumers to adopt their respective platforms (Zhang et al., 2007; Chopdar and Sivakumar, 2019). Whereas, our study has furnished both theoretical and empirical support regarding the impact of impulsiveness on switching intention of app shoppers, thereby providing a new perspective for theorists and practitioners.

Moreover, this is the first study examining the impact of both consumer impulsiveness and their intention to install another app on the actual use behavior associated with multiple shopping apps. The study findings validate user's intention as the foremost predictor of their actual use behavior of shopping apps. Even though the direct effect of impulsiveness construct on use behavior was insignificant, it cannot be considered irrelevant in our study context. Our model provides a finer understanding of mobile shoppers' multiple app usage phenomenon by illustrating how consumer impulsiveness can act as an indirect antecedent to use behavior by affecting users' intention to install different shopping applications.

This study has numerous practical implications to assist mobile retailers and marketers. The favorable effects of various stimuli on consumers impulsiveness produce insights worthy of managerial attention and action. Managers need to understand the importance of mobility in consumers' lives and incorporate specific features in apps that augment their flexibility of location and time. Regarding product assortment, m-retailers are advised to maintain an optimum number of variations, to deliver pleasant shopping experiences to customers, and to induce impulsiveness among them. A wide variety in terms of brands and price points, along with a range of complementary items would aid m-retailers in inducing impulsiveness among shopping app users. Personalization was found to be extremely important for mobile shoppers in the context of this study. Thus, retailers should provide personalized offers and services to consumers through their apps. They should furnish information and services that are personally relevant and fitting in consumers' interests, purchase history, location, and time or occasion. Retailers can benefit immensely by customizing and localizing their services to cater to the unique needs of app users. They should proactively engage in delivering tailor-made solutions to induce a higher degree of impulsive buying. In addition, marketers should emphasize on making shopping on mobile apps fun and entertaining to cater to the hedonic desires of consumers. Shopping apps with offers and interactive features that enable social sharing and conversation will boost the pleasure derived from their use and actuate impulsiveness among m-shoppers. Although visual appeal does not influence impulsiveness directly, it may have an indirect effect. Hence, mobile retailers are advised not to overlook this aspect while designing mobile shopping apps.

As discussed earlier, retailers can focus on various antecedents mentioned above to drive consumer impulsiveness in using their mobile shopping applications. By investing more resources in app design and features, retailers can generate more impulse purchases among app users. However, consumer's impulsiveness with a specific app significantly drives their intention to install another shopping app offered by a different mobile retailer (competitor). Therefore, this interesting finding makes it tricky for mobile retailers to achieve customer retention and presents new business opportunities for their competitors. Moreover, impulse purchases may lead to other negative consequences by making consumers less satisfied with their shopping (San-Martin & López-Catalán, 2013), and may promote unethical consumption behavior (Bossuyt et al., 2017). Hence, it is advised that mobile retailers should devise unique customer retention programs to intensify user engagement and loyalty among app shoppers instead of entirely focusing on promoting impulsiveness. They should continuously innovate by adding unique in-app features and programs to deliver a pleasurable shopping experience to customers on their shopping application platform over that of their competitors. This may aid online retailers in minimizing customer defection to other shopping apps and sustain their share of wallets.

6.3. Limitations and future research

Along with the contributions of this work, some limitations need to be acknowledged that presents future research opportunities. Firstly, even though the present study enlisted a set of stimuli as antecedents of consumer impulsiveness, they are not exhaustive. Thus, future studies could do well to explore other external and consumer-related variables like online reviews and ratings, app reward system and personality traits for a more comprehensive understanding of impulsiveness among shopping app users. Secondly, as this research does not limit itself to the study of a specific product category, future works should focus on investigating consumer impulsiveness associated with different product categories sold on mobile app platforms. Thirdly, as we have not considered the moderating influence of any variables in this study, exploring the differential impact of variables like gender, age, occupation, income, product involvement, and personality traits could provide exciting results in the future. Future studies can also examine the moderating role of customer loyalty programs and customer experience to attenuate the probable adverse consequences of impulsiveness in our model. We urge future scholars to also examine the presence of unobserved heterogeneity in the data by applying latent class techniques like finite mixture partial least squares (FIMIX-PLS).

Furthermore, replicating this study with different samples could further improve the generalizability of the findings, especially in cross-country settings (Chopdar et al., 2018). Fourthly, we have utilized self-reported measures of use behavior concerning multiple app usage among mobile shoppers, resulting in some biasness. Hence, future studies would do well to capture more objective measures of the phenomenon for more substantial evidence of multiple app installation and use. Next, as this research adopts a cross-sectional design, we suggest scholars to engage in longitudinal studies involving panels of mobile shopping application users, which may yield more actionable information. Finally, the results showed that impulsiveness is a weak predictor of use behavior. Therefore, scholars need to bring in and integrate other app related, psychological and situational variables that may explain multiple app usage behavior better and strengthen the predictive power of the model.

7. Conclusions

This research is a pioneering attempt to identify factors that stimulate impulsiveness among m-shoppers, and how it affects their intention and use of multiple shopping applications. It utilizes the S-O-R framework to shed light on the influence of various app-related, consumer traits and situational drivers on impulsiveness of consumers. This study contributes further by uncovering the significant impact of impulsiveness on users' behavioral intention to install another shopping

application. Consequently, it depicts how users' intention to install other shopping apps and their impulsiveness may espouse mobile shoppers to use apps of different retailers.

It proposes novel ways to engender impulsiveness among shopping app users. However, it advises m-retailers to be mindful of its consequences, as it may lead mobile shoppers to share-out their purchase with multiple retailers. The interesting findings germinating from this research are likely to compel marketing professionals to re-think their current strategies and take a more balanced approach to strengthen customer loyalty with a specific mobile shopping application. The insights gleaned from this research necessitates a deeper examination of consumer impulsiveness with shopping apps to uncover future implications for mobile retailers, consumers and app developers.

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Author contributions

Prasanta Kr Chopdar: Conceptualization, Visualization, Data curation, Writing – original draft, Writing – review & editing, Investigation, Formal analysis, Methodology, Project administration, Software. **Justin Paul:** Visualization, Validation, Supervision. **Nikolaos Korfiatis:** Writing – review & editing, Resources. **Miltiadis Lytras:** Resources.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix 1. . Constructs, indicators, and sources

Construct	Items (Measured from 1 – completely disagree, to 7 – completely agree)	Adopted from
Mobility	Mobile shopping applications can be used anytime.	Marinkovic et al. (2017)
	Mobile shopping applications can be used anywhere.	
	Mobile shopping applications can be used while travelling.	
	Using a mobile shopping application is convenient because my phone is almost always at hand.	
Personalization	This mobile shopping application makes purchase recommendations that match my needs.	Kim et al. (2016)
	This mobile shopping application enables me to order products/services that are tailor made for me.	
	The push notifications and promotions that this mobile shopping application sends to me are tailored to my situation.	
	This mobile shopping application makes me feel that I am a unique customer.	
	I believe that this mobile shopping application is customized to my needs.	
Product Assortment	This mobile shopping application deals with a variety of products.	Park et al. (2012)
	This mobile shopping application has wide assortment of products with different prices.	
	This mobile shopping application deals with a variety of brands.	
	This mobile shopping application sells up-to-date products.	
Hedonic Motivation	Using this mobile shopping application is fun.	Venkatesh et al. (2012)
	Using this mobile shopping application is enjoyable.	
	Using this mobile shopping application is very entertaining.	
Visual Appeal	This mobile shopping application is visually pleasing.	Liu et al. (2013)
	This mobile shopping application displays visually pleasing design.	
	The layout of this mobile shopping application is attractive.	
Impulsiveness	When I shop using this mobile shopping application, I often buy things spontaneously.	Rook and Fisher (1995)
	When I use this mobile shopping application, I often buy things without thinking beforehand.	
	When I use this mobile shopping application, sometimes I feel like buying things on the spur-of-the-moment.	
	"Just do it" describes the way I buy things on this mobile shopping application.	
Intention to Install	I would install another mobile shopping application in addition to the one I am using.	Tseng and Teng (2014)
	I would consider installing another mobile shopping application in addition to the one I am using.	
	I plan to install another mobile shopping application in addition to the one I am using.	
Use Behavior	I use multiple mobile shopping applications in order to purchase online products.	Chopdar et al. (2018)
	I use different mobile shopping applications in order to shop for products from different online retailers.	
	I use multiple mobile shopping applications to make personal purchases.	
	I use different kinds of mobile shopping applications.	

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