Demystifying the Effect of Flow Experience for Mobile App-Based E-Services:
A Moderated Mediation Study

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ABSTRACT

The purpose of this paper is to understand the consumer behavior by investigating the effect of flow experience and marketing mix on consumers' continued intention to use e-services provided through mobile applications and the subsequent effect on consumer loyalty. The study also tests, through a moderated mediation approach, the mediation of continued intention to use between flow experience-marketing mix and consumer loyalty while considering the moderating role of e-trust and privacy concern with the application. An online survey was conducted to collect data from the consumers, obtaining 405 valid samples which were analyzed using multiple regression to test the conceptual model of this study. The findings support that flow experience in mobile apps increases consumer intention to use, which is a significant predictor for consumer loyalty for services availed through mobile apps. This study provides insights for the marketers to build the flow in the mobile apps with interactive features, aesthetic design, and ease of use to drive continued intention to use and loyalty.

KEYWORDS

Application Loyalty, Consumer Experience, Flow Experience, Marketing Mix, Mobile Application, Relationship Marketing

1. INTRODUCTION

Smartphone proliferation has exposed the avenue to use a wide variety of mobile applications (mobile apps). By 2019, smartphone users are expected to reach around 2.5 billion landmarks (Statista, 2018). Modern consumption is now driven by smartphones and other pertinent technologies, which have become a necessity of the consumer's life (Braun, Zolfagharian, & Belk, 2016). Mobile apps act as an effecting marketing tool (Persaud & Azhar, 2012), which has enabled marketers to deliver services without having physical communication and connecting consumers irrespective of geographical boundaries (Grant & O'Donohoe, 2007). Marketers create experiential value for consumers through smartphone apps (Rezaei & Valaei, 2017). Service providers are delivering numerous services through mobile apps such as 'Uber' is providing riding services for consumers, 'Just Eat' is delivering foods for consumers, 'Spotify' is providing music streaming services, 'Aliexpress' is providing

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global shopping experiences and so on. All these service providers are managing electronic services (e-services), experiences and online relationships through mobile apps. According to Gartner (2011), it is expected that 85% of customers by 2020 will maintain relationships with service providers online. Online marketers are formulating their value propositions and strategy for relationship marketing (RM) through effective partnerships which ultimately lead to consumer's satisfaction (Boateng, 2019; Kanagal, 2009). Long term profitability and sustainability in the marketplace are achieved through RM as well (Nyadzayo & Khajehzadeh, 2016). Conversely, due to lower searching cost and lack of interactivity in online bring threat to customer's loyalty (Steinhoff, Arli, Weaven, & Kozlenkova, 2018; Ansari, Mela, & Neslin, 2008). E-services are application or software-based information systems, which establish interaction between system and users with the help of internet. E-services have earned immense acceptance and popularity because of seamless transactional efficiencies for on-demand service solutions, which strengthen the relationships between marketers and consumer (Ruyter et al., 2001). Almost every service can be availed through electronically (for example: consumers avail ride sharing services, order foods from favourite restaurants, request for repairing services, book hotel and trips, avail banking services and so on). Consumers have various options of availing or enjoying services at their finger points, so the service evaluation happens quickly and switching cost is also low. Therefore, attract and retain consumers are paramount to marketers (Featherman & Pavlou, 2003). So, both prospects and challenges are there for marketers to manage the online relationship with their valued consumers for e-services.

Marketers aim to provide a seamless experience for consumers throughout the journey of availing or enjoying the anticipated services while building online relationships with consumers. Interactivity is more seamless in an online environment comparing to offline (e.g. face to face) which stimulates flow experiences for consumers (Steinhoff et al., 2018; Novak, Hoffmann, & Yung, 2000). According to Csikszentmihalyi (2008), consumers perceive high involvement and enjoyment while doing an activity with high concentration thus portraying a psychological flow state. Flow is a relevant concept for online relationship marketing since consumers experience flows in an internet-mediated environment such as websites, mobile apps etc. In the business context, previous research examined flow theory to explain online customer behaviour (Koufaris, 2002), acceptance of instant messaging (Lu, Zhou, & Wang, 2009), experience on website browsing (O'Cass, 2010), online customer experience in e-commerce (Bilgihan, Okumus, Nusair, & Bujisic, 2014), loyalty and addiction for mobile games (Su, Chiang, Lee, & Chang, 2016; Chou & Ting, 2003) and so on. Despite the importance of the flow experience in an online environment, a very little is known how the flow experience affects the consumer's continued intention to use and loyalty for mobile app-based e-services. Furthermore, flow experience is more from the product perspective, thus how this product aspect (flow experience) along with other marketing mix variables influence the continued intention to use and loyalty is highly overlooked in the context of the mobile app-based e-services. To the best of our knowledge, so far no study conceptualized flow experience and marketing mix to understand the effect on consumer's continued intention to use and loyalty for app-based e-services. This is what the current research aims to offer. Flow experience is a crucial phenomenon that transfers consumers from transactional state to a relational state with marketers (Steinhoff et al., 2018). Therefore, to understand this relational state, the sole aim of our research study is to investigate:

How flow experience and marketing mix influence consumers continued intention to use and loyalty for app-based e-services?

The specific research questions are the following:

RQ1: How flow experience affects consumers continued intention to use and loyalty for app-based e-services?

RQ2: How flow experience and marketing mix both influence consumers continued intention to use and loyalty for app-based e-services?

In addressing these questions, we conceptualize and hypothesize a model to examine the influence of flow experiences and marketing mix on the consumer's continued intention to use and loyalty for app-based e-services. To empirically test the framework and hypotheses, a cross-sectional survey was conducted online.

Our research study makes important theoretical and managerial contributions. First, we provide insights into extant literature of online relationship marketing (e.g. Steinhoff et al., 2018; Verma, Sharma, & Sheth, 2016; Yadav & Pavlou, 2014). We contribute to the literature by examining the effect of flow experience on usage and loyalty in an internet-mediated environment like mobile apps. Second, we contribute to extending the literature of flow theory (e.g. Catalan, Martinez, & Wallace, 2019; Verhagen et al., 2011). Our contribution here by exhibiting the flow experience effect on user behaviour and loyalty in app-based services context, therefore, addressing the questions of e-services industry. Third, we also contribute to the literature of online services (e.g. Ramaswami, Strader, & Brett, 2001; Fassnacht & Koese, 2006; Liu, Guo, & Hsieh, 2010). We show from the perspective of app-based services, how the flow experience affects online behaviour and loyalty of the consumers. Fourth, we extend the literature of e-loyalty (e.g. Brodie, Hollebeek, Juric, & Ilic, 2011; Giovanis & Athanasopoulou 2017; Parihar, Dawra, & Sahay, 2019). We contribute by demonstrating how drivers of flow experience impact continued intention to use app-based services and overall loyalty. Apart from the key theoretical contributions, our research also provides managerial relevance by demonstrating how marketers can enhance the flow experience to ensure the adoption and loyalty for the application-based services. Specifically, the factors that drive flow experience for app-based services and the influence of these factors on consumer's adoption and loyalty which will ultimately enable the marketers to formulate their online relationship marketing strategy.

The remainder of the paper is as follows. The next section considers the theoretical background followed by hypotheses development. The third section specifies the methodology used in this research study followed by data analysis with relevant explanations. The final section of this paper presents theoretical implications, managerial implications and directions for future research.

2. THEORETICAL BACKGROUND AND HYPOTHESES

Relationship marketing (RM) has received growing attention from both practitioners and academic researchers to understand how to establish and maintain a relationship with customers (Palmatier, Dant, Grewal, & Evans, 2006; Sheth & Parvatiyar, 2002). Relationship marketing (RM) emerged from the context of service marketing literature and introduced to go back on fundamental marketing concepts of attracting, satisfying and retaining customers (Berry, 1983; Christopher, Payne, & Ballantyne, 2013). RM emphasizes on building an interactive relationship for the long-term to achieve customer satisfaction and profitability (Xu, Goedegebuure, & Van der Heijden, 2007). RM highlights customer at the centre of the focus through exchanging information, building trust and ultimately form a competitive advantage for the marketers (Lo & Campos, 2018). So, many business firms continuously put emphasize on RM, which is a source of their competitive advantage. By establishing a long-term relationship with valued consumers, marketers promote loyalty and achieve customer lifetime value (Yu & Tung, 2013) therefore implementing of RM strategy leads to enhance the value that marketers deliver to the customers (Bruhn, 2003). RM indeed aims to provide mutual benefits for both the marketers and consumers with increased effectiveness and efficiency in the relationship (Sheth, 2015).

Technological advancement and increased penetration of the internet have enhanced relationship marketing beyond the generic setting of the relationship between marketers and consumers. For example, now consumers buy products from e-commerce sites instead of visiting the physical outlets. Transactions between sellers and buyers happen in online thus the relationship between them, so

RM evolves from offline to an online setting. Firms have highlighted the internet as a quick form of communication to maintain the relationship with the consumers. Marketers capitalized internet commercialization both as a communication and selling channel which enabled marketers to go beyond geographical locations to become global marketers (e.g. Amazon, Aliexpress etc.). Increased adoption of social media (e.g. Facebook, Twitter etc.) has exposed marketers to build a relationship through two-way communications and at the same time marketers started facing challenges since the communication through the web was open to all, consumers can share both good and bad things of the companies with all users of the social media. Thus, social media (SM) received explosive attention from marketers to utilize SM as an RM tool (Trainor, Andzulis, Rapp, & Agnihotri, 2014). An empirical study by Zhang, Trusov, Stephen, & Jamal (2017) exhibited that consumers social media activity has a positive association with their shopping activities and consumers feel happy while posting on SM about their purchases (Duan & Dholakia, 2017). Smartphone and mobile apps have made consumers more accessible for required information and services. For marketers, mobile apps emerged as a blessing because of its dynamic information processing capabilities through which business firms deliver personalized offers and collect data (e.g. big data) to formulate what consumers exactly need (Arora et al., 2008). In recent research by Steinhoff et al. (2018) enlightened four technological milestones covering all the developments of technologies that facilitated the effort of relationship marketers: hypertext web (e.g. online shopping), social web (e.g. Facebook), semantic web (e.g. mobile apps) and symbiotic web (e.g. virtual agents, augmented reality apps). In our research context, both semantic web and symbiotic web are pertinent since RM strategies evolved with more engagement, exposure and experience opportunities for marketers from service delivery perspective. Due to intense competition and the importance of service-based economies in this digital age of RM, it is indispensable for marketers to think beyond strategy and performance (Palmatier & Steinhoff, 2019). Mobile apps have become a typical phenomenon in an online context. Marketers use mobile apps as a primary source of service innovation and consumers experience a journey hence flow while browsing throughout the app and availing any services (e.g. ride sharing, food delivery, banking etc.). Despite the extensive research of flow in computer-mediated environments, there is a paucity of research understanding in the context of the mobile apps (Johsnon, Bauer, & Singh, 2019) and thus we set our research agenda to examine the flow experience in app-based services context which leads to seamless experiences for consumers to build a strong online relationship.

Flow is a mental state while performing a task, in which people feel involved and experience a pleasant journey (Csziksentmihalyi, 1990). According to Hoffman & Novak (2009), this mental state has been used widely in the computer-mediated environment (e.g. websites) to understand consumer's attitude, intention, usage and behavior. Consumer's attitude towards a brand highly depends on the involvement consumers experience in the online world thus delivering engaging activities needs to be consistent in the virtual world (Ozkara, Ozmen, & Kim, 2017). Consumer's journey in the online world predominantly evokes flow experiences. Marketers build relationships in the online through delivering flow experiences followed by extending the relationship in the long run. Consumers experience flow states more online than offline settings that increase the bond between marketers and consumers; therefore, enhance the performance of online relationship marketing (Steinhoff et al., 2018). Flow theory and experience comprehend the main drivers that influence the critical outcomes for the business firms. Numerous variables affect consumers experience and outcome from the business perspective, but those are not necessarily pertinent to relationship marketing. Therefore, we highlight two important relationship marketing outcomes, consumer's continued intention to use and loyalty and considering the applicability of flow theory we examine how these variables are influenced by the flow experience in the context of mobile app-based e-services. Numerous studies were conducted to understand the flow experience from different contexts, not limited to human-computer interactions, websites, mobile games etc. Table 1 presents a selected list of studies in various fields and constructs used to examine flow experience. It is prevalent from the extant literature that flow is too broad and ill-defined with many constructs.

Table 1. Example of Studies used Flow Theory

Author (s)	Constructs	Area of Study
Trevino and Webster (1992)	Control, attention focus, curiosity, intrinsic interest	Human-computer interactions
Ghani and Deshpande (1994)	Concentration, enjoyment	Human-computer interactions
Skadberg and Kimmel (2004)	Design, performance, prior web experience and prior knowledge, contents	Websites
Donna and Novak (1997)	The seamless sequence of responses, loss of self-consciousness, intrinsically enjoyable, self-reinforcing	Websites
Van Noor et al. (2012)	Interactivity	Websites
Hsu and Lu (2004)	Perceived ease of use, perceived usefulness	Online games
Chou and Ting (2003)	Concentration, playfulness, time distortion, telepresence, exploratory behavior	Online games
Kiili et al. (2012)	Concentration, Loss of self-consciousness, rewarding experience, time distortion	Online games
Su et al. (2016)	Human-computer interaction, social interaction, skill, challenge, perceived enjoyment, attention focus	Mobile games
Zhou and Lu (2011)	Perceived enjoyment, attention focus	Mobile instant messaging
Lee et al. (2007)	Trust, structural assurance	Online banking
Zhou (2012)	Structural assurance, Ubiquity, Perceived ease of use, Personal innovativeness	Mobile banking
Liu et al. (2016)	Perceived expertise, perceived similarity, perceived familiarity	Social commerce
Lee and Chai (2017)	The perceived reality, perceived naturalness	Augmented reality

Therefore, following the extant literature of mobile application usability (e.g. Bhattacherjee, 2001), we hypothesize four constructs of flow experience from mobile apps perspective: interactivity, involvement, perceived ease of use and application design, and their effect on continued intention to use and subsequently consumer's loyalty. Furthermore, to better understand the online RM, we propose integrative effect of two marketing mix variables (advertising and price promotion) and flow experience on continued intention to use and loyalty. The marketing mix, one of the greatest marketing theories introduced by Borden (1964) and McCarthy (1964) with the four-element framework: product, price, promotion and place. Both practitioners and academicians adopted marketing mix as indispensable in operational marketing management. Marketing mix has played an evolutionary role in developing commercial philosophy (Rafiq and Ahmed, 1995). In our research context, e-services conceivably portray product usage by users through mobile applications. Marketers utilize both promotion and price to drive service usage. Therefore, we aim to examine how promotion and price together integrate with flow experience for mobile applications users and successively affected consumer's behaviour. We predict that continued intention to use mediates the relationship between flow experience along with marketing mix and consumer's overall loyalty. We also assume e-trust and privacy concern with application moderate the effect of continued intention to use on loyalty. Figure 1 depicts our proposed conceptual model for this study.

Figure 1. Conceptual Framework
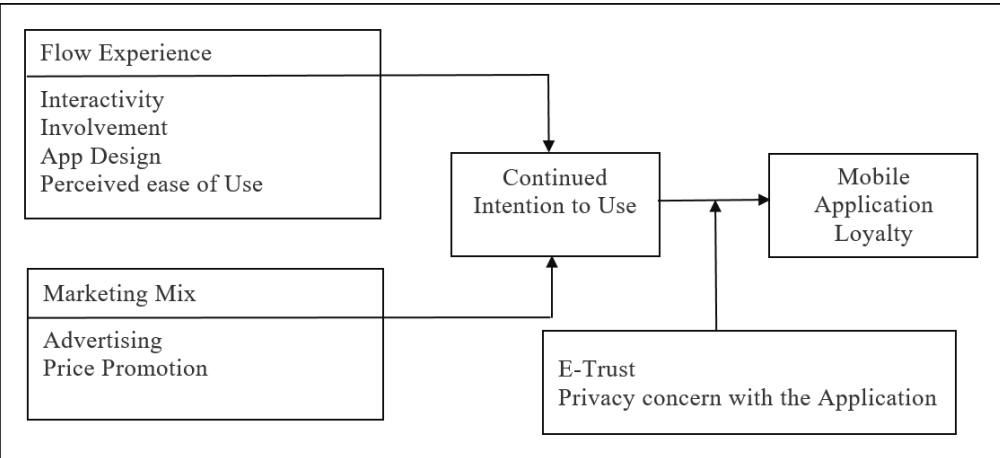
2.1 Continued Intention to Use

Consumers who use any sort of technology, continued intention to use is a common phenomenon and it portrays the extent to which a person will keep using technological products or services (Brown, Venkatesh, & Goyal, 2012, 2014). According to Bhattacherjee (2001), consumer's continued intention to use and repurchase decision is analogous because initially consumers experience or buy a product followed by either reuse decision or reverse the initial decision to use further. Consumer's intention exposes the way of understanding consumer's actual behaviors (Tseng, 2015). Moreover, continuance intention emerged from the expectation-confirmation model and adopted by many researchers (e.g. Lin, Wu, & Tsai, 2005; Lee, 2010) to understand consumer behavior from an information system perspective. Therefore, it is principally essential to understand the factors such as flow, which will drive the consumer's continued intention to use mobile app-based e-services.

2.2 Interactivity

Consumers experience interactive tools-features while browsing throughout the mobile applications and these experiences bring two-way communication between the consumer and system/seller. Interactivity enhances the appeal of interfaces by implementing features in the applications and through which firms build their online relationship marketing efforts (Boateng, 2019). Interactivity is the most salient feature in mobile communication (Gao, Rau, & Salvendy, 2009). According to Liu & Shrum (2002), interactivity is the degree to which two parties can communicate with each other through a communication medium, on which the messages and influences between them are synchronized. Firms use emails, comments, chats, criticisms, questions, feedback etc. to promote interactivity which plays a critical role in online relationship management (Fang, 2012). Extant literature (e.g. Van Noort, Voorveld, & Van Reijmersdal, 2012; Kim, Wang, & Malthouse, 2015) articulated the pivotal role of interactivity to explain consumer's behavioral intentions. Interactivity, particularly crucial in determining brand-related outcomes such as attitude towards the brand, and purchase intentions. Therefore, in our context, we hypothesize that:

Hypothesis One (H1): Interactivity increases consumer's continued intention to use app-based services.

2.3 Involvement

Marketers get involved with consumers by forming a relationship while discussions initiated related to product, service, price and so on. When buyers get involved with sellers for discussion, then it portrays buyers have trust in sellers quality (Kozlenkova et al., 2017). Involvement is one of the crucial constructs to predict consumer behavior which highlights aspects of motivation and interest of consumer's followed by the consequences performed by the consumers either to consider or to reconsider their purchase actions (Teichert & Rost, 2003). Involvement concept has been used extensively in websites literature stream (e.g. McMillan, Hwang, & Lee, 2003; Jiang, Chan, Tan, & Chua, 2010). Involvement has a considerable influence over consumer's product purchase decision processes (Hollebeek, Jaeger, Brodie, & Balemi, 2007) and the degree to which consumers are involved personally with the product or brand, that implies their higher degree of purchase and repurchase intentions (Prendergast, Tsang, & Chan, 2010). Therefore, in our study context we argue that the higher consumers feel involved during the flow experience, the higher their continued intention to use the mobile apps.

Hypothesis Two (H2): Involvement increases consumer's continued intention to use app-based services.

2.4 Perceived Ease of Use

Technology acceptance model (TAM) is a widely used theory to illustrate consumer behavior for information technology acceptance and continuance (e.g. Koufaris, 2002; Akturan & Tezcan, 2012; Deb & Lomo-David, 2014). In TAM, perceived ease of use (PEOU) is an integral construct, that presents the degree to which a user perceives the technology is usable and interaction with the system is convenient. Perceived ease of use has a direct influence over consumer's adoption intention and direct-indirect impact both on using utilitarian (e.g. Uber, Food delivery etc.) and hedonic (e.g. streaming) information systems (Davis, Bagozzi, & Warshaw, 1989). Several studies empirically articulated that PEOU has significant influence over continuance intention to use a product (e.g. Agarwal & Karahanna, 2000; Venkatesh, 2000) and actual continuance usage (Lippert, 2007). Therefore, PEOU is pertinent to consider in our context as we intend to understand the flow experience and whether consumers perceive the app services easy to use.

Hypothesis Three (H3): Perceived ease of use increases consumer's continued intention to use app-based services.

2.5 Application Design

Application design refers to the degree to which a consumer perceives that the product or application used by him is well designed (Hoehle & Venkatesh, 2015). Product design literature stream suggests that designing of a product assist in building the differentiation, which is a source of competitive advantage and indispensable marketing variable for business firms (Creusen, Gemser, & Candi, 2010). Designing the product according to consumer's need is a fertile area of research through which firms bring innovation and take the help directly from the users through crowdsourcing (Chang & Taylor, 2016). Product design, in our context application design, brings subtle branding efforts which enhance consumer's satisfaction on the overall design (Karjalainen & Snelders, 2010). Application design is a pivotal predictor for consumer's continued intention to use the application (Hoehle & Venkatesh, 2015; Hoehle, Zhang, & Venkatesh, 2015). Thus, we hypothesize that:

Hypothesis Four (H4): Application design increases consumer's continued intention to use app-based services.

2.6 Marketing Mix

Advertising has a universal effect and influence on consumer's behavioral intentions. Advertising is considered as the primary marketing tool to influence consumer's purchase intentions (Shaouf, Lu, & Li, 2000). Advertising has been experiencing a significant paradigm shift to integrate into digital mediums such as through mobile phones, and thus the mobile advertising has emerged. The extant literature of mobile advertising exhibited the positive effect of mobile advertising on consumer's purchase intention (e.g. Salem, Althuwaini, & Habib, 2018; Persaud & Azhar, 2012). Due to the change in consumer behavior from offline to online has triggered marketers' interest in providing advertising through mobile apps (Spurgeon, 2005). Several studies (e.g. Crespo-Almendros & Del Barrio-García, 2014; Kuisma, Simola, Uusitalo, & Oorni, 2010) have empirically exhibited that consumers positively response through mobile advertising efforts. In mobile app-based services, consumers experience advertising messages through in-app and notifications thereby while going through the flow experiences, consumers receive mobile advertising efforts. Our proposition is also aligned with these findings. We predict that mobile advertising positively influences consumer's continued intention to use mobile app-based services.

Hypothesis Five (H5): Mobile advertising increases consumer's continued intention to use app-based services.

Service providers use price promotion or discount to increase the traffic or usage of the mobile application. For an example, Uber provides price promotion code to users with one-time redemption option, with these price discounts Uber's rebate accounted for \$57.3 million out of \$246 million of their total marketing expenses in 2014 (Singh, Teng, & Netessine, 2017). Despite sudden picks in the sales, such price promotion induces consumers to put focus and priority on pricing rather than looking into product or service differentiation available in other alternatives (Boulding, Lee, & Staelin, 1994). Price discounts often portray lower quality and influence the negative perception of quality (Grewal, Krishnan, Baker, & Borin, 1998). Brand dilution happens in the mind of the consumers with the erosion of perceived quality levels because of the adoption of frequent price discounts (Hollebeek, Jaeger, Brodie, & Balemi, 2007). Consumers perceive products are purchased only based on price because of heavy price promotion and thus distinctiveness gradually diminished (Mela, Gupta, & Jedidi, 1998). Therefore, we argue that brand stickiness diminishes due to heavy price promotion provided by a service provider and that negatively influence consumers for using the service provided by that service provider.

Hypothesis Six (H6): Prince promotion decreases consumer's continued intention to use app-based services.

2.7 Mobile Application Loyalty

Consumer's loyalty is a vital business outcome for business firms. In general, loyalty is defined as a commitment from the consumers to patronize the same product or service despite other situational and marketing efforts for switching (Parihar et al., 2019). Hoehle & Venkatesh (2015) define mobile application loyalty as the degree to which a consumer has a firm commitment to rebuy or repatronize a mobile application. The extant literature suggests that consumer's loyalty is highly driven by the user experience (Flavian, Guinaliu, & Gurrea, 2006; Casalo, Flavian, & Guinaliu, 2008). In this research context, flow experience is the ultimate experience consumers go throughout the application. Continued intention to use and loyalty have analogous meaning, but loyalty is more complete construct than an intention to use in IS research context (Chen, Yen, Pornpriphet, & Widjaja, 2015). In recent research, Hew, Lee, Ooi, & Lin (2016) empirically articulates that consumers continued intention to use positively influence consumers brand loyalty from the mobile social commerce perspective.

Thus, we predict on the same notion that consumer's continued intention to use the mobile application increases consumer's loyalty for that mobile application and further we argue that continued intention to use mediates the relationship between flow experience-marketing mix and consumers loyalty.

Hypothesis Seven (H7): The higher the continued intention to use the mobile application, the higher the consumer's loyalty for that mobile application.

2.8 Moderating Role of E-Trust and Privacy

Electronic trust (e-trust) refers to the degree to which consumers perceive that the service provider is trustworthy and transactions with the provider are reliable. Trust is an immensely crucial component in an online environment since it's build relationship between sellers and buyers (Yasir, Majid, & Johnson, 2014). Customer satisfaction builds through the establishment of e-trust which requires a considerable effort from the sellers perspective (Chou et al., 2015). For mobile applications, e-trust is similarly vital as consumers are availing services with the information and making payment in the application. Prior studies revealed that a good site and overall experience in the site put a comfort zone for the consumers to believe the site is trustable and made by a reliable service provider (Cyr, 2008). Trust has a substantial influence on consumer's subsequent behaviors including satisfaction and loyalty (Jin, Yong Park, & Kim, 2008). Trust is a proven antecedent of consumer loyalty and higher levels of trust positively associated with loyalty (Singh & Sirdeshmukh, 2000). Thereby, we hypothesize in our context that e-trust has a positive moderating role over the relationship between continued intention to use and mobile application loyalty.

Hypothesis Eight (H8): The higher the e-trust of consumers for mobile apps, the higher the positive effect of continued intention to use on the consumer's loyalty for that mobile apps.

Privacy concern is the risk of exposing the individually identifiable personal information of consumers. Privacy concern has four dimensions: data collection, unauthorized access, unauthorized secondary use and data accuracy; but from the smartphone and mobile commerce perspective, privacy concern has been extended along with data collection dimension as consumers real-time location is exposed (Zhang, Chen, & Lee, 2013). For mobile applications, consumers provide information related to credit card, demographics, location, connected peers, liking/disliking and so on. Therefore, if there is any privacy concern with the application, then consumer's security will be vulnerable. During the last decade, the link between privacy concerns and consumer behavior has been at the centre of much attention. In a survey, 52% participants responded that they discontinued an online transaction due to privacy concerns (Ranganathan & Grandon, 2002). Privacy-related concerns are deciding factors and negatively affect loyalty membership (Leenheer, Van Heerde, Bijmolt, & Smidts, 2007). In our research context, we argue that the higher level of privacy concerns with the application negatively influence the relationship between continued intention to use and consumers loyalty.

Hypothesis Nine (H9): The higher the privacy concerns with the application, the lower the positive effect of continued intention to use on the consumer's loyalty for that application.

3. METHODOLOGY

3.1 Research Instrument

We adopted all the scales from prior studies and modified to fit the domain of mobile application. All of the scales were seven-point Likert scales (strongly agree-strongly disagree). Table 2 provides the measures, sources and reliability for all the constructs.

Table 2. Variables, Items and Data Sources

Construct	Items	Reliability	Sources
Application Design	Overall, I think the music streaming application is designed well	0.915	Hoehle and Venkatesh (2015)
	In general, I believe that the music streaming application has a great design		
	Generally speaking, the music streaming application is well designed		
	I am very satisfied with the overall design of the music streaming application		
Perceived Ease of Use	My interaction with the mobile application is clear and understandable	0.904	Venkatesh and Davis (2000)
	Interacting with the mobile application does not require a lot of my mental effort		
	I find the mobile application to be easy to use		
	I find it easy to get the mobile application to do what I want it to do		
Interactivity	I click into deeper links of the mobile application	0.841	Ko et al. 2005
	I stay longer for details in the mobile application		
	I use a various feature of the mobile application		
	I use a search engine to find the required information in the mobile application		
Involvement	In general, I have a strong interest in mobile applications	0.886	Brocato et al. 2015
	Mobile applications are very important to me		
	Mobile applications matter a lot to me		
	Mobile applications mean a lot to me		
Advertising	Overall, I consider advertising a good thing	0.894	Schumann et al. 2014
	My general opinion of advertising is favorable		
	I find the advertising that I currently usually see on this Mobile application is very interesting		
	Overall, I like advertising		
Price Promotion	There is always a special offer in the mobile application	0.850	Yoo et al., 2000
	It is easy to find a special offer on the mobile application		
Continued Intention to Use	I intend to continue using the mobile application	0.787	Bhattacherjee, 2001
	I want to continue using the mobile application rather than discontinue		
	I predict I will continue using the mobile application		
	I plan to continue using the mobile application		
	I don't intend to continue using the mobile application in future		
	Chances are high that I will continue using the mobile application in future		
E-trust	The performance at this mobile application always meet my expectations	0.838	Gabarino and Johnson, 1999
	The mobile application can be counted on to deliver consistent performance and transaction		
	I cannot always trust performances at this mobile application to be good		
Privacy Concern with the Application	In general, I am concerned about my privacy when using the mobile application	0.858	Schumann et al. 2014
	I am concerned that the information I submit on the mobile application could be misused		
	I am concerned that a person can find private information about me on the mobile application		
	I am concerned about submitting information on the mobile application, because they could be used in a way that I cannot foresee		
Mobile Application Loyalty	Next time I will definitely buy services through this mobile application	0.893	Johnson et al. 2006
	If I lose my cell phone I will definitely download this mobile application again		
	If I got any other application for free, I would choose my current mobile application		
	I recommend the mobile application phone to other people		
	I talk to other people about the mobile application		

All these items were retained for final use as coefficient alpha ranged between 0.787 To 0.915 which portrayed very strong reliability and association of survey data for this research study. According to (Nunnally, Bernstein, & Berge, 1967), a reliability range of point five to six at least should be acceptable of primary research data

3.2 Data

This study adopted a cross-sectional survey design and data were collected using convenience sampling with an online survey. We designed this survey in the English language so the survey can be distributed among various ethnicities of participants. We developed the survey in both Qualtrics and Google form. We distributed the link in Mturk (Amazon Mechanical Turk), where we recruited participants in return for a nominal payment. Mturk developed by Amazon has received wide acceptance by the academic researchers to conduct research and expose the opportunity to recruit diverse participants from the U.S. and other countries. Goodman and Paolacci (2017) exhibited that 27% empirical works of five volumes in the Journal of Consumer Research empirically conducted using Mturk and adopting Mturk is increasing in top marketing academic journals. We collected data in two different times from Mturk in between April 2019 and June 2019. At the outset of the survey, participants were informed about the confidentiality, anonymity and purpose of the study. Participants have given their consent before commencing the formal survey. Before conducting the survey, we ensured the content validity of the questionnaire by three academicians and sixteen postgraduate students. To be congruent with our study context, two qualifier questions were asked beginning of the questionnaire, whether participants have a smartphone and whether they have used an app-based service in last three months followed by mentioning the category of services (e.g. ride-sharing, banking etc.). Demographic information was asked at the end of the survey to minimize the possible desirability bias (Punyatoya, 2015). The initial sample consisted of 489 participants. We excluded 84 participants because either they failed to pass in the instructional manipulation check (IMC) question or they did not complete the survey. We included two instructional manipulation check questions (e.g. if you read this question, then please tick 'agree'). According to Oppenheimer, Meyvis, & Davidenko (2009), IMC is accepted and common in the cross-sectional survey to ensure accountability for the responsible behavior of the participants. In general, 16%-18% of participants fail in IMC questions (Emrich & Verhoef, 2015). For our study, 17.2% respondents failed in the IMC questions. The final sample consisted of 405 respondents $\left(37\% \; female; Mod_{age} = 20 - 29\right)$. We collected data across five service categories (ride-sharing, entertainment, food delivery, banking and utility) from this 405 respondents.

3.3 Statistical Methods

To test our overall conceptual model, OLS regression was employed to specify two separate models for estimation purpose: continued intention to use and mobile application loyalty. The foundation for OLS regression is ascertained with data requirements as suggested by Sarstedt & Mooi (2019). Firstly, we have 405 observations for finally ten variables and 30 observations per variable are accepted to run the OLS regression (Van Voorhis & Morgan, 2007). Secondly, scale type of dependent variable is the interval. Finally, there is no multicollinearity among independent variables. Variance inflation factor (VIF) for independent variables ranged below 10 and VIF of 10 and above indicates that there is a multicollinearity problem (Hair, Black, Babin, & Anderson, 2019). Thereby, for this study, we did not get any multicollinearity problem.

In our both model of continued intention to use and mobile application loyalty, we included five sociodemographic variables (gender, income level, age group, education, and ethnicity), four service category dummies (utility, ride sharing, food delivery and banking, with entertainment as the baseline category) and service tenure of using the application to control for differences across consumers and service categories. According to Greene (2000), despite these covariates are not the focus of our studies but controlling effects of covariates provide estimation for stronger hypotheses testing.

The regression model for continued intention to use for respondent i and product category p is the following:

$$Continued\,Intention\,to\,Use_{ip}$$

$$= \beta_{0ip} + \beta_1 Application\,Design_{ip} + \beta_2 Perceived\,Ease\,of\,Use_{ip} + \beta_3 Interactivity_{ip}$$

$$+ \beta_4 Involvement_{ip} + \beta_5 Adverti\sin g_{ip} - \beta_6 \Pr ice\,\Pr omotion_{ip} + \beta_7 Gender_{ip}$$

$$+ \beta_8 Income\,Level_{ip} + \beta_9 Age\,Group_{ip} + \beta_{10} Education_{ip} + \beta_{11} Ethnicity_{ip}$$

$$+ \beta_{12} Service\,Tenure_{ip} + \beta_{13} Utility\,Dummy_{ip} + \beta_{14} Ride\,Sharing\,Dummy_{ip}$$

$$+ \beta_{15} Food\,Delivery\,Dummy_{ip} + \beta_{16} Banking\,Dummy_{ip} + \in_{ip}$$

In this model, β_{0ip} and $\in_{ip}$ are the constant and error term respectively. $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5\,and\,\beta_6$ are the estimated regression coefficients that quantify the association between the independent variables (application design, perceived ease of use, interactivity, involvement, advertising and price promotion) and continued intention to use. $\beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}\,and\,\beta_{12}$ represent the estimated regression coefficients for control variables: gender, income level, age group, education, ethnicity and service tenure respectively. $\beta_{13}, \beta_{14}, \beta_{15}\,and\,\beta_{16}$ indicate the estimated regression coefficient for dummy variables: utility, ride sharing, food delivery and banking respectively.

The regression model for mobile application loyalty for respondent i and product category p is the following:

$$Mobile\,Application\,Loyalty_{ip}$$

$$= \gamma_{0ip} + \gamma_1 Continued\,Intention\,to\,Use_{ip} + \gamma_2 Etrust_{ip}$$

$$- \gamma_3 \Pr ivacy\,Concern\,with\,Application_{ip} + \gamma_4 Continued\,Intention\,to\,Use_{ip} \times Etrust_{ip}$$

$$- \gamma_5 Continued\,Intention\,to\,Use_{ip} \times \Pr ivacy\,Concern\,with\,Application_{ip}$$

$$+ \gamma_6 Gender_{ip} + \gamma_7 Income\,Level_{ip} + \gamma_8 Age\,Group_{ip} + \gamma_9 Education_{ip} + \gamma_{10} Ethnicity_{ip}$$

$$+ \gamma_{11} Service\,Tenure_{ip} + \gamma_{12} Utility\,Dummy_{ip} + \gamma_{13} Ride\,Sharing\,Dummy_{ip}$$

$$+ \gamma_{14} Food\,Delivery\,Dummy_{ip} + \gamma_{15} Banking\,Dummy_{ip} + \in_{ip}$$

In this model, γ_{0ip} and $\in_{ip}$ are the constant and error term respectively. $\gamma_1, \gamma_2\,and\,\gamma_3$ are the estimated regression coefficients that quantify the association between the variables (continued intention to use, e-trust and privacy concern with the application) and mobile application loyalty. In the interactions, we mean-centered the variables e-trust and privacy concern with the application with their grand means. γ_4 represents the estimated regression coefficient for the interaction effect between continued intention to use and e-trust. Similarly, γ_5 is the estimated regression coefficient for the interaction effect between continued intention to use and privacy concern with the application. $\gamma_6, \gamma_7, \gamma_8, \gamma_9, \gamma_{10}\,and\,\gamma_{11}$ represent the estimated regression coefficients for control variables: gender, income level, age group, education, ethnicity and service tenure respectively. $\gamma_{12}, \gamma_{13}, \gamma_{14}\,and\,\gamma_{15}$

indicate the estimated regression coefficient for dummy variables: utility, ride sharing, food delivery and banking respectively.

4. FINDINGS

4.1 Descriptive Statistics

The descriptive statistics of all the dependent and independent variables are represented in table 3, which shows that 37 per cent responders are female. The mode of age group and education is 20-29 years and bachelor's degree respectively. The mean scores and standard deviations of dependent variables ranged from 5.33 to 5.47 and 1.07 to 1.16 respectively. The mean scores and standard deviations of independent variables ranged from 4.78 to 5.56 and 1.02 to 1.45 respectively.

4.2 Regression Analysis Assumptions

Firstly, to check the linearity of the overall model, we adopted Ramsey's reset test (Ramsey 1969; Cook & Weisberg 1983). We found significant F change between the base model $\left(F\left(21,383\right) = 57.83, R^2 \ change = .760 \right)$ and modified model with squares and cubes $\left(F\left(2,381\right) = .013, R^2 change = .000 \right)$. Secondly, we examined for homoscedasticity through an analysis of residual plots (dependent variable vs unstandardized residual plot) and found errors

Table 3.Descriptive Statistics

Particulates		
Gender	Male	63%
	Female	37%
Age Group (years)	Mode age	20-29
Income level	Mode Income Level	Less than $10000
Education	Mode Education	Bachelor's Degree
Ethnicity	Mode Ethnicity	American
Service tenure	Mode Service Tenure	More than 12 months
	Mean	*SD*
Dependent Variables		
Continued intention to use	5.33	1.16
Mobile application loyalty	5.47	1.07
Independent Variables		
Application design	5.56	1.15
Perceived ease of use	5.50	1.20
Interactivity	5.18	1.11
Involvement	5.33	1.17
Advertising	4.78	1.41
Price promotion	4.86	1.45
E-trust	5.53	1.02
Privacy concern with the application	5.45	1.14

variance is constant. Thereby, linearity and homoscedasticity assumptions were confirmed. To check for autocorrelation, we adopted the Durbin-Watson test (Durbin & Watson, 1951). We found Durbin-Watson value is 2.03 which is within the acceptable range (1.5 to 2.5 is the rule of thumb) as suggested by Field (2009) so there is no notion for autocorrelation. Finally, to check normality, standardized residuals were compared with the normal distribution and found errors were approximately normally distributed. Therefore, all the regression assumptions were ascertained.

4.3 Model Fit

The overall model fit for continued intention to use and mobile application loyalty is exhibited in table 4.

For continued intention to use, ANOVA was significant at $(F = 32.90, p < .001)$. We found R^2 value .576 so, 57.6% of the variance is explained by the independent variables. On the other hand, for mobile application loyalty, ANOVA was also significant at $(F = 62.53, p < .001)$. R^2 value was .707 so, 70.7% of the variance is explained by the independent variables. In the cross-sectional design in marketing similar to our study, R^2 value of above 0.50 is denoted as substantial (Sarstedt & Mooi, 2019). Therefore, for both our model we received significant coefficient of determinants.

4.4 Predictive Validity

To assess the predictive validity of our models, we split the sample into an estimation sample and validation sample as representing on table V. To examine whether the regression model continues to hold on comparable data not used in the estimation, available data are split into two parts, the estimation sample and the validation sample where estimation sample contains 70% and validation sample contain the rest hence stated as in-sample and out-of-sample fit, predicting the last 30% case number based on the first 70% case number (Sarstedt & Mooi, 2019). For continued intention to use, in-sample-fit and out-of-sample fit were .735 and .783 respectively. So, the model based on the estimation sample predicted better the dependent variable for the holdout sample. For mobile application loyalty, in-sample-fit and out-of-sample fit were .819 and .873 respectively. So, for mobile application loyalty as well, the model based on the estimation sample predicted better the dependent variable for the holdout sample.

Furthermore, we predicted our main dependent variable of this study, mobile application loyalty through comparing between main effects model (without interaction) and model with interaction. For both main effect model and model with interaction, we get increased out-of-sample fit .865 and .873 respectively in comparing to in-sample fit .804 and .819 respectively. Hence in both contexts, the model for mobile application loyalty based on the estimation sample predicted better the dependent variable for the holdout sample.

4.5 Hypotheses Testing

In line with our expectation, interactivity increases consumers continued intention to use app-based services $\left(\beta_3 = .233, p < .001, H1\, supported\right)$. Involvement, perceived ease of use $\left(\beta_2 = .306, p < .001, H3\, supported\right)$ and application design $\left(\beta_1 = .184, p < .01, H4\, supported\right)$, all the variables increase consumers continued intention to use app-based services. For marketing mix variables, mobile advertising decreases consumers continued intention to use app-based services $\left(\beta_5 = -.098, p < .01, H5\, not\, supported\right)$ and price promotion $\left(\beta_6 = -.084, p < .05, H6\, supported\right)$. Besides, as expected the higher the continued intention to use the mobile application, the higher the consumers' loyalty for that mobile application $\left(\gamma_1 = .215, p < .001, H7\, supported\right)$. In line with our prediction for interaction effect, the higher the e-trust of consumers for mobile apps, the higher the positive effect of continued

Table 4. Overall Model Estimation Results

Variable	Continued Intention to Use			Mobile Application Loyalty		
	Estimate	t-Value	VIF	Estimate	t-Value	VIF
Intercept	1.572	5.813***		.732	2.662	
Application design	.184	3.055**	4.541			
Perceived ease of use	.306	5.228***	4.658			
Interactivity	.233	5.191***	2.376			
Involvement	.098	2.082*	2.870			
Advertising	-.098	-2.696**	2.518			
Price promotion	-.084	-2.270*	2.682			
Continued intention to use				.215	4.629***	2.418
E-trust				.345	7.292***	2.692
Privacy concern with the application				.308	7.627***	2.453
Continued intention to use × E-trust				.157	3.939***	4.758
Continued intention to use × Privacy concern with the application				-.199	-5.228***	4.843
Control Variables						
Gender	-.025	-.359	1.068	-.147	-2.337*	1.074
Age group	.150	4.087***	1.294	-.071	-2.137*	1.320
Education	-.100	-1.889	1.060	.069	1.452	1.053
Income level	.010	.337	1.147	-.030	-1.078	1.147
Ethnicity	.009	.391	1.096	.016	.772	1.100
Utility	-.023	-.114	1.121	-.034	-.184	1.123
Ride sharing	.042	.441	1.685	.084	.968	1.701
Food delivery	.016	.175	1.745	.075	.908	1.728
Banking	.076	.705	1.445	-.121	-1.253	1.430
Service tenure	.001	.058	1.214	.048	2.109*	1.213
R^2	.576			.707		
Adjusted R^2	.558			.696		
df	16			15		
F-value	32.90			62.53		

*p<.05.
** p<.01.
*** p<.001.

Table 5. Estimation Model Fit for Validation Sample

Variable	In-sample fit	Out-of-sample fit
Continued intention to use	.735	.783
Mobile application loyalty	.819	.873

intention to use on the consumers' loyalty for that mobile apps $\left(\gamma_4 = .157, p < .001, H8\ supported\right)$. We also found support for another interaction effect, the higher the privacy concerns with the application, the lower the positive effect of continued intention to use on the consumers' loyalty for that application $\left(\gamma_5 = -.199, p < .001, H9\ supported\right)$.

Furthermore, we also considered the face validity whether the significant parameter estimates are in line with our expectations. All the variables under the flow experience were in line with our expectation followed by price promotion under the marketing mix so that all these factors estimation were face valid. We found a negative association for advertising which was not facing valid as per the theory and our propositions although there was no multicollinearity problem found earlier. Continued intention to use and e-trust found face valid hence positively associated with mobile application loyalty. But individually privacy concern with the application had a positive association with mobile application loyalty which was not as per the expectation through the interaction effect was negative and significant in line with the prediction.

4.6 Robustness Checks

To check the robustness of our findings, we estimated both continued intention to use and mobile application loyalty without control variables. Despite the substantial loss of data, the results indicated that the coefficients were highly similar to the coefficients in the original model. For the continued intention to use, we found a negative association of advertising like the original model. Across the two models (original and without control variables) of mobile application loyalty that included the interaction between continued intention to use and e-trust followed by continued intention to use and privacy concern with the application, we observed a highly consistent pattern and that is, these interactions were highly significant.

4.7 Test of Mediation

The conceptual model depicted in figure 1 suggested that flow experience and marketing mix variables were mediated by continued intention to use. We conducted the mediation analysis using model 4 of PROCESS Macro (Hayes, 2018).

Mobile application loyalty was entered as the outcome variable, independent variables were entered individually as independent variable followed by including other variables of our model as covariates except continued intention to use was entered as a mediator and 5,000 bias-corrected bootstrap samples were requested. Mediation test results are presented in Table 6. From the mediation analysis, we have found that continued intention to use was a significant predictor (p<.05) for mobile application loyalty. Therefore, we investigated whether zero (0) lies within the CI interval range. If zero does not lie within the CI range, then we can conclude that the indirect effect for this mediator

Table 6. Mediation Analysis

Effects on Mobile Application Loyalty	Total	Direct	Indirect	CI Indirect		Mediation
Application design → Loyalty	0.03	-0.04	0.07	0.0230	0.1379	Supported
Involvement → Loyalty	0.25*	0.21*	0.03	-0.0096	0.0878	Not supported
Interactivity → Loyalty	0.26*	0.17*	0.08	0.0355	0.1550	Supported
Perceived ease of use → Loyalty	0.25*	0.13*	0.11	0.0575	0.2200	Supported
Price promotion → Loyalty	0.04	0.07*	-0.03	-0.0853	-0.0050	Supported
Advertising → Loyalty	0.02	0.06	-0.03	-0.0855	-0.0179	Supported

* Significant at the 95% confidence interval

is significant and support for mediation (Andela, Truchot, & Van der Doef, 2016; Hayes, 2018). With continued intention to use as a mediator in the model, we found that continued intention to use mediated the effect of application design, interactivity, perceived ease of use, price promotion and advertising on mobile application loyalty since CI for the indirect effect did not contain zero (table 6). We also found that with continued intention to use as a mediator in the model, there was no mediation effect of involvement on mobile application loyalty.

4.8 Test of Moderated Mediation

We examined the moderation effect of e-trust and privacy concern with application to the mediation test. We used model 16 of PROCESS macro (Hayes, 2018) to test the moderated mediation by implementing 5,000 bias-corrected bootstrap samples. Table 7 depicts the reported model parameters for our moderation mediation analysis.

In moderated mediation, a significant interaction is not required to test moderated mediation via the index of moderated mediation approach (Hayes, 2015; Dixon, 2016). For application design, the index of partial moderated mediation of e-trust, 0.0234, 95% CI [0.0028, 0.0525] and privacy concern with the application, -0.0277, 95% CI [0.0577, -0.0045] does not include zero which supports meaningful indirect effect hence moderated mediation. We found support for meaningful indirect effect hence moderated mediation for interactivity, perceived ease of use, price promotion and advertising (table 7). But for involvement, the index of partial moderated mediation of e-trust, 0.0125, 95% CI [-0.0024, 0.0352] and privacy concern with the application, -0.0148, 95% CI [-0.0385, 0.0028] include zero so that not supported for meaningful indirect effect hence moderated mediation. Therefore, we found consistent findings for variables in both independent mediation test and moderated mediation test.

Table 7. Moderated Mediation Test Results

Variable	Moderator	Index of Partial Moderated Mediation	95% bootstrap CI[a]	Moderated Mediation
Application design	E-trust	0.0234	0.0028 to 0.0525	Supported
	Privacy concern with the application	-0.0277	-0.0577 to -0.0045	
Involvement	E-trust	0.0125	-0.0024 to 0.0352	Not supported
	Privacy concern with the application	-0.0148	-0.0385 to 0.0028	
Interactivity	E-trust	0.0297	0.0051 to 0.0614	Supported
	Privacy concern with the application	-0.0352	-0.0671 to -0.0080	
Perceived ease of use	E-trust	0.0389	0.0074 to 0.0754	Supported
	Privacy concern with the application	-0.0462	-0.0847 to -0.0128	
Price promotion	E-trust	-0.0106	-0.0243 to -0.0005	Supported
	Privacy concern with the application	0.0126	0.0011 to 0.0273	
Advertising	E-trust	-0.0125	-0.0280 to -0.0015	Supported
	Privacy concern with the application	0.0148	0.0026 to 0.0308	

a Percentile bootstrap CI based on 5,000 bootstrap samples
PROCESS Model 16 enabled mean centring for products

5. DISCUSSION

We developed a conceptual model elucidating the effect of flow experience along with marketing mix on consumer's continued intention to use app-based services and subsequently consumers loyalty for that mobile app. Our study supported that all the flow experience variables (interactivity, involvement, application design and perceived ease of use) have significant influence over continued intention to use and continued intention to use is a significant predictor for mobile application loyalty. Thus, validating the substantial impact of flow experience in the online environment which shapes the experience and indeed builds a strong online relationship with consumers. Though the effect of mobile advertising was significant, we found a negative association with continued intention to use. A possible explanation, consumers experience too many ads, perceive ads are intrusive (Andrews, 2006) and invaded their privacy (Park, Shenoy, & Salvendy, 2008) which together directed negative association towards continued intention to use. We found the support of the negative association of price promotion on continued intention to use as predicted. We have also found both the interaction effect, the interaction between continued intention to use and e-trust followed by continued intention to use and privacy concern with the application, were highly significant. The study found that continued intention to use mediates the relationship between flow experience (except involvement) and loyalty when consumers perceive application design, perceived ease of use and interactivity shape their overall experience towards continued intention to use the application. Additionally, continued intention to use mediates the relationship between marketing mix variables (advertising and price promotion) and loyalty. With the presence of moderators, e-trust and privacy concern with the application, we found support for moderated mediation for all the variables except involvement. Therefore, the application design, perceived ease of use, interactivity, advertising and price promotion have an indirect effect on mobile application loyalty through continued intention to use with the presence of moderating role of e-trust and privacy with the application.

5.1 Theoretical Implications

Our study importantly makes several theoretical contributions to extant literature. The major contribution is that we extend previous literature streams to address the questions of flow experience effect on app-based services context. We contribute to the literature of online relationship marketing (e.g. Steinhoff et al., 2018; Verma et al., 2016) by examining the effect of flow experience on continued intention to use and subsequently consumer loyalty. Although prior research (Yadav & Pavlou, 2014) has studied the effect and importance of flow experience to examine the online relationship marketing in various contexts (e.g. online games, e-commerce etc.), but limited research has focused on the mobile application perspective. Furthermore, we examined the flow experience along with relevant marketing mix variables effect on consumers experience during their journey in the mobile application for availing or enjoying services. The mediating role of continued intention to use suggests that ensuring flow experience with appropriate marketing mix strengthens the consumers' loyalty for the services provided by the mobile applications. Another contribution is that we extend the literature of flow theory (e.g. Verhagen et al., 2011; Catalan et al., 2019). we examined the flow experience along with relevant marketing mix variables (application design, involvement, interactivity and perceived ease of use) that shape the flow experience of consumers for mobile applications and exhibiting the positive effect of flow experience on usage behavior and loyalty. Our study found a significant direct effect of all variables continued intention to use and significant indirect effect (except involvement) on consumer's loyalty through the mediator continued intention to use. So, flow experience is an antecedent for continued intention to use, which is the consequence of consumers loyalty. Therefore, this study contributes to the literature by extending flow theory and elucidating the loyalty of services provided through mobile apps. In addition, to contribute to online RM and flow theory, our findings have contributions for online service literature (e.g. Ramaswami et al., 2001; Fassnacht & Koese, 2006) by showing the significant effect of flow experience and marketing mix

to enhance the consumer behavior and loyalty for app-based services. Our study also contributes by extending the literature of e-loyalty (e.g. Brodie et al., 2011; Parihar et al., 2019). We exhibited the significant drivers that have an impact on consumers e-loyalty for mobile apps through the mediating role of continued intention to use.

5.2 Practical Implications

Our findings have several implications for service providers of online services hence online relationship marketers. The major implication from our findings is that reconfirming and strengthen the significant importance of flow experience in an online service environment such as for app-based services. Marketers need to ensure the flow experience constitutes of involvement, interactivity, perceived ease of use and application design that meet the consumer's expectation and overall engaging to ensure consumer's continued intention to use the application. Marketers may adopt crowdsourcing to design their application, decide on which interactive features need to be added in the app and ensure consumers perceive the overall application is easy to use for availing or enjoying required services. In other words, marketers may build the application flow from scratch through involving consumers at the ideation phase, which reflects the consumer's need for service delivery through the application. By maintaining the flow, ensured and enhanced experience will induce consumers to build continued relationship and longevity with the online marketers. Online marketers also need to build trust and overcome any privacy concern in the online environment to ensure consumers loyalty for their provided app-based services. Apart from that, online marketers need to take precautionary measures for their mobile advertising programs and campaigns. Consumers experience excessive ads sometimes while browsing the app which ultimately leads to a distraction of availing the core service and bring dissatisfaction. Marketers may take necessary permissions from the consumers to show relevant ads and ensure not hindering any privacy concerns. Otherwise, mobile advertising will negatively affect consumer's continued intention to use the app and service. Additionally, consumers take into consideration the price promotion strategy of their services. Price promotion can play a vital role in early acquisition but not for regular consumers regularly. Consumers perceive the service quality is low which may bring the switching intention. Marketers need to embrace a different strategy for e-services. The same service provided by the same provider physically and electronically is not analogous. For e-services, marketers interact through the system or applications and consumers communicate through different phases of flow. Therefore, if the overall experience is not appealing then consumers will switch easily, and retention opportunity will be lost. Marketers need to put the uttermost focus on designing the flow experiences for e-services so the long-term relationship can be achieved. Above all, practitioners must take into considerations the combined approach of flow experience and marketing mix to formulate their online relationship marketing strategy. Our proposed model and findings provide a suggested pathway for the marketers to shape the overall flow experience for the app-based services to accomplish the goal of building and maintaining a strong online relationship with the consumers.

5.3 Limitations and Further Research

Our study has several limitations. First, we researched with cross-sectional data for a single context so future research with longitudinal data for various contexts will provide more comprehensive insights. Second, we considered four variables under the flow experience. Future studies may include other variables such as engagement, perceived control, structural assurance, concentration etc. to extend and generalize our findings. Third, our research model was hypothesized for existing users of app-based services so the further study can explore the same model is generalizable for potential users of the app. Furthermore, future research can add value with more sample size and extensive online environment and mobile application perspective. An interesting area for future research is to examine the mediating role of other possible mediators (e.g. satisfaction, service quality etc.) and the moderating role of other possible moderators (e.g. e-WOM, brand equity etc.). So, exploring the effect of other variables in future research will make the theoretical model more robust.

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