International Journal of Marketing, Communication and New Media
ISSN: 2182-9306. Vol. 11, Nº 21, DECEMBER 2023

IJMCNM

DOI: https://doi.org/10.54663/2182-9306.2023.v11.n21.153-178

Research Paper

The Concept of M-Commerce Customer Experience: How Retail Mobile Apps Can Change the Game

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ABSTRACT

The present study aims to uncover the factors influencing customer experience while buying from retail mobile apps by evaluating design principles from the designers' perspective and validating them with user feedback. In stage one, the authors used in-depth interviews and a grounded theory approach to creating Retail mobile apps Customer experience theory. In this regard, a total of 24 interviews were conducted. After performing the three coding steps using MAXQDA software, the final research model was obtained. In stage two, Data was obtained from users of retail mobile apps to test the theory, and the questionnaire survey method was used. Finally in order to evaluate the derived model, structural equation modeling was done using the partial least square technique (PLS-SEM). The researchers have developed "Retail mobile apps Customer experience theory" based on their data analysis. The theory emphasizes the crucial role played by mobile app designers in shaping the future requirements and desires of customers, as well as meeting their current demands through effective interaction. This highlights the importance of mobile app designers in developing customer experience.

Keywords: Customer experience, Grounded theory, Retail mobile applications, Mixed-method study, M-commerce and User experience

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Received on: 2023/05/17
Approved on: 2023/11/16
Evaluated by a double blind review system

1. INTRODUCTION

Even though the global COVID-19 pandemic woke and shuddered traditional business owners and marketers around the world (Rajamannar, 2021), it is crucial to remember that, even before the pandemic, consumer experience had changed dramatically due to the rise of e-commerce and the merging of online and offline channels (Manthiou, et al., 2020). Hence, the trend in retail nowadays is going phygital, which is the result of combining physical and digital contexts (Batat, 2019). As a result, Mobile apps are appearing as a new platform for companies to manage customer interactions (Vahdat et al., 2020) and the majority of marketing budgets of retailers go toward enhancing their customer experience through mobile apps (WARC, 2017). Mobile applications are software programs that are downloaded from innovative store platforms and installed on smartphones using their operating systems (Garg & Telang, 2013) which include several features, such as calendars, emails, social networking, web browsing, gaming, making online purchases and much more (Hsiao & Chen, 2016). A benefit of using mobile apps for retailers is that, unlike websites, they can exploit hardware and smartphone features for a streamlined user experience (Purcell et al., 2011). As a result, with the growth of smartphones and the availability of mobile apps, consumers are now interacting differently with brands (Fang, 2019). Because mobile apps are gaining tremendous traction in business communities during the recent pandemic (Cenamor, 2021) and the fact that more than 90% of smartphone owners have at least one retail app on their devices (Mindsea, 2019), it is imperative to consider the strategic role of mobile apps as one of the most essential and fastest-growing channels of communication in terms of retailing. Because there are few theories about retail mobile app customer experience, researchers devised a theory that identifies a customer's priorities and benefits retailers. Consequently, the present study was an attempt to answer the following questions:

RQ. What factors make up the customer experience in retail mobile applications? Based on this question, the objectives of this study were:

(1) to determine the factors influencing the customer experience in retail mobile applications
(2) to create Retail mobile apps Customer experience theory

(3) to illustrate the application of structural equation modeling with a partial least square estimation approach to testing the theory

To do so, we organized the paper as follows: The first step was to look at how customer experience is usually defined. Furthermore, we linked customer experience to M-commerce in retail and explored M-commerce customer experience; in this regard, some of the prior literature was reviewed. In Section 2, the retail mobile apps customer experience theory was described. In Section 3, the proposed theory was validated using the users' opinions. Finally, according to the findings of this research, the results and suggestions were presented in Section 4.

2. LITERATURE REVIEW

2.1 E-retail and M-commerce customer experience

Philosophers introduced the idea of "experience" in 1265 under the Latin word "Experientia", which means "attempt, trial, and test" (Batat, 2019). Nowadays, in light of so many people discussing experiences, it may seem everyone has a similar idea about what experiences are. When attempting to define experiences, people tend to offer examples of their own experiences rather than defining the phenomenon or, in some cases, describing the context in which the experiences occurred (Rossman & Duerden, 2019). Nevertheless, the experience can be described as “the acquisition, whether deliberate or not, of the understanding of human beings and things through their practices in the real world, and thus its contribution to the development of knowledge” (Batat, 2019, p.43), or the “knowledge or skill acquired from cumulative exposure” or “past events that represent a shared community”. Since Holbrooke and Hirschman initially developed the notion in 1982, numerous researchers have explored the significance of customer experience in marketing, with the majority of them believing that a great customer experience will lead to long-term competitive advantage and profitability for each company, over time (Bustamante et al., 2017).

E-commerce, as used in economics, is the purchasing and selling of goods and services over the Internet using several channels, such as retail stores, online banking, money transfers, and online payments (pantelimon et al., 2020). The e-commerce industry has become integral to the global retailing in the last few years. Nowadays, more than ever, people prefer to make purchases through their mobile phones (Patel et al., 2020). People's expectations of telecommunications have been dramatically transformed by smartphones and new mobile technologies (Logan, 2017). Alternatively, called mobile commerce (or m-commerce), m-commerce includes all aspects of e-

commerce, still, it entails using mobile devices such as mobile phones, tablets, and even newer smart devices like wearables to conduct economic activities. Due to the increasing use of mobile devices to conduct online business, most e-commerce platforms now feature mobile-compatible versions or native apps to shorten the process of placing an order, from adding items to the cart to paying for them (pantelimon et al., 2020). As a percentage of total retail e-commerce sales worldwide, the share of mobile retail commerce has increased from 2016 to 2021, according to Statista[1]. The percentage of retail e-commerce generated through mobile devices is projected to increase from 58.9 percent in 2017 to 72.9 percent in 2021. This trend is primarily driven by emerging e-commerce markets in mobile-first economies. E-commerce purchases on smartphones and tablets still lag behind traditional online orders via desktop but global e-retailers are catching up. Moreover, studies have shown that retail mobile apps are more time-efficient and cognitively easier than mobile versions of websites for users (Ruby Garage, 2017). Not surprisingly, in comparison to desktop or mobile versions of websites, retail mobile apps have gained rapid popularity in recent years (Forbes, 2017). As such, mobile apps are considered one of the most critical elements of m-commerce; however, we do not fully understand how the customer experience can be improved when using mobile apps today (McLean et al., 2018). In 2010, Schmitt introduced Customer Experience Management CEM) as the new framework. This framework consists of 5 steps: analyzing the experiential world of the customer; building the experiential platform; designing the brand experience; structuring the customer interface; and engaging in continuous innovation, which led to the enrichment of the concept.

2.2 The Literature on customer experience in retail mobile apps

In today's business environment, customer experience occupies a prominent position as one of the leading research structures relating to service management (De Keyser et al., 2020). Furthermore, Manthiou's (2020) findings show that luxury customers made the majority of their purchases online even before the current pandemic began. Poor in-store service is often the cause of this tendency (Manthiou, 2020). Mobile devices are versatile tools that people utilize for both personal and professional purposes. Developers have built a significant number of mobile applications to keep up with the trend of improving the capabilities of mobile devices. A mobile app might be a web app, a native app, or a hybrid app (Picoto et al., 2019). Given the differences in capabilities

[1] Statista. (2022), "E-commerce as percentage of total retail sales worldwide from 2015 to 2021, with forecasts from 2022 to 2026", available at: https://www.statista.com/statistics/534123/e-commerce-share-of-retail-sales-worldwide.

and functions between mobile technologies and PCs, they should be complementary. Customers will replace old platforms with new platforms, according to the media displacement theory. Customers will stop interacting with existing technologies once they adopt a new platform, according to this hypothesis, because they can now acquire the same information with the new platform. For example, when people get their news via the internet, they are less likely to read a printed newspaper. Furthermore, because customer attention and time are limited if obtaining media interactions is a zero-sum game, a firm should consider whether introducing a new platform is a conscious decision (Wang, 2020). In 2020, Kaushik, Mohan, and Kumar used Structural Equation Modelling-SEM with a Survey of 567 users to Examine the ancestors and consequences of customers' faith in mobile retail apps. They concluded that the antecedents which significantly affect trust toward retail apps are: the consumers' previous experience, the apps' perceived usefulness, ease of use, quality and the organization's reputation, and offline presence. In the same year, McLean et al., (2020), tried to investigate the effect of the usage duration of the mobile app on the user's experience, via Longitudinal examination with a Survey of 474 consumers they concluded that while the level of enjoyment and customization of the app has a more significant role in shaping experiences with a continuous using period, the perceived ease of use and perceived usefulness leave the same impact over time. In contrast, the influence of subjective norms shows their impact on consumer behavior in the early stages. In line with this research, Japutra et al., (2020), investigated how user experience with retail mobile apps can lead to retail loyalty. Data were collected through a survey in Indonesia. The results showed that app development was crucial for retailers because it can lead to not only the formation of satisfaction and loyalty towards the apps themselves but also loyalty toward retailers. In this study, it was emphasized that retailers should focus on strategies such as apps with attractive and pleasant appearances (for example, design, style, color, etc.) and improve the features of their apps to be easy to use and reliable (that is, with stable performance) in any situation. In addition, Chopdar and Balakrishnan (2020) tried to understand the drivers of repurchase intention and satisfying experience in an m-commerce shopping environment. The results indicate perceived ubiquity and m-commerce app incentives as the two strongest predictors of impulsiveness and perceived value respectively. It was further observed that impulsiveness negatively affects consumers repurchase intention but positively enhances the satisfying experience, whereas perceived value favourably affects both variables. Sarkar et al., (2020), conducted a

meta-analysis of 118 related empirical studies. The results indicate that antecedents namely perceived usefulness, perceived ease of use, system quality, information quality, service quality, user interface, perceived risk, perceived security, structural assurance, ubiquity, and disposition to trust, while consequences namely attitude, user satisfaction, behavioral intention, and loyalty have a significant relationship with trust in m-commerce. Further, all the relationships were found to be moderated by culture except for perceived ease of use, disposition to trust, and attitude. Van Nort and Van Reijmersdal (2019) examined whether different types of mobile apps, for example, informative or entertainment apps, affect the cognitive and emotional responses of consumers. A pilot design with 112 participants found that mobile apps generally increased brand responses. Informative apps evoke a higher level of cognitive responses, while entertainment apps evoke a higher level of enjoyment and emotional responses to the brand. They conclude that mobile advertisers should adapt their app design to match their campaign goals. In their 2019 research, van Heerde, Dinner, and Neslin answered the question of which type of customers a mobile app would best serve. An econometric analysis of 629 customers found that customers who lived far from physical store locations and were only offline shoppers were most influenced by the store's mobile app. In 2019, Jeon et al., investigated the determinants of the intention to use mobile applications. This research, based on the UTAUT, examined the effect of performance expectancy, effort expectancy, social influence, facilitating conditions, customer innovativeness, customer involvement, and perceived trust variables on the intention to use mobile apps for flight booking. 369 consumers were investigated as the sample of the study. The results showed that performance expectations, facilitating conditions, customer innovation, and perceived trust affect the intention to use mobile apps for flight booking.

In 2019, Fang investigated whether an app keeps customers connected with us every day. Focusing on apps from different industries, this study confirms the positive effect of usage value on continued usage intention and brand loyalty intentions. In the same year, after reviewing 11 qualitative conceptual studies and 73 quantitative empirical studies, Tang (2019) identified three main streams in the mobile apps' literature. Branded apps as supportive tools, apps as revenue-generating business tools, and consumer attitudes and behaviors in using mobile apps. McLean et al., (2018) investigated the results of using mobile apps for a retail store. A survey-based study with 474 participants found that utility-based value variables, i.e., perceived ease of use, perceived usefulness, and perceived convenience, were more influential in in-app engagement than hedonic

variables. Where the app is used has an impact on the app interaction, which leads to customer retention. Frey et al. (2017) investigated the effect of the life stage on the use of mobile apps. By examining 1435 cases, this research set up an experiment to predict the number of apps that people have on their mobile devices, which depends on their current life stage. Alnawas and Aburub (2016) investigated whether brand interaction through mobile apps affects customer satisfaction and purchase intention. Their study, based on questions from 358 participants, found that apps provide four types of benefits: learning, social integration, personal integration, and hedonic benefits. In particular, learning and hedonic benefits influence purchase intention.

It seems that since mobile apps can be considered an essential part of e-commerce, we do not have much understanding of the impact of customer experience when using mobile apps in e-commerce (McLean et al., 2018). According to the previous studies, it can be said that each related research has emphasized only a few factors affecting the customer experience, and a survey that conducted general and comprehensive research on identifying and classifying all the indicators affecting the customer experience in retail mobile applications was not found. Therefore, the current study was conducted to fulfill its mission to eliminate this gap. So, we used an exploratory, grounded theory technique to address the research gaps of a lack of established conceptualization, generalization, and differentiation of customer experience in retail mobile apps.

3. METHODOLOGY

The present research was an attempt to identify the factors influencing the customer experience in retail mobile apps in 2 phases, Phase I: To identify customer experience in retail mobile apps indicators and model outlines by grounded theory approach. Phase II: To determine the real relationships between dimensions and components. In the following, we will discuss each of these methods in detail.

3.1 Grounded Theory Fieldwork— a Consumer's View of Retail mobile apps

To answer the research question, we employed the grounded theory approach that entailed the interactive collection and analysis of field data and literature to build a theory founded on these data. While our method in this work followed the footsteps of Strauss and Corbin's grounded theory, all writers agreed on a few basic grounded theory principles: Emergence: The concepts in a grounded theory investigation must emerge through data analysis, Constant Comparative Analysis: Data is evaluated and coded in order to find markers of new ideas and concepts and

Theoretical Sampling: In a grounded theory study, all data is not collected 'up front,' based on a specified sample or unit, but rather iteratively sampled based on theoretical concepts that develop as the data is processed (Walsh et al., 2020).

Before going over the specifics of our strategy, we'll go over two main reasons why the grounded theory was the best method for answering the study's research questions. As the introduction states, customer experience research in retail mobile apps is still little understood. There is a need for a theoretical and empirical study that incorporates all early concepts, methodologies, and research perspectives at this early and uneven stage of development. Second, the researchers who apply a grounded theory approach have more freedom in selecting respondents and recording behaviors from which potential phenomena can be recognized. The following are the detailed steps in the procedure.

3.1.1 Theoretical sampling

In The grounded theory method, Data is collected, coded, and evaluated in theoretical sampling to develop qualities and notions that emerge from the data. Theoretical sampling is a crucial procedure for theory building in the grounded theory method (Conlon et al., 2020). When data saturation is reached, i.e., the collected data does not generate any new attributes or concepts, the sampling will end (Aldiabat et al., 2018). The best-known retail app in IRAN, named Digikala, was chosen for the current study as the subject of research. The data was gathered through in-depth interviews with CEOs, product owners, and business analysts who had worked with this organization on mobile app development projects, as well as individuals who were introduced to these experts. The interviews were taped and examined to generate notions until theoretical saturation was reached. There was a total of 24 interviews done, which was regarded to be a substantial sample size for qualitative research (Marshall et al., 2013). Refer to Table 1 for the list of participants. MaxQDA, the qualitative text analysis software, aided the coding and analysis of interviews by allowing us to quickly establish a hierarchical code/category system that could be updated or adjusted.

Table 1. Sample Characteristics- Grounded theory

Respondent Characteristics (GT)	Frequency (n)	%
Gender		
Male	19	80
Female	5	20
Age (in years)		
25 – 35	13	54
36 – 45	10	42
46 – 54	1	4
occupation		
CEO	5	21
Product manager	5	21
Developer	6	25
Designer	8	33
Years of experience in developing M-Commerce App		
up to 3 years	5	20
3-5 years	9	38
5-10 years	7	30
More than 10 years	3	12

3.1.2 Data analysis

Open coding, axial coding, and selective coding were used to analyze the acquired data in three steps. In retail mobile apps, open coding created categories of information about the customer experience, axial coding connected the categories, and selective coding established a "storyline" that related the coding and the categories (Creswell, 2007).

(1) Open coding

- Axial coding

The properties discovered through open coding were then classified based on their similarities or differences. In axial coding, the data was compiled innovatively, employing six predefined categories, as indicated by Strauss and Corbin, which included causative conditions, phenomena, context, intervening factors, tactics, and outcomes (Vollstedt & Rezat, 2019).

-*Causal conditions*

The findings of this study suggested that addressing the user interface (UI) plays the role of causal conditions in improving customers' experience when working with retail mobile applications. Based on the interviews, the authors found that due to screen constraints and the "fat finger" effect, there are a few reasons why searching suggestions are preferable over the direct display of search

results on mobile. The number of characters that must be written is reduced when autocomplete is used. It is also easier to fit three to five suggestions on a screen, which can be referred to as Autocomplete (autosuggest) patterns. The other main factor is Visual weight for principal elements, which means that the most visual weight should be given to the main component on the screen. To create an optimal experience for the user, it is time to consider predictability. The concept of predictability in UI design relates to the confidence that the functionality of your program will operate precisely as your consumers anticipate. Then Typography is the art and ability of positioning type in written text to make it readable, aesthetically pleasing, and legible. In addition to the mentioned items, the visibility principle asserts that a design should make all appropriate options for a task evident without overwhelming the user with extraneous information. Users usually use their thumbs when scrolling through an app when holding the phone in one hand That shows the importance of addressing Finger Range of Motion. In dealing with all the mentioned cases the principle of simplicity and structure should be kept in mind. By making the program easier to use, a simple and attractive UI design may keep users interested and the user interface should be thoughtfully structured using explicit, consistent models that are evident and recognizable to people. Also, the interviewees emphasized that responsive design which is used to provide content that is easily adjustable to different screen sizes, an appealing user interface, and the serial position effect which describes how the order in which items appear in a series affects recall precision are all critical in mobile app UI designing which should not be ignored.

Designing an appropriate user interface might be difficult due to the specific properties of mobile devices, such as poor resolution, tiny screen size, and varied data entry methods (Pandey et al., 2019). The UI indicators, according to the respondents, are listed in Table 2. Therefore, this research proposed the following hypothesis:

Hypothesis 1 (H1). User interface positively affects User experience (UX) in retail mobile apps.

Table 2. Categories and concepts related to causal conditions

General Category	Subcategory	Axial Coding
Causal conditions	User interface (UI)	Autocomplete (autosuggest) patterns
		Visual weight for principal elements
		predictability
		typography Measuring
		Visibility
		Finger Range of Motion

General Category	Subcategory	Axial Coding
		Minimalistic UI design
		The structure principle
		Responsive design
		Attractive design
		Serial positioning effect

- *Phenomenon*

The authors concluded that there are two issues that must be addressed in the design of mobile apps: first, the creation of a usable mobile application, and second, user-friendliness, which means the user will enjoy using it in addition to using it to fulfill their shopping needs. While Usability emphasizes the need to pay special attention to Cognitive load management, error management, Advertising management, and User time management by addressing the Information Architecture, and Navigation, user-friendliness emphasizes facilitating the registration process, facilitating how to work with the application, facilitating learning and providing appropriate support services in order to gain user trust. Table 3 lists the usability and user-friendliness indices based on the respondents' responses. Therefore, the following hypothesis was also proposed:

Hypothesis 2 (H2). User experience (usability and user-friendliness) positively affects strategies.

Table 3. Categories and concepts related to the Phenomenon

General Category	Subcategory	Axial Coding
Phenomenon	Usability	Cognitive load management
		Error management
		User time management
		Designing The Information Architecture
		Navigation
	User-friendliness	Advertising management
		Ease of registration
		Providing appropriate support (CRM)
		Gaining users' trust
		Ease of use
		Ease of learning
		Receiving feedback from users

- *Contextual conditions*

The primary contextual aspects in this study are the technological capabilities of the application and the Mobile App Development Team, as indicated in Table 4. Therefore, the following hypotheses were made:

Hypothesis 3 (H3). Contextual conditions (the technological capabilities of the application and the Mobile App Development Team) positively affect Strategies.

Hypothesis 4 (H4). Contextual conditions (the technological capabilities of the application and the Mobile App Development Team) positively affect User experience.

Table 4. Categories and concepts related to Contextual conditions

General Category	Subcategory	Axial Coding
Contextual conditions	Technological capabilities of the application	Augmented reality
		Blockchain technology
		Machine learning
		Beacon technology
		Artificial intelligence
		Load time and speed
		In-App Guidance
		Navigable Menu Structure
		In-App Notifications
		In-App Analytics
	Mobile App Development Team	Product Owner
		Project Manager
		UI/UX Designer
		Mobile App Developers
		QA Engineer

- *Intervening conditions*

Three categories of mobile device capabilities, market mechanisms, and acknowledgment of the user story were regarded as intervening factors in this study, as shown in Table 5. Therefore, the following hypotheses were made:

Hypothesis 5 (H5). Intervening conditions (Mobile device capabilities, Market mechanisms, and user story) positively affect Strategies.

Hypothesis 6 (H6). Intervening conditions (Mobile device capabilities, Market mechanisms, and user story) positively affect User experience.

Table 5. Categories and concepts related to Intervening conditions

General Category	Subcategory	Axial Coding
Intervening conditions	Mobile device capabilities	Phone screen size
		Geo-location via Global Positioning System (GPS)
		Type of mobile operating system
	Market mechanisms	Technical feasibility
		Benchmarking
		Competitive analysis
	User story	Users' needs (Target audience)
		User onboarding
		Design for interruption

- *Strategies and Consequences*

Based on the concepts gleaned from the interviews, the researchers found that using flow concepts, application tests, offering MVP (the minimum viable product), and using PWA (progressive web applications) are the strategies that increase the likelihood of increased intention to use or buy and disseminate WOM (positively rate the app). These strategies ultimately impact the company's sales, brand credibility, and ability to gain a competitive advantage. The categories and concepts connected to the mentioned strategies are shown in Table 6, and the consequences are shown in Table 7. Therefore, the following hypothesis was made:

Hypothesis 7 (H7). The strategies (Flow, Application Test, MVP, and PWA) positively affect Consequences.

Table 6. Categories and concepts related to Strategies

General Category	Subcategory	Axial Coding
Strategies	Flow	Recommender System
		Search design
		Filtering system
		User-generated content (UGC)
		Content management
		The Information Architecture (IA)
		Gamification
		Loyalty program
	Application tests	Usability Test
		Functional Test

General Category	Subcategory	Axial Coding
		Interruption Test
	MVP	Minimum viable product
	PWA	Progressive web applications

Table 7. Categories and concepts related to Consequences

General Category	Subcategory	Axial Coding
Consequences	Users' consequences	Increase the likelihood of greater intention to use or buy, and spread word of mouth about (positively rate the app).
	Retailers' consequences	Increase sales, serve a wider range of customers, improve customer relationship capabilities, improve brand credibility and gain a competitive advantage.

(2) Selective coding

The theoretical model developed as a result of this study suggested that causal conditions (User interface (UI)) shape a phenomenon (User experience (UX) in terms of usability and user-friendliness, while the context (the technological capabilities of the application and the Mobile App Development Team), as well as intervening conditions (Mobile device capabilities, Market mechanisms, and the User story), influence the strategies (Flow, application tests, MVP and PWA bring about a set of consequences for users and retailers (see Figure 1).

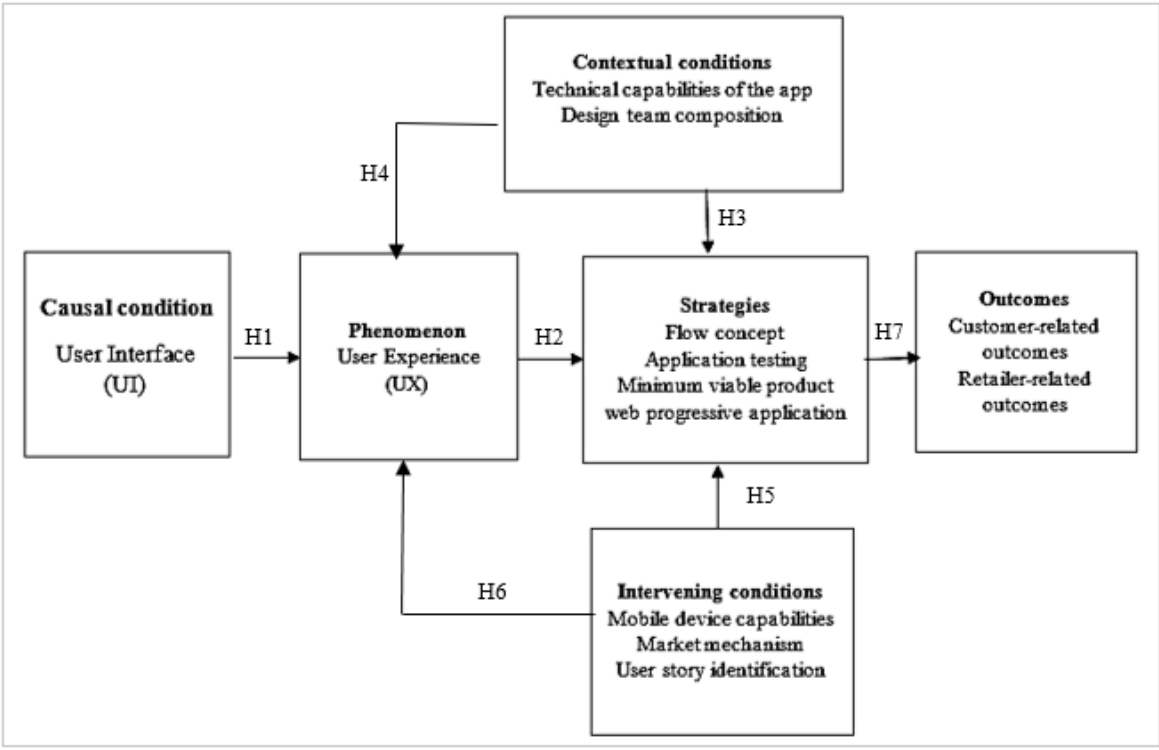

Figure 1. Research model and hypotheses.

3.2 Test the model: Can Retail Mobile Apps Really Change the Game?

Based on the 159 valid questionnaires collected, the questionnaire survey method was used to evaluate the derived model by analyzing the relationship between the variables. The difference analysis of various background variables to research variables was then tested using descriptive statistics and an independent sample t-test test using SPSS 22.0 (IBM, USA) software. To explore the link between the latent variables, structural equation modeling was done using the partial least square technique and structural equation model (PLS-SEM).

The Digikala app as the best-known retail app in IRAN, with more than 10 million active users in 2022, was chosen for this study. The data were collected through an online survey aimed at Iranian users of the Digikala app. The market research institute was used to recruit the participants. Considering that the focus of this research was only on retail mobile applications, users aged at least 18 and at most 60 years who used the app at least more than 6 months were considered. The final sample consisted of 159 people after removing 43 participants who failed the survey's attention tests or didn't finish the entire questionnaire (Table 8). The responders were 35 years old on average. Common method bias was assessed using procedural and statistical methods because

the data was based on self-reported metrics and gathered through a single survey (Podsakoff et al., 2003). Also, the study was voluntary, and participants' comments were kept anonymous. Additionally, the dependent and independent variables were split among multiple survey pages, making it impossible for the respondents to discern any causal connections between the constructs (Kock, 2015).

Table 8. Sample Characteristics- pls

Respondent Characteristics (pls)	Frequency (n)	%
Gender		
Male	76	47.8
Female	83	52.2
Age (in years)		
18 – 30	59	37
30 – 40	78	49
40 – 50	16	10
>50	6	4
Duration of usage (in months)		
6 - 12	62	39
> 12	97	61

4. RESULTS

Partial least squares (PLS) structural equation modeling with SmartPLS 2.0 was used to evaluate the hypotheses (Ringle et al., 2005). PLS is appropriate when the model is complex and includes formative and reflective measures, as it does in our work (Chin, 2010, Hair et al., 2011). According to Roldán and Sánchez-Franco (2012), the PLS methodology starts with a graphical description of the structural or internal model, a symbol-based representation of the relationships between the latent variables (constructs) and the relationships between the indicators and the constructs of the measurement or external model.

The two processes they highlight in each PLS study are the assessment of the structural model and the evaluation of the measurement model.

4.1. Measurement model

Given that the measuring model is reflective, it must be evaluated in terms of validity and reliability (Roldán & Sánchez-Franco, 2012). In this way, both indicator and dimension loadings go over the cutoff of 0.625. As a result, measurements and indications were trustworthy.

As their composite reliability indices were over 0.7, constructs and dimensions exhibit good internal consistency. Additionally, all latent variables had convergent validity because the average variance extracted (AVE) ratios were higher than the threshold of 0.5 (Appendix 1).

4.2. Structural model

The algebraic sign, magnitude and significance of the structural path coefficients, the R2 values, and the Q2 (redundancy) test for predictive relevance were used to evaluate the structural model (Roldán & Sánchez-Franco, 2012). The endogenous constructions acquired R2 values of more than 0.45, with the consequence factor even reaching a remarkable value of 0.880 which was greater than the significant level that Chin suggests (2010). The theoretical/structural model's predictive usefulness was evaluated using the cross-validated redundancy index (Q2) for endogenous constructs. We discovered the evidence that our model had predictive validity because all Q2 values were greater than 0 (Chin, 2010). Additionally, Table 9 displays the goodness of fit (GoF) as an overall measure of model fit for PLS-SEM.

Table 9. Effects on endogenous variables.

Effects on endogenous variables	Direct effect	t-value (bootstrap)	GOF
User Experience ($R^2 = 0.351/Q^2 = 0.177$)			0.582
H1: User Interface	0.120	2.422	
H4: Contextual conditions	0.273	3.704	
H6: Intervening conditions	0.415	5.495	
Strategies ($R^2 = 0.471/Q^2 = 0.321$)			
H2: User Experience	0.743	8.384	
H3: Contextual conditions	0.111	2.667	
H5: Intervening conditions	0.308	2.868	
Consequences ($R^2 = 0.880/Q^2 = 0.497$)			
H7: Strategies	0.938	56.747	

The path analysis uses the value of t to assess the validity of the hypothesis. If the t value is more than 1.96, then 0.05 is the significant level. When the t value is more than 2.58, it has reached the 0.05 level of significance. When the t value is greater than 3.29, it has reached the 0.001 level of significance. Table 9 shows that H2, H4, H6, and H7 have all become statistically significant at a

p-value of less than 0.001. With a p-value of less than 0.01 for H3, and H5, and less than 0.05 for H1. Consequently, all the hypotheses of H1 to H7 in this study were proved to be valid.

5. DISCUSSION

It seems that since mobile apps can be considered an essential part of e-commerce, we do not have much understanding of the impact of customer experience when using mobile apps in e-commerce (McLean et al., 2018). Previous studies have often overlooked important factors, including the distinctive features of retail mobile apps. Out of a total of 62 subcategories, the current study's findings uncovered new subcategories that had not been discovered in the earlier studies. The previous research has not looked into the link between dimensions or their influence. For instance, the research has identified capabilities such as Autocomplete (autosuggest) patterns, predictability, The structure principle, and designing a minimalistic UI as exclusive outputs. These features were not addressed in previous research, and identifying them under a specific heading called User Interface can deepen our understanding of customer feedback. A basic, minimal, and appealing user interface can turn a potential user into a long-term customer. However, Visual design (Kapoor & Vij, 2018), Design solutions (Tarute et al.,2017) and visually Attraction (Merikivi et al.,2017) have been references to the importance of this issue.

Among the factors affecting the customer experience in retail mobile applications, it can be said that the most frequent indicators that have been mentioned in several studies can be found in the usability and user-friendliness subcategories such as ease of use (Rese et al.,2017; Gurtner et al.; 2014, Lee et al., 2017; Ozturk et al.,2016; Hur et al., 2017; Newman et al.,2018 and more), usefulness (Yang, 2013,Lee et al., 2017; Hur et al., 2017; McLean et al.,2020; Kaushik, Mohan, & Kumar,2020, and more) and trust (Wang & Lin,2017; Cheung & To,2017; Jeon et al.,2019 and more).

Furthermore, the research suggests novel features such as blockchain, machine learning, and beacon technology, as well as the use of artificial intelligence, in-app guidance, notifications, and analytics, which were previously not considered in the literature. However, it seems that the importance of the app development team is neglected. Nevertheless, adoption of Augmented Reality (AR) technologies in retailing (Rese et al.,2017) had been investigated.

Also, the size of the mobile device screen has been shown to impact the UX in several studies but is beyond the control of app designers and stores.

The most specific indicators identified in this research, which have received less attention in past research, are related to the use of strategies such as Minimum viable product and Progressive web applications in the development of retail mobile apps.

In general, Although the findings are consistent with the previous, the indicators are revealed in more detail in this research.

Ultimately, the unique contribution of this study, unaddressed in prior research, lies in its introduction of a novel application of the "interaction effect" theory within the realm of retail mobile app development.

6. CONCLUSION

The primary objective of this study was to investigate the factors influencing customer experiences with retail mobile apps. These factors were categorized into 12 main categories and 62 subcategories. Notably, this research uncovered new subcategories not explored in prior studies, expanding our understanding. Specifically, the customer experience of using retail mobile applications is influenced by the user interface. The UI is critical in providing a positive user experience by attracting and retaining users. For instance, autocomplete patterns make it easier for users to fill out forms and make purchases. Search suggestions are preferable to direct search results on mobile due to screen constraints and the "fat finger" effect. The visibility principle states that a design should make all relevant options for a task evident without overwhelming the user with extraneous information. Typography and finger range of motion are important factors to consider when designing a user interface that reduces the user's cognitive and physical effort.

Furthermore, the model demonstrated that the app's technological capabilities and the composition of the design team are the aspects that create the context for developing the user experience in retail mobile apps. For instance, it is crucial for the app to be compatible with different devices and user skill levels. To cater to a wider range of users, the Digikala app has implemented speech search functionality. Additionally, augmented reality features allow customers to visualize how a product meets their needs. To ensure the security and integrity of the mobile app, text, photos, and voice can be processed using blockchain and on-device machine learning. Beacons can also send promotions to mobile devices when a consumer visits a particular department or product area. In-app guidance, such as product tours and smart advice, can improve the user experience. App

developers can monitor user experience through integrated analytics tools, and in-app alerts can be sent to users.

The study recommends that a professional mobile app development team is essential to develop, deliver, and support the mobile app to ensure a positive customer experience.

The user experience (UX) of mobile applications is affected by various factors such as the capabilities of the mobile device, market mechanisms, and user story recognition.

To enhance the UX, several strategies can be employed, including the use of Flow theory to engage users, bidding systems to encourage purchases, and convenient search and filtering options for finding products. App testing and delivering minimal viable products can also enable effective customer feedback. Progressive web applications can further improve the UX by reducing reliance on operating systems and ensuring the app is always up-to-date.

When discussing the UX of retail mobile apps, the concepts of usability and user-friendliness should be considered. Usability focuses on managing cognitive load, errors, advertising, and user time, while user-friendliness aims to simplify registration, application usage, learning, and providing support services to gain user trust.

Finally implementing a model developed through this study can increase the intention to use or buy, disseminate positive word-of-mouth reviews, and boost the company's sales, brand credibility, and competitive advantage. Expert interviews and user feedback have validated the model's predictive power and its incorporation of user experience into mobile app development.

After obtaining the model, we attempted to confirm the validity of the obtained model by referring to the users of retail mobile apps. The findings validated the measurement model's validity and reliability, which validated its strong predictive power in the retail mobile application model as a framework for incorporating user experience into the creation of the related apps. Table 9 summarizes the results of the analysis. The findings reveal that the “Retail mobile apps Customer experience theory" has the ability to describe the customer's experience when shopping through retail mobile apps, providing support to H1 to H7.

The proposed model demonstrated high predictive validity with a Q2 coefficient value above 0, indicating that mobile application designers effectively meet user needs through their opinions and ideas. To explore how this is achieved, we conducted expert interviews and gathered feedback from users, leading to some intriguing conclusions. Given the dynamic nature of the mobile app industry, keeping up with emerging trends is crucial. Conducting thorough market research is a

key component of developing successful mobile apps, as modern app performance heavily relies on this research. In this context, designers play a crucial role in not only meeting current user demands but also in developing future requirements and wants by interacting with users. This study not only accomplished its primary objective but also revealed an "interaction effect" in consumer behavior research, where the impact of one variable depends on the value of another. Therefore, it can be argued that designers play a critical role in shaping users' requirements and wants, and in turn, impact the success of mobile apps.

Theoretically, this study offers a deeper understanding of how retail mobile apps can allow retailers to foster stronger customer connections and can also inspire designers' work and highlights the differences between designers' and users' perspectives on optimal app experiences.

From a managerial perspective, the current paper provides designers direction regarding what to emphasize and has strong implications for retailers in choosing appropriate strategies to enhance customer experiences.

However, it's essential to acknowledge the limitations of this cross-sectional study conducted over time. Future researchers in digital marketing should consider investigating customer experience models across various channels of customer engagement with retailers. Additionally, the study's sample selection criteria, especially the requirement for consistent app usage over the past six months, restricted the number of respondents. Lastly, the relatively limited retail app market in Iran posed challenges for user access to diverse examples for review and comment.

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Appendix 1

Measurement model

Construct	Indicator	Factor loading	AVE	Cronbach's alpha	CR
User Interface	Q1	0.758	0.642	0.946	0.951
	Q2	0.771			
	Q3	0.931			
	Q4	0.744			
	Q5	0.659			
	Q6	0.771			
	Q7	0.931			
	Q8	0.771			
	Q9	0.931			
	Q10	0.744			
	Q11	0.744			
Technological capabilities	Q12	0.684	0.621	0.932	0.941
	Q13	0.807			
	Q14	0.813			
	Q15	0.772			
	Q16	0.797			
	Q17	0.747			
	Q18	0.853			
	Q19	0.780			
	Q20	0.791			
	Q21	0.824			
Mobile App Development Team	Q22	0.754	0.662	0.871	0.907
	Q23	0.862			
	Q24	0.884			
	Q25	0.815			
	Q26	0.745			
Capabilities of mobile devices	Q27	0.855	0.657	0.724	0.848
	Q28	0.823			
	Q29	0.675			
Market-related mechanisms	Q30	0.627	0.699	0.768	0.871
	Q31	0.930			
	Q32	0.916			
	Q33	0.738			

Construct	Indicator	Factor loading	AVE	Cronbach's alpha	CR
User story	Q34	0.930	0.650	0.730	0.874
	Q35	0.845			
Usability	Q36	0.766	0.793	0.933	0.950
	Q37	0.853			
	Q38	0.969			
	Q39	0.891			
	Q40	0.951			
User-friendliness	Q41	0.772	0.646	0.907	0.927
	Q42	0.679			
	Q43	0.819			
	Q44	0.829			
	Q45	0.900			
	Q46	0.786			
	Q47	0.830			
Flow	Q48	0.861	0.770	0.955	0.963
	Q49	0.921			
	Q50	0.901			
	Q51	0.934			
	Q52	0.863			
	Q53	0.865			
	Q54	0.672			
	Q55	0.968			
Application testing	Q56	0.923	0.827	0.895	0.934
	Q57	0.892			
	Q58	0.912			
MVP	Q59	0.926	0.870	0.851	0.930
	Q60	0.939			
PWA	Q61	0.873	0.797	0.747	0.887
	Q62	0.912			
Users' consequences	Q63	0.924	0.846	0.818	0.916
	Q64	0.914			
Retailers consequences	Q65	0.625	0.496	0.682	0.762
	Q66	0.944			
	Q67	0.846			
	Q68	0.696			
	Q69	0.928			

How to cite this article:

Ghandvar, P.; Azad, N.; Naami, A.; & Meshkani, F. A. (2023). The Concept of M-commerce Customer Experience: How Retail Mobile Apps Can Change the Game. *International Journal of Marketing, Communication and New Media*, Vol. 11, N. 21,153-178.