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Assessing the Potential Barriers to M-Commerce Adoption in India

Shahir Bhatt[1] and Amola Bhatt[2]

Abstract

In the era of information technology and click-and-mortar businesses, execution of commercial transactions is experiencing a paradigm shift. New-age consumers have shifted to electronic commerce, and with the advent of smart-phone and internet usage on mobile phones, people are gradually tempted to use mobile commerce. In spite of the various benefits offered by mobile commerce, there are various factors which inhibit its adoption. Dearth of relevant research in this area makes the case for this empirical study. Data is collected from 296 respondents using a self-administered questionnaire. Analysis is done using multivariate techniques like factor analysis followed by ANOVA and independent sample t-test. Five factors, namely, unawareness, mobile-device inoperability, personalization, time consumption/ confusion, and cost are found to hinder the adoption of m-commerce. Additionally, it is seen that there is a relationship between unawareness and age, unawareness and educational qualification, personalization and educational qualification, personalization and occupation, and time consumption/ confusion and age.

Keywords: M-commerce, Unawareness, Mobile-device inoperability, Personalization, Time consumption / confusion, Cost.

[1] Assistant Professor, Institute of Management, Nirma University, Ahmedabad. E-mail: shahirbhatt@gmail.com

[2] Assistant Professor, Institute of Management, Nirma University, Ahmedabad. Email: amolamba@gmail.com

1. Introduction

An enormous growth of penetration in mobile devices is noted in research studies (Barnes & Scornavacca, 2004; Dholakia, N., Dholakia, R.R., Lehrer, M., & Kshetri, N., 2004; Massoud & Gupta, 2003). Mobile is now at the heart and soul of communication – from personal communication, mobile commerce, to entertainment and professional networking. Mobile commerce can pose as a solution to issues of productivity and sustainability.

Mobile commerce, which is commonly referred to as m-commerce, has become an imperative in today's business environment (Rottenberg & Sisi, 2002). According to Oxford Dictionary, m-commerce means commercial transactions conducted electronically by mobiles. Investopedia defines mobile commerce as the use of information technologies and communication technologies for the purpose of mobile integration of different value chains and business processes, and for the purpose of management of business relationships. Sadeh (2002) characterizes m-commerce in a similar vein as "the emerging set of applications and services people can access from their Internet-enabled mobile devices." This has been stated more accurately by Chaffey (2009, p. 6) who defines m-commerce as "electronic transactions and communications conducted using mobile devices such as laptops, PDAs, and mobile phones, and typically with a wireless connection".

As per the data released by the Telecom Regulatory Authority of India (TRAI) in December 2014, of the total 237 million internet subscribers in the country, 92 per cent comprise mobile wireless subscribers, which clearly highlights the importance of mobile internet services. According to TechNavio Report (2012), the mobile-commerce market in India is expected to grow at an annual compound rate of 71 per cent over the period 2012-2016. In a different vein, Rackspace Survey released in September 2014 found that while huge numbers of consumers in Asia-Pacific are using their smartphones to browse and purchase items from m-commerce sites, the impact of a poor user experience acts as a deterrent in the adoption of m-commerce. M-commerce can be said to be in the nascent stage. It has a potential to deal with various transactions like mobile banking, mobile ticketing, mobile entertainment, and mobile advertising. Therefore, an extensive research in this area is very much needed (Kao, 2009).

M-commerce is extremely user friendly as it can be used by any individual carrying a mobile-phone, unlike e-commerce, which is not as much felicitous. On one hand, m-commerce is handy and can be used at any point of time, on the other, it also poses a risk as far as security of transactions is concerned. Moreover, since mobiles are used by illiterate segment of customers also, they can also be educated on the usage of m-commerce. However, for this to happen, it is essential that the issues faced by existing customers and the more literate lot be known. Thus, the present study elicits the problems faced by consumers in adopting m-commerce specifically. The results from the study would help the businesses in shaping appropriate strategies to promote their products through m-commerce.

2. Literature Review

2.1 Association between m-commerce and e-commerce

Approaches to association between m-commerce and e-commerce have differed over a period of time. Vrechopoulos, Constantiou, Sideris, Doukidis and Mylonopoulos (2003) consider m-commerce as an extended form of e-commerce based on internet technology that offers services and products through mobile network and device. Feng, Hoegler, and Stucky (2006) went on further to state that m-commerce is more than e-commerce due to its different interaction style, usage pattern and value chain. They also stated that m-commerce is a new and innovative business opportunity with its own unique characteristics and functions, such as mobility and broad reachability. However, Sharma (2009) adapted a very simplistic approach that m-commerce is a subset of e-commerce which includes all e-commerce transactions carried out using a mobile (hand-held) device. He meant that the functionality of m-commerce, as far as the implementation of business transactions is concerned, is the same as that of e-commerce.

2.2 Impact of demographic factors on usage of m-commerce

Alkhunaizan and Love (2013) in their research analyzed the effect of demographical factors (gender, age, and education) on mobile-commerce usage in Saudi Arabia. Findings of the study indicate that age has a statistically significant impact on the actual usage while gender and education do not impact the actual usage of mobile commerce. In contrast, Park, Yang and Lehto (2007) find moderating factors such as gender and education to have a significant influence but interestingly, Internet usage

experience is found to have no significant effect on m-commerce adoption. Rhee and Kim (2004) and Chinn and Fairlie (2006) as cited in Gitau and Nzuki (2014) found that people with high education level were more likely to use the Internet. This finding can be used to conclude that such people are more likely to use mobile and other electronic devices for carrying out commercial transactions. Dai and Palvia (2008) have revealed that younger users tend to adopt m-commerce more than the older users. Teo (2001) has showed that males in general are inclined to use the technology more than females. This indicated that gender also influenced the technology usage and could be extended to m-commerce transactions.

2.3 Factors affecting adoption of m-commerce

Qingfei, Shaobo and Gang (2008) noted the importance of "user acceptance" in the development and success of m-commerce. With the help of m-commerce, marketers can reduce time by easily accessing information in a real-time environment and can cultivate new business opportunities. Consumer experiences evoked with mobile phones may differ by shopping motivations, as m-commerce can provide both hedonic (entertainment) and utilitarian (efficiency and time-critical) features (Anckar & D'Incau, 2002). Bhatt and Bhatt (2014) explored the major factors influencing the adoption of m-commerce and segmented the m-commerce customers into groups. The factors which came out from this study as influencing the usage of m-commerce were: attitude towards m-commerce, perceived benefits, adventure, perceived risk and idea (awareness about the usage of m-commerce). Further, three segments of m-commerce users were brought out from the study, which included reserved shoppers, utilitarian shoppers, and assured shoppers. Thakur and Srivastava (2013) also investigated the factors influencing the adoption of mobile commerce based on constructs from the technology-acceptance model and innovation-resistance theory in India.

2.4 Factors discouraging adoption of m-commerce

M-commerce is considered as an innovative platform where the benefits from it are continuously at odds with the concerns and needs of individual privacy. Consequently, the advantages of m-commerce must be weighed against its potential for privacy violations (Milne, 2003). Kini (2009) conducted a study among MBA students in Chile and found that despite this community being an extensive user of electronic commerce, it is not content with using mobile

commerce owing to mobile-access speed, service quality and price factors. Fong and Burton (2008) also conducted an experiment in China to understand the Chinese acceptance of m-commerce. The results suggested that the Chinese were not too eager to explore m-commerce story despite their agreeing to the convenience it offers. High subscription fees and poor download speed are critical barriers to m-commerce success (Samtani, Leow, Lim, & Goh, 2003). Other technical factors that can impact m-commerce adoption include user interface constraints, slow network connections, information security, or even the threat of government regulations (Wen and Mahatanankoon, 2004). Rahman (2013) noted that language barrier is also an issue as far as m-commerce is concerned, especially in the developing countries. He surveyed the customers of Bangladesh and found that due to rampant illiteracy and lack of knowledge of English, many people could not use the services of m-commerce. In addition to this, he also states that perceived risk, government regulations and cost were cited as issues by the customers but they were not very significant. A similar study was conducted in India, which states that language barrier is an equally disturbing feature which discourages Indian customers from resorting to m-commerce. Other factors which potentially obstruct the usage of m-commerce are complete lack of Internet connectivity in some areas, less graphic resolutions as compared to laptops or computers, lack of awareness due to widespread illiteracy and less number of mobile phone users in India as compared to world scenario (Gupta & Vyas, 2014). Batra and Juneja (2013) focus more on the technical problems related to the usage of m-commerce like security issues, lack of ubiquitous wireless network coverage, lack of standards, and technical mismatches among various wireless devices and smartphones. Moreover, the cost of smartphones and low access speed exacerbate the situation. Similar reasons are cited by Carlsson and Walden (2002) and Wu and Wang (2005) as they emphasize that the constraints of mobile devices adversely affect the usage of m-commerce.

Thus, many risks must be overcome to ensure the success of mobile commerce. These include inefficiencies within the device and the system, security and privacy concerns, high user costs from time-usage charges, the possible abuse of advertising, user comfort levels, and fulfilment issues caused by absence of incentives to use m-commerce (Chae & Kim, 2004; Chiu, 2001; Ding & Hampe, 2003; Herb, 2001; Srivastava, 2005; Yeo & Huang, 2003; and Mahatankoon & Vila-Ruiz, 2007).

Several researchers studied the antecedents and determinants of m-commerce (Langendoerfer, 2002; Martin, 2012; and Jaradat & Rababaa 2013). Majority

of research on m-commerce in India is conducted on factors influencing the adoption of m-commerce (Bhatti, 2007; Patel, 2011; Batra & Juneja, 2013; and Bhatt & Bhatt, 2014). Very few studies till date have been conducted exclusively on the potential barriers to m-commerce adoption in India (Gupta & Vyas, 2014; Batra & Juneja, 2013; and Tandon, Mandal & Saha, 2003).

Mobile user's perceptions and intention to use m-commerce are differentiated by the variability of the user's demographics, shopping motivations, and media dependency. So, a research indicating the perceptions of consumers towards m-commerce and segmenting the customers based on their demographic or other factors would help the retailers identify their target audience and design appropriate marketing strategies. Hence, the researchers have made attempts to study the aspects that can hinder the adoption of m-commerce, so that the impact of these factors can be minimized by the retailers or the retailers can make the consumers aware of the potential benefits and how they can avoid the perceived losses.

3. Research Objectives

The literature review suggested that researchers have studied the factors influencing the usage of m-commerce and the impact of demographic factors on the same. However, there is a dearth of research which pinpoints the problems faced by customers in adopting m-commerce, especially in India. Hence, the present study is undertaken with the following objectives:

- To explore the factors hindering m-commerce adoption
- To examine the relationship between the factors brought out in the study and the demographics

4. Research Methodology

The sampling unit for the study is consumer who is aware about e-commerce. The participants were provided with the definition of m-commerce to avoid possible misunderstanding about it. The respondents belonged to Ahmedabad district of the State of Gujarat. The survey was conducted from April 2014 to June 2014. The questionnaire constructed for the study included several questions which were continuous and categorical in nature. A scale was constructed with five point Likert-type statements in which respondents were asked to indicate their level of agreement (1 = *strongly disagree* to 5 = *strongly agree*). The questionnaire for the study was based on the scale developed by Mahatanankoon

and Vila-Ruiz (2007) consisting of 24 items. The reliability of the scale was found sound and apt for the current study. The sampling technique used for the study was convenient sampling. Reponses were obtained from 296 respondents. The respondents were guaranteed anonymity and confidentiality of their responses. SPSS 19 was used to analyze the data. Factor analysis and one-way ANOVA were used to analyze the data collected.

5. Sample Characteristics

As shown in Table 1, the demographics of respondents who are aware about m-commerce were classified according to their age, gender, education, monthly income and occupation. Out of the total respondents, 61.5% were males and the rest were females. Majority of respondents were post graduates (48.3%) and 61.5% respondents belonged to the age group between 20 to 35 years. 88.9% of respondents earned less than Rs 30000 per month and most of the respondents were students (45.6%) or were engaged in the private sector (29.4%).

Table 1: Demographics of the Sample

		Frequency	Percentage
Age	Less than 20 years	95	32.1
	20 - 35 years	182	61.5
	More than 35 years	19	6.4
Gender	Male	182	61.5
	Female	114	38.5
Educational Qualification	Undergraduate	51	17.2
	Graduate	102	34.5
	Postgraduate	143	48.3
Occupation	Self employed	51	17.2
	Homemaker/Housewife	23	7.8
	Student	135	45.6
	Job/Service	87	29.4
Monthly Income	Less than Rs. 30000	263	88.9
	Equal or more than Rs. 30000	33	11.1

Source: Primary data collected through questionnaire.

6. Factors Hindering M-commerce Adoption

To determine the important factors hindering m-commerce, the factorability of 24 items measuring perceptions of consumers was examined. The respondents were asked to rate 24 variables using a 5-point Likert scale, which ranged from 'strongly disagree' to 'strongly agree'. Firstly, the internal consistency of the items was checked using Cronbach's alpha. The Cronbach's alpha value came to 0.910 for the entire scale of 24 items which was considered to be excellent, as the closer the reliability coefficient gets to the value of 1 the better is the reliability of the measures (Cronbach, 1951). Moreover, deletion of any item could not significantly improve the reliability results. Next, the Bartlett's test of sphericity (Bartlett, 1954) was found to be significant (Chi-Square 3944.859, p-value < 0.0001). The Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was high at 0.885. The KMO value of 0.885 was excellent since it exceeded the recommended value of 0.6 (Kaiser, 1974). The two results of (KMO and Bartlett's) suggested that the data was appropriate to proceed with the factor analysis using all the 24 items of the scale (Malhotra, 2010). The principal component analysis with varimax rotation was used as the basic idea was to identify the factors, thereby narrowing the scope and computing factor loadings for the same.

Exploratory factor analysis (EFA) was performed and it was found that all the items carried an eigenvalue of more than 1. Hence, all the factors were retained as they were considered significant to the study. The result was that there were a total of 5 factors, which explained 66.32 % of the total variance. Moreover, factor reliability tests which state whether all items in a particular factor are internally consistent and will consistently load on the same factor, were conducted. These are represented by the Cronbach's alpha value for each factor in Table 2. The table gives the rotated component matrix dimensions along with the Cronbach's alpha value for better understanding of the factors.

Factor 1 has an eigenvalue of 8.861 and has ten variables clubbed under it. The reliability of the variables that constitute the factor is 0.913 (Cronbach's alpha). This can be labelled as "unawareness", as these ten variables revealed the unawareness of consumers towards m-commerce. This included the individual's unawareness towards m-commerce applications and their pricing schemes, lack of knowledge of mobile service provider, demands for conventional business transactions and thus exhibiting resistance towards change, and lack of knowledge of the manufacturer as well as Internet

Table 2: Factors Hindering M-commerce

	1	2	3	4	5	Reliability	Mean Value
Factor 1: Unawareness							
I lack knowledge of the pricing scheme of M-commerce	.841					0.913	2.59
I am unaware of existing M-commerce applications	.805						
I am unaware of my mobile capabilities	.767						
My mobile service provider does not support M-commerce application	.733						
Manufacturer doesn't develop apps for my mobile	.641						
Internet vendor do not offer mobile transaction services	.599						
I prefer face-to-face interaction while purchasing	.591						
I am used to the physical form of payment	.568						
My mobile carrier doesn't provide other services	.540						
Lack of telecom standards hinders acceptance	.540						
Factor 2: Mobile Device Inoperability							
Roaming capabilities hinders acceptance of M-commerce		.820				0.796	2.69
Interoperability of different sender hinders the acceptance		.814					
Reliability of mobile carriers hinders acceptance		.607					

My mobile can be customized to reflect M-commerce activities		.581					
Factor 3: Personalization							
I am able to customize my M-commerce activities			.816			0.761	2.94
I need to personalize my M-commerce activities			.791				
I prefer to purchase via my computer			.758				
I prefer electronic form of payment			.610				
Factor 4: Time Consumption/ Confusion							
Using my computer than mobile to purchase is faster				.737		0.762	2.63
Functions of my mobile hinders acceptance of M-commerce				.599			
My mobile is cumbersome for M-commerce activities				.592			
I am impatient with M-commerce				.524			
Factor 5: Cost							
It is costly to add M-commerce in subscription plan					.717	0.652	3.08
It is too time consuming to perform M-commerce activities					.631		

Source: Primary data collected through questionnaire.

vendor. The items received a mean score of 2.59 on a scale of 1 to 5 where majority agreed that unawareness towards m-commerce is an important reason hindering m-commerce adoption. Consumers often perceive m-commerce as surfing the Internet, checking sports, or viewing weather information. Some may be aware of m-commerce applications but do not know how to install them on their devices. Mahatankoon and Vila-Ruiz (2007)

have also cited this as an influential factor; and this result coincides with prior research. In addition to that, m-commerce marketing relies on word-of-mouth and other intricate social factors. For example, a consumer will utilize mobile applications if his/her friends are active mobile users (Lu, Yu, Liu & Yao, 2003; and Kleijnen & Wetzels, 2004).

Factor 2 has an eigenvalue of 2.899 and has four variables clubbed under it. The reliability of the variables that constitute the factor is 0.796 (Cronbach's alpha). This can be labelled as "mobile-phone inoperability", as these four variables included poor reliability of mobile carriers, inability of mobile phones to customize and poor roaming capabilities. The items received a mean score of 2.69 on a scale of 1 to 5 where majority indicated the inefficiency of mobile phones as the reason for not adopting m-commerce. Carlsson and Walden (2002) also stated the slow speed of service and the limited screen size of mobile devices as the main hindrance for adoption of m-commerce expansion. The difficulties because of limitations of mobile devices diminish the potential uses of mobile commerce. It is evident that m-commerce would not be able to fulfil its potential without widespread proliferation of wireless devices and related applications.

Factor 3 has an eigenvalue of 1.983 and has four variables clubbed under it. The reliability of the variables that constitute the factor is 0.761 (Cronbach's alpha). This can be labelled as "personalization", as these four variables comprise the inability to customize m-commerce activities, and the preference towards e-commerce. The items received a mean score of 2.94 on a scale of 1 to 5 where majority had a neutral opinion towards customization. Langendoerfer (2002) revealed that psychological factors mainly related to privacy issues are responsible for the lack of advocacy for m-commerce rather than technological issues. Mahatankoon and Vila-Ruiz (2007) also stated that electronic commerce customers may decide to buy products from a trusted vendor just by looking at its reliability and reviews, but for m-commerce consumers, this functionality still remains a challenge. M-commerce services must be personalized and tailored to each consumer based on his/her profile, location and need. These operations range from customized ring-tone recommendations to location-based services (Ho & Kwok, 2003). One of the reasons for preferring e-commerce in comparison to m-commerce is security. Mobile phones are more likely to be stolen compared to computers and laptops. So, it is quite important for the companies to ensure that the security of the customers are not compromised in such cases. Often the customers face trouble while losing their mobile

phones (Varshney, 2004). Examining barriers to adoption, Khodawandi, Pousttchi and Wiedemann (2003) indicate that the lack of perceived security (defined as subjective security) is the most frequent reason for a refusal. Rogger and Celia (2004) found similar results.

Factor 4 has an eigenvalue of 1.115 and has four variables clubbed under it. The reliability of the variables that constitute the factor is 0.762 (Cronbach's alpha). This can be labelled as "time consuming / confusion," as these four variables comprise speed-related issues leading to impatience amongst customers and computer purchases being faster than mobile purchases. The items received a mean score of 2.63 on a scale of 1 to 5 where majority agreed that speed is an important determinant hindering the spread of m-commerce. It is found that mobile phones are slower in terms of speed as compared to computers. Optimization of m-commerce application would result into customer satisfaction. Upkar (2002) reveals that companies using m-commerce need to remove several images that might be vital for the applications. He further states that companies should not include some attractive flash, scripts or plug-ins in their m-commerce websites or apps.

Factor 5 has an eigenvalue of 1.059 and has two variables clubbed under it. The reliability of the variables that constitute the factor is 0.652 (Cronbach's alpha). This can be labelled as "cost", as these variables include the opportunity cost of opting for m-commerce. The items received a mean score of 3.08 on a scale of 1 to 5 where majority cited cost as the most important reason hindering m-commerce adoption. Similarly, some studies revealed that high subscription fees are a critical barrier to m-commerce success (Samtani, Leow, Lim & Goh, 2003).

7. Hypothesis

The study tested the following hypothesis:

Ho: There is no significant relationship between factors hindering m-commerce and the demographics

H1: There is significant relationship between factors hindering m-commerce and the demographics

One-way ANOVA (analysis of variance)/ independent sample t-test is used to test the hypothesis. On a variable of interest, ANOVA tests the significance

of differences between two or more groups, while t-test looks at differences between two groups. Of the independent variables relating to demographics, gender contains only two groups while the other variables like age, educational qualification, occupation and monthly income consist of more than two categories. Hence, t-test is applied for gender while ANOVA is used for the remaining variables. Data is normally distributed and homogeneity of variance is checked using Levene's statistic which can be seen in Table 3. Post-hoc tests (Tuckey/Games Howell) are also carried out to further analyze the data wherever a significant relationship is established.

Table 3: Relationship of Factors with Demographics

		Age	Gender	Educational Qualification	Occup-ation	Monthly Income
Unawareness	Levene statistic (Sig)[3]	0.398	0.365	0.002	0.708	0.428
	Anova/Welch / t-statistic[4]	4.334	0.496	10.071	2.112	0.875
	Significance[5]	0.014	0.620	0.000	0.099	0.350
Mobile-device Inoperability	Levene statistic (Sig)	0.074	0.094	0.170	0.066	0.669
	Anova/Welch/ t-statistic	1.740	1.539	2.371	0.889	0.362
	Significance	0.177	0.125	0.095	0.447	0.548
	Levene statistic (Sig)	0.027	1.570	0.712	0.077	0.950

[3] Levene's test is used for determining the homogeneity of variances. In the given table, the significance value of Levene's test is shown. If this significance value is less than 0.05, the null hypothesis of equal variances is rejected.

[4] ANOVA test indicates whether there is an overall difference between the groups. However, it can only be used if the data meets the assumption of homogeneity of variance (as indicated by Levene's test). If the data does not satisfy the assumption of homogeneity of variance, Welch F-test is run to identify the overall difference between the groups. The t-test is also used to find the difference between the groups, when the groups are limited to two. In this case for "gender", t-test is run as groups are only two. If the groups exceed two, then ANOVA is used. The statistics in this row relate to ANOVA or Welch F or t-test as applicable under the given constraints.

[5] The significance value given in this row is used to accept or reject the null hypothesis tested using ANOVA or Welch or t-test.

Personal-ization	Anova/Welch/t-statistic	2.744	1.364	4.226	6.669	0.265
	Significance	0.073	0.174	0.016	0.000	0.607
Time Consumption/ Confusion	Levene statistic (Sig)	0.064	0.184	0.169	0.581	0.678
	Anova/Welch/t-statistic	3.330	0.818	2.280	1.532	0.857
	Significance	0.037	0.414	0.104	0.206	0.355
Cost	Levene statistic (Sig)	0.353	0.005	0.720	0.544	0.549
	Anova/Welch/t-statistic	0.784	0.942	2.017	1.848	3.038
	Significance	0.457	0.494	0.135	0.139	0.082

Source: Primary data collected through questionnaire.

Unawareness Vs Age

There is a statistically significant difference between groups as determined by the one-way ANOVA (F (2,293) = 4.334, p = 0.014). The null hypothesis can be rejected here. A Tuckey post-hoc test revealed that unawareness is statistically higher for respondents above 35 years bracket (3.09 ± .569, p = .010) than for respondents in 20-35 years bracket (2.58 ± .725). For other age categories there are no statistically significant differences. It can be concluded that for the given data there is a relationship between unawareness and age. Thus, unawareness may yield to rejection of m-commerce more in the younger generation (20-35 years).

Unawareness Vs Educational Qualification

The assumption of homogeneity of variance is violated and therefore, the Welch F-ratio is reported. There is a statistically significant difference between groups as determined by Welch (F (2, 130.812) = 10.071, p = .000). Hence the null hypothesis can be rejected here. The Games-Howell post-hoc test does not rely on homogeneity of variance and so this was chosen. This test revealed that unawareness is statistically higher for undergraduate participants (3.03 ±.775, p = .000) than for graduates (2.47 ± .600). Also the test revealed that unawareness is statistically higher for undergraduate participants (3.03 ±.775, p = .003) than for post graduates (2.61 ± .737). It

can be concluded that for the given data there is a relationship between unawareness and educational qualification. It can be stated that graduates and post-graduates believe that lack of knowledge can be the critical factor hindering m-commerce adoption.

Personalization Vs Educational Qualification

There is a statistically significant difference between groups as determined by one-way ANOVA ($F(2,293) = 4.226$, $p = 0.016$). The null hypothesis can be rejected here. A Tuckey post-hoc test exhibited that personalization is statistically lower for undergraduates ($2.68 \pm .700$, $p = .020$) than for graduates ($3.00 \pm .640$). Also the test showed that personalization is statistically lower for undergraduates ($2.68 \pm .700$, $p = .023$) than for post graduates ($2.98 \pm .733$). It can be concluded that for the given data there is a relationship between personalization and educational qualification. It can be inferred that graduates and post-graduates may not opt for m-commerce if it is not tailored as per their requirements.

Personalization Vs Occupation

There is a statistically significant difference between groups as determined by one-way ANOVA ($F(2,293) = 6.669$, $p = 0.000$). The null hypothesis can be rejected here. A Tuckey post-hoc test exhibited that personalization is statistically higher for students ($3.12 \pm .651$, $p = .008$) than for people in service ($2.80 \pm .727$). For other occupation categories, there are no statistically significant differences. It can be concluded that for the given data there is a relationship between personalization and occupational background. It can be inferred that students require customized mobile applications, and if not provided, that can be a reason for minimizing m-commerce transactions.

Time Consumption /Confusion Vs Age

There is a statistically significant difference between groups as determined by one-way ANOVA ($F(2,293) = 3.330$, $p = 0.037$). The null hypothesis can be rejected here. A Tuckey post-hoc test exhibited that time consumption/ confusion is higher for respondents above the age of 35 years ($2.98 \pm .494$, $p = .043$) than for respondents below the age of 20 years ($2.53 \pm .584$). For other age categories there are no statistically significant differences. It can be concluded that for the given data there is a relationship between time consumption/confusion and age. It can be inferred that older consumers may reject the use of m-commerce if found time consuming and confusing.

8. Limitations and Future Scope

Every study is prone to certain limitations owing to time and monetary constraints. The present study is restricted in its geographical scope as it has been carried out in the Ahmedabad district of the State of Gujarat. If carried out nationwide, with a larger sample size, the accuracy of findings can be improved and the findings can be generalized to a greater extent. Also, it would facilitate comparison of results pertaining to different geographical regions, so that area specific strategies could also be developed. Different paradigms of research methodology can be used to study the factors which discourage the customers from adopting m-commerce. In the present study, exploratory factor analysis has been conducted to identify the factors which can hinder the adoption of m-commerce. This study can be extended with the help of confirmatory factor analysis and structured equation modelling to further validate the factors which have come out of this research and design a model based on the same.

9. Conclusion

The advent of technology and proliferation of electronic gadgets have significantly impacted the business world. Communication has experienced radical shift from the age of telephone to mobile phones and phablets. Likewise, commercial transactions which took place on physical platforms are now done online using electronic devices like computers and laptops, and the trend is turning towards usage of smartphones and i-pads. Hence, it becomes pertinent to study how customers view the usage of e-commerce and m-commerce facilities. Similarly, it becomes equally important to study the factors which have the potential to hinder the growth of e-commerce and m-commerce. The present study focuses on the same.

Based on data collection and analysis, it is found that five factors, namely, unawareness, mobile-device inoperability, personalization, consumption/ confusion, and cost hinder the adoption of m-commerce. Lack of knowledge related to m-commerce pricing, applications and supporting infrastructure could act as a huge deterrent. Similarly, incapacity of mobile phones, issues related to speed and cost could also pose as obstacles in the development of m-commerce. To improve the spread of m-commerce, people will need to be made more aware about the usage and plans of m-commerce. Some retailers have already started providing incentives and other offers for promoting the usage of online transactions. Simultaneously, the make of mobile phones will also need to be revamped, such that these transactions can be carried

out easily and in a cost-effective manner. Later on, the scope of adding customized features can also be considered for improving the usage of m-commerce.

Additionally, it is found that there is a relationship between unawareness and age, unawareness and educational qualification, personalization and educational qualification, personalization and occupation and time consumption/confusion and age. The younger generation agrees to unawareness being a hindrance, while the comparative elder lot believe that time consumption may pose as an issue in m-commerce development. Also, graduates and post–graduates believe that lack of knowledge can be the critical factor hindering m-commerce adoption and they would also like m-commerce to be more personalized in approach. These factors can be kept in mind while promoting m-commerce to a particular target audience.

References

Alkhunaizan, A., & Love, S. (2013). Effect of demography on mobile commerce frequency of actual use in Saudi Arabia. *Advances in information systems and technologies,* pp. 125-131, Springer.

Anckar, B. , & D'Incau, D. (2002). Value creation in mobile commerce: Findings from a consumer survey. *Journal of Information Technology Theory and Application (JITTA)*, *4*(1), Article 8.

Article (May 29, 2014). *Mobile commerce services are struggling in India.* Retrieved from http://mobile-financial.com/news/mobile-commerce-services-are-struggling-india

Barlett, M.S. (1954). A note on multiplying the factors for various chi-square approximations. *Journal of the Royal Statistical Society, 16* (Series B): 296-298.

Barnes, S.J., & Scornavacca, E., (2004). Mobile marketing: The role of permission and acceptance. *International Journal of Mobile Communication*, *2* (2),128-139

Batra, S., & Juneja, N. (2013). M-commerce in India: Emerging issues. *International Journal of Advanced Research in IT and Engineering*.

Bhatt, S., & Bhatt, A. (2014). M-commerce and its influence on consumer's perceptions. *SAJOSPS-South Asian Journal for Political Studies, 15* (1), 84-88.

Bhatti, T. (2007). Exploring factors influencing the adoption of mobile commerce. *Journal of Internet Banking and Commerce*, *12* (3)

Business World Article (2014). *From e-commerce to m-commerce on the move.* Retrieved from http://www.businessworld.in/news/economy/from-e-to-m-%E2%80%93-commerce-on-the-move/1673988/page-1.html.

Carlsson, C., & Walden, P. (2002). Mobile commerce: Some extensions of core concepts and key issues. *Proceedings of the SSGRR 2002 Conference,* L'Aquila, Italy, July 29 - August 4, 2002.

Chae, M. & Kim, J. (2003). What's so different about the mobile Internet? *Communications of the ACM, 46* (12), pp. 240-247.

Chaffey, D. (2009). E-business and E-commerce management: Strategy, implementation and practice (4th ed.).

Chiu, W. (2001). Web site personalization. *Websphere Documentation* (IBM white paper). Retrieved from http://www.ibm.com.

Chronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 22*(3), pp. 297-334.

Dai, H. & Palvia, P. (2008). Factors affecting mobile commerce adoption: A cross-cultural study in China and the United States. *The Data Base for Advances in Information Systems*, *40*(4), pp. 43-61.

Dholakia, N., Dholakia, R.R., Lehrer, M., & Kshetri, N., (2004). Global heterogeneity in the emerging m-commerce landscape, *University of Rhode Island*, Kingston, RI.

Ding, M.S., & Hampe, J.F. (2003). Reconsidering the challenges of m payments: A roadmap to plotting the potential of the future m-commerce market. In *Proceedings of the 16th Bled Electronic Commerce Conference,* 873-884, Slovenia, Bled.

Economic Times Article (Dec 1, 2014). *M-Commerce to contribute upto 70% of online shopping: Experts.* Retrieved from http://articles.economictimes.indiatimes.com/2014-12-01/news/56614582_1_mobile-internet-users-m-commerce-cent.

Economic Times Article (Feb 20, 2014). *Mobiles increasingly affecting purchasing decisions: InMobi.* Retrieved from http://articles.economictimes.indiatimes.com/2014-02-20/news/47527187_1_inmobi-mobile-devices-digital-goods.

Feng, H., Hoegler, T., & Stucky, W. (2006). Exploring the critical success factors for mobile commerce. Paper presented at the *International Conference on Mobile Business* (ICMB'06), IEEE Computer Society.

Fong, J., & Burton, S. (2008). A cross-cultural comparison of electronic word-of-mouth and country-of-origin effects. *Journal of Business Research, 61* (3), pp. 233-42.

Gitau, L., & Nzuki, D. (2014). Analysis of determinants of m-commerce adoption by online consumers. *International Journal of Business, Humanities and Technology, 4*(3), pp. 88-94.

Gupta, S., & Vyas A. (2014). Benefits and drawbacks of m-commerce in India: A review. *International Journal of Advanced Research in Computer and Communication Engineering, 3*(4), pp. 6327-6329.

Herb, B. (2001). Let your cell phone do the e-shopping, *eWeek, 18* (2), pp. 1-2.

Ho, S. Y., & Kwok, S. H. (2003). The attraction of personalized service for users in mobile commerce: An empirical study. *ACM SlGecom Exchanges*, *3* (4), pp. 10-18.

Impact of m-commerce on overall Indian information technology: Essay (n.d.). Retrieved from http://www.uniassignment.com/essay-samples/information-technology/impact-of-mcommerce-on-overall-indian-information-technology-essay.php.

Indian Retailer Article (2014). *How m-commerce will fare in 2015?* Retrieved from http://www.indianretailer.com/article/multi-channel/mobile-commerce/How-m-commerce-will-fare-in-2015-2702.

Jaradat, M.R.M., & Rababaa, M.S. (2013). Assessing key factor that influence on the acceptance of mobile commerce based on modified UTAUT. *International Journal of Business and Management, 8*(23), pp. 102-112.

Kaiser, H.F. (1974). An index of factorial simplicity. *Psychometrica, 39*, pp. 31-36.

Khodawandi, D., Pousttchi, K., & Wiedemann, D.G. (2003). Akzeptanz mobiler bezahlverfahren in Deutschland. In *Proceedings of the 3rd Workshop on Mobile Commerce* (pousttchi, K. and Turowski, K. Eds.), pp. 42-57, Augsburg, Germany.

Kini, R. B. (2009). Adoption and evaluation of mobile commerce in Chile. *The Electronic Journal Information Systems Evaluation, 12*(1), pp. 75 – 88

Kleijnen, M.H.P., M. Wetzels, & K. de Ruyter (2004). Consumer acceptance of wireless finance., *Journal of Financial Services Marketing*, *8* (3), pp. 206-217

Kotler, P (2000). *Marketing management*. The Millennium Edition, Upper Saddle River, Prentice Hall.

Langendoerfer, P. (2002). M-commerce: Why it does not fly (yet?). In *Proceedings of the SSGRR 2002s Conference*, L'Aquila, Italy, July 29 - August 4, 2002.

Lu, J., C. S. Yu, C. Liu, & J. E. Yao (2003). Technology acceptance model for wireless Internet. *Internet Research: Electronic Networking and Applications*, *13* (3), pp. 206-222.

Mahatanankoon, P. & Vila-Ruiz, J. (2007). Why won't consumers adopt m-commerce? An exploratory study. *Joumal of Intemet Commerce*, *6*(4)

Malhotra, N. (2010). *Marketing research: An applied orientation*, Pearson Education, New Delhi.

Martin, S.S. (2012). Factors determining firms' perceived performance of mobile commerce. *Industrial Management & Data Systems, 112*(6), pp. 946-963.

Massoud, S.L., & Gupta O. (2003). Consumer perception and attitude toward mobile communication. *International Journal of Mobile Communication,* Vol. 1, No.4, pp. 390-408.

M-Commerce definition (n.d.). Retrieved from http://www.investopedia.com/

M-Commerce definition (n.d.). Retrieved from http://www.oxforddictionaries.com

Milne, G. R. & Rohm A. J. (2003). The 411 on mobile privacy. *Marketing of Information Technology and Decision Making, 2*(2), pp. 313-332.

Mishra S. (2014). Adoption of m-commerce in India: Applying theory of planned Behaviour model. *Journal of Internet Banking and Commerce, 19*(1), pp. 1-17.

Park, J., Yang, S., & Lehto, X. (2007). Adoption and usage of mobile technologies for Chinese consumers. *Journal of Electronic Commerce Research, 31*(3), pp. 196–206.

Qingfei, M., Shaobo, J., & Gang, Q. (2008). Mobile commerce user acceptance study in China: A revised UTAUT model'. *Tsinghua Science and Technology, 13*(3), pp. 257-264.

Rackspace Survey (2014). *Survey on Mobile Commerce Users*. Retrieved from http:www.rackspace.com/cn/...releases/asia-mobile-commerce-survey-result

Rahman, M. (2013). Barriers to m-commerce adoption in developing countries – A qualitative study among the stakeholders of Bangladesh. *The International Technology Management Review,* 3(2), pp. 80-91.

Rogger, A.J., & Celia, I. (2004). Akzeptanz des Kaufens und Bezahlens mit dem Mobiltelefon. In *Proceedings of the 4th Workshop on Mobile Commerce* (Pousttchi, K. and Turowski, K. Eds.), pp. 79-85, Augsburg, Germany.

Rossi, B. (Oct 24, 2014). *Why do retailers still not see mobile commerce as a priority?* Retrieved from http://mobile-financial.com/news/why-do-retailers-still-not-see-mobile-commerce-priority.

Rottenberg, C. & Sisi, L. (2002).The mobil speedpass and mobile commerce. *MURJ, 7*, p. 33.

Sadeh, N. (2002). *M-commerce: technologies, services, and business models*, New York: John Wiley & Sons.

Samtani, A., Leow, T.T., Lim, H.J., & Goh P. G. J. (2003). Overcoming the barriers of successful m-commerce in Singapore. *International Journal of Mobile Communication 1*(1/2), pp. 194-231.

Sharma, D. (2009). Government policies & regulations: Impact on mobile commerce in Indian context. *Indian Broadcasting (Engineering) Services*, Government of India.

Singh, S. (Oct 21, 2014). *Mobile-Commerce comes of age in India.* Retrieved from http://timesofindia.indiatimes.com/tech/tech-news/Mobile-commerce-comes-of-age-in-India/articleshow/44898756.cms.

Srivastava, L. (2005). Mobile phones and the evolution of social behavior. *Behaviour and Information Technology, 24* (2), pp. 111-129.

Tandon, R., Mandal, S., & Saha, D. (2003). M-commerce – Issues and challenges. www.hipc.org/hipc2003/HiPC03Posters/m-commerce.pdf.

TechNavio Report (2012). *Mobile commerce market in India 2012-2016*. Retrieved from http://www.technavio.com/report/mobile-commerce-market-india-2012-2016.

Thakur, R., & Srivastava, M. (2013). Customer usage intention of mobile commerce in India: An empirical study. *Journal of Indian Business Research, 5*(1), pp. 52–72. http://dx.doi.org/10.1108/17554191311303385.

Upkar, V. (2002). M-commerce: Framework, applications and networking support, Kluwer Academic Publishers Hingham, MA, USA, Volume 7, *SSGRR 2002s Conference,* L'Aquila, Italy, July 29 - August 4, 2002.

Varshney, U. (2004). Using wireless networks for enhanced monitoring of patients. *Tenth America's Conference on Information Systems,* New York.

Varshney, U., & Vetter, R. (2002). Mobile commerce: Framework, applications and networking support. *Mobile Networks and Applications,* 7(3), pp. 185-198.

Vrechopoulos, A.P., Constantiou, I.D., Sideris, I., Doukidis, G.I., & Mylonopoulos, N. (2003). The critical role of consumer behavior research in mobile commerce. *International Journal of Mobile Communications*, *1*(3), pp. 329-340.

Wen, J. H., & Mahatanankoon, P. (2004). M-commerce operation modes and applications. *International Journal of Electronic Business*, *2*(3), pp. 301-315.

Wu, J. H., & Wang, S.C. (2005) What drives mobile commerce? An empirical evaluation of the revised technology acceptance model. *Information and Management, 42*, 719-729.

Yeo, J., & W. Huang (2003). Mobile e-commerce outlook. *International Journal of Information Technology and Decision Making*, *2*(2), pp. 313-332.