Exploring Factors Affecting Mobile Services Adoption by Young Consumers in Cameroon

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Abstract. With the advancement of mobile devices and sophisticated mobile data transmission technologies nurtured by telecommunication providers of 4G services, m-commerce has become an important platform for easier consumer interactions. It's in this light that researchers have been paying much attention to how businesses, can reach specific consumer segments such as teens and young adults. This research aims to investigate factors predicting the consumer's intention to adopt m-commerce in Cameroon, but also the moderating effects of demographic variables on such prediction. Data were collected from 262 Cameroonian respondents aged less than 45, as the category of unconditional IT users in Cameroon. A quantitative approach based on the PLS-SEM algorithm was used. Results showed no significant moderating effect of age and gender for the hypothesis: Behavioural intention positively influences consumer intention to adopt m-commerce. Findings are expected to help companies dealing with m-commerce to better formulate marketing strategies to attract more users.

Keywords: m-commerce · Consumer intention · Demographic variables
UTAUT · TAM · Factors of adoption · Cameroon

1 Introduction

Mobile phone has dominated the lifestyle of consumers worldwide, especially the youngsters. According to Emarketer, mobile phone penetration rate will rate from 61.1% in 2013 to 69.4% in 2017 [1]. Cameroon is not on the side-lines of this impressive progression. Statistics on the development of ITs in the country confirm this trend. In fact, the Cameroon's population is estimated at some 23 924 407 inhabitants in 2016 [2]; the number of mobile telephony users is estimated at 16 331 852 (2016), for a penetration rate of 68.267%. Moreover, a study carried out by Internet Lives (2016) shows that the country totals about 4.3 million Internet users, for a penetration rate estimated at 18%. This rate seems very much higher than the statistics of 2011 where the number of internet users was estimated at only 1.055 million, with a penetration rate of 5% [3]. Therefore, m-commerce in a great opportunity for companies in Cameroon, especially in a global world where local enterprises are directly in competition with local and foreign

competitors, m-commerce appears to be an essential instrument to get a competitive advantage.

Numerous authors have proposed definitions of mobile commerce [4]: Yang defines m-commerce as transactions conducted through a variety of mobile media via a wireless telecommunication network in a wireless environment [5]. Feng et al. mean that m-commerce is more than an extension of e-commerce because of its affordance (value chain, usage models and interaction styles, etc.,) which enables operators and users to provide a new business model with features such as mobility and accessibility [6]. Tarasewich defines it as any activity related to a (potential) commercial transaction, carried out through connection to communication networks with wireless (or mobile) devices [7]. A more elaborate definition of m-commerce comes from Tiwari and Buse; they consider m-commerce as any transaction involving transfer of ownership or rights to use goods and services, through the use of mobile access to computerized networks by means of electronic devices such as a personal digital assistant (PDA) or a smartphone [8]. They continue by presenting m-commerce as an m-business and believe that m-commerce should not be limited to transactions of monetary value, as this would mean neglecting other m-commerce activities such as after-sales services and the sending of games or free music to users [8]. Tiwari and Buse also add that m-commerce does not necessarily need to operate through a wireless telecommunication network [8]. Due to its holistic characteristic which encompasses the previous definitions, we adopt the one by Chong: *"any transaction involving the transfer of ownership or rights to use goods and services which is initiated and/use of mobile access to computerized networks with the help of mobile support"* [9].

The present study contributes to the growing literature on mobile commerce by focusing on Cameroonian young consumers. The objective is to determine the factors that influence the adoption of m-commerce in Cameroon. To achieve this objective, we are going to answer the two following research questions: (1) what are the key determinants of m-commerce in Cameroon? (2) What are the moderating effects of age and gender on m-commerce adoption? To address this objective, a model has been developed drawing on theories and models such as the Technology Acceptance Model (TAM) [10], the Innovation Diffusion Theory (DOI) [11], the Theory of Reasoned Action [12], the Theory of Planned Behaviour [13], the Unified Theory of adoption and Use of Technologies (UTAUT) [14], and the dimensions of the national culture [15], Four major constructs were obtained: perceived ease of use, perceived usefulness, behavioral intention, and uncertainty avoidance. Trust was then added. Finally, age and gender were used to moderate the effect of previous constructs on the intention to adopt m-commerce. The remainder of this paper is structured as follows: the theoretical background aiming to define the research model is presented, followed by the methodology that is being adopted, and finally, data analysis is explained and the results are discussed, together with some limitations to the research.

2   Theoretical Background

The analysis on the consumer's intention to adopt the technology has been conducted via various technology acceptance theories and models such as the technology acceptance model (TAM) [10], the innovation diffusion theory (DOI) [11], the theory of planned behaviour [13], the theory of reasoned action [12], and the unified theory of adoption and use of technologies (UTAUT) [14]. We have also explored Hofstede's cultural dimensions. Then from these studies, we define the structural model used for this research made of five constructs: uncertainty avoidance (UA), perceived ease of use (PEOU), perceived usefulness (PU), trust (T), and behavioural intention (BI). Their aim was to explain the consumer's intention to adopt mobile commerce (CIA).

2.1   Uncertainty Avoidance (UA)

Uncertainty avoidance is the degree to which people in a culture feel uncomfortable with uncertainty and ambiguity. It is the degree to which a society, an organization or a group relies on social norms, rules and procedures to mitigate the unpredictability of future events [16]. Thus, in a culture with a high uncertainty avoidance score, trust plays a very important role in the use of new technologies [17, 18]. For people with a high score of uncertainty avoidance, m-commerce companies will need to provide a high degree of confidence in order to alleviate feelings of discomfort with uncertainty and ambiguity. In addition, in a culture with a high score of uncertainty avoidance, users prefer technologies offering specific, highly structured features [19, 20]. However, mobile commerce services are generally well defined and structured in predefined menus. In consequence, they are perceived as easy to use by people with a high score of discomfort, uncertainty and ambiguity. Furthermore, in a culture with a high score of uncertainty avoidance, highly structured services that reduce uncertainty will be seen as interesting. The available m-commerce platforms provide to their customers this type of structuration in the menu of provided services. The ability of the user to perform m-commerce operations at any time gives assurance and reduces anxiety. Therefore, we hypothesize that:

Hypothesis 1: Uncertainty avoidance influences perceived usefulness.
Hypothesis 2: Uncertainty avoidance influences perceived ease of use.
Hypothesis 3: Uncertainty avoidance influences trust.

2.2   Perceived Ease of Use (PEOU)

Perceived ease of use can be defined as the degree to which a person believes that the use of a particular system would be done with less effort [21]. It should be noted that despite a high penetration rate of mobile telephony in developing countries, mobile services such as m-commerce remain new to consumers; and their distribution could be slow, especially for inexperienced users. Therefore, the perceived ease of use should be considered as an important factor in adoption. The literature presents numerous studies related to the effects of perceived ease of use in the adoption of 3G mobile services [22, 23], m-banking [24, 25],

e-marketing [26], mobile health services [27] and mobile commerce [9, 28–30]. Many of these studies show that the perceived ease of use has a significant and positive influence on both behavioral intention and perceived usefulness. Therefore, we hypothesize that:

Hypothesis 4: Perceived ease of use positively influences perceived usefulness.
Hypothesis 6: Perceived ease of use positively influences behavioral intention.

2.3 Perceived Usefulness (PU)

Perceived usefulness is one of the most used variables of the original version of TAM. It is generally considered to be the degree to which an individual believes that the use of a particular system could improve one's performance at work [21]. In the field of mobile commerce, Wei et al. define it as the degree to which a consumer thinks that using m-commerce will improve his performance at work and his daily activities [31]. Jeyaraj et al. indicate that perceived usefulness, which is the perception of a value from the potential use of a technology, is the most studied and the most effective variable in the adoption of technologies [32]. Indeed, it generally has a very strong influence on the adoption of new technologies [21]. Therefore, we set forth the following hypothesis:

Hypothesis 5: Perceived usefulness positively influences behavioral intention.

2.4 Trust (T)

Trust can be defined as the degree to which an individual believes that the use of m-commerce is secure and has no threats to the protection of privacy [31]. In a context where mobile commerce is in its initial phase of integration into the habits of consumers in developing countries, many of them are not yet familiar with the various aspects and characteristics of this mobile service. This creates naturally narrows the prospects for trust, privacy and security in relation to these platforms. Thus, consumer confidence becomes one of the most important factors in the analysis of consumer behavior [31, 33]. Therefore, the following hypothesis is formulated:

Hypothesis 7: Trust positively influences behavioral intention.

2.5 Behavioral Intention (BI)

Behavioral intention can be defined as the strength of one's intention to perform a specific behaviour [34]. It's the measure of the likelihood that a person will adopt the application, whereas the TAM uses actual data to represent a self-report measure of time or frequency in the adoption of the application [35]. Behavioural intention has a positive direct effect on usage of mobile devices [36]. Therefore, we hypothesize that:

Hypothesis 8: Behavioral intention positively influences the consumer intention to adopt m-commerce.

2.6   Control Variables (Gender, Age)

The effects of Behavioural intention on the consumer intention to adopt m-commerce would be significantly different for each specific group of moderators.

Hypothesis 9: Gender is significantly different for the relationship between the *behavioral intention* and the *consumer intention to adopt m-commerce.*

Hypothesis 10: Age is significantly different for the relationship between the *behavioral intention* and the *consumer intention to adopt m-commerce.*

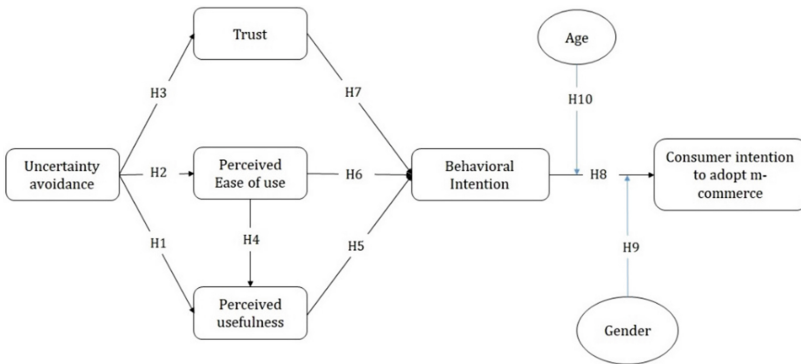Then, we conceptualize the research model below (Fig. 1.).

Fig. 1.   Research model

3   Methodology

The population of this study is every individual living in Yaounde or Douala who uses a smart phone with a Wi-Fi 3G or 4G connection. Data collection was carried in two phases. First, a developed survey questionnaire was used to make a pre-test with 8 young university students (in journalism, management of information system, accounting) and 8 young professionals (education, information system). Second, once this pre-test proved the stability of the research model, the questionnaire was widely administered via an Internet link (google forms) and physically at various Yaounde- and Douala-based universities (University of Yaounde 1, UCAC and University of Douala) and in work-places. We obtained 55 answers online. Concerning the physical questionnaire, we distributed 295 and received 241 of them filled-in, 34 of which were unusable (not completely answered, etc.). Overall, we obtained a total of 262 usable surveys for this study, giving a return rate of 77.06%.

Consistent with previous technology adoption studies, the independent and dependent variables used in this study are derived from the existing literature [37]. A total of 23 items were used to measure the 5 independent variables, and 2 items were used to measure the dependent variable. Besides the demographic profiles (age, gender),

we used a 7-point Likert scale ranging from 1 (strong disagree) to 7 (strongly agree) to measure all items.

We used smartpls-3.2.6 software for the processing and analysis of the data collected. This allowed us to assess the adequacy of the theoretical model and verify its hypotheses.

4   Data Analysis and Results

This section presents the results of our study following a proper processing of data collected in the field.

4.1   Demographic Information

The demographic characteristics of our respondents are shown in Table 1.

Table 1.   Demographic characteristics of respondents

Profile	Description	Frequency	Percentage
Gender	M	140	53.44%
	F	122	46.56%
Age	less than 18 years	7	2.67%
	18–25	187	71.37%
	26–35	64	24.43%
	36–45	4	1.53%
	Over 45 years	0	0

The 262 respondents were composed of 140 men (53.44%). It is a fairly average distribution. Concerning age, the majority of respondents (95.8%) were aged between 18 and 35 years old while 71.37% of respondents had an age range of 18 to 25. The participants' average age was between 18 and 25 (71.37%), which corresponds to the category of mobile services unconditional IT users in the country.

4.2   Demographic Features of Respondents

Measurement Model. The internal reliability, a convergent and discriminant validity are used to assess the measurement model [38]. Hence, for each construct, the internal reliability is measured (Composite reliability-CR and the Cronbach's alpha). The acceptable value of these measures must be greater than 0.70 [38, 39]. The preferred value of the convergent validity, measured by the Average variance extracted (AVE), is greater than 0.50 [38, 40]. Moreover, because they ensure that the items being used match their correspondent constructs and that these constructs are independent, Cross loading and correlations between constructs are also key measures for the convergent validity. Concerning the outer loadings, Hair et al. [38] underlined that further analysis should

be carried out for values between 0.40 and 0.70 and that items below 0.40 should be removed.

The results of the CR, Cronbach's alpha and AVE are shown in Table 2.

Table 2. Constructs reliability and validity

	Cronbach's alpha	rho_A	Composite reliability	Average Variance Extracted (AVE)
Uncertainty avoidance	0.727	0.850	0.843	0.644
Perceived usefulness	0.727	0.727	0.849	0.656
Perceived ease of use	0.759	0.774	0.845	0.577
Trust	0.864	0.867	0.899	0.597
Behavioral intention	0.874	0.875	0.903	0.570
Consumer intention to adopt m-commerce	0.747	0.757	0.887	0.797

Table 2 reveals that the Cronbach's alpha of the constructs range from 0.727 to 0.874 > 0.7 an that the CR value ranges from 0.843 to 0.903 > 0.7. It indicates a strong internal consistency and reliability of the constructs of our research model. As for AVE, their value ranges from 0.570 to 0.797 > 0.5. Based on these findings, we can conclude that the convergent validity is insured.

Table 3 shows the HTMT corresponding values. This ratios allowed to verify correlation between the constructs. To be acceptable, these values should be below the threshold of 0.90 [38]. On the basis of the findings, both the reliability and validity of constructs are guaranteed.

Table 3. Heterotrait-Monotrait Ratio (HTMT)

	Uncertainty avoidance	Perceived ease of use	Perceived usefulness	Trust	Behavioral intention	Consumer intention to adopt m-commerce
Uncertainty avoidance						
Perceived ease of use	0.285					
Perceived usefulness	0.298	0.396				
Trust	0.325	0.192	0.215			
Behavioral intention	0.417	0.584	0.411	0.392		
Consumer intention to adopt m-commerce	0.243	0.365	0.222	0.192	0.688	

Structural Model. The use of bootstrapping method allows us to test the significance of the relationship between the constructs featuring in the model through the

interpretation of the t-statistics, as well as the correlation between these constructs by looking deeply at the values of the path coefficient. The t-Statistics must be greater than 1.96 in order to express some significance. Table 4 summarizes these values.

Table 4. Structural model testing hypothesis using boostrapping

Hypothesis	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	t-statistics (|O/ STDEV|)	p-values
H1: UA -> PU	0.169	0.173	0.063	2.698	0.007
H2: UA -> PEOU	0.228	0.235	0.058	3.959	0.000
H3: UA -> T	0.271	0.279	0.059	4.567	0.000
H4: PEOU -> PU	0.264	0.268	0.059	4.479	0.000
H5: PU -> BI	0.164	0.165	0.052	3.167	0.002
H6: PEOU -> BI	0.403	0.405	0.061	6.590	0.000
H7: T -> BI	0.246	0.249	0.055	4.496	0.000
H8: BI -> CIA	0.558	0.562	0.054	10.257	0.000

Table 4 shows that all the relationships have significant effects on the adoption of m-commerce. Hence, these findings support hypotheses H1, H2, H3, H4, H5, H6, H7 and H8 (Table 5).

Table 5. Hypothesis testing results

Hypothesis	p-values	Test results
H1: UA -> PU	0.007	Accepted
H2: UA -> PEOU	0.000	Accepted
H3: UA -> T	0.000	Accepted
H4: PEOU -> PU	0.000	Accepted
H5: PU -> BI	0.002	Accepted
H6: PEOU -> BI	0.000	Accepted
H7: T -> BI	0.000	Accepted
H8: BI -> CIA	0.000	Accepted

Table 6 shows the values of R^2 and R^2 adjusted of the latent constructs "*Behavioural intention*" and "*Consumer intention to adopt m-commerce*". The variable "*Behavioural intention*" is explained at 33.6% by the variables *"Trust", "Perceived ease of use"* and *"Perceived usefulness"*, but in turn it explains at 31.1% the variance of the variable "*Consumer intention to adopt m-commerce*". In the two cases, $R^2 > 0.25$, which means that our model is quite good and interesting if we refer to Hair et al. [38].

Table 6. R-square and R-square adjusted

Latent constructs	R Square	R Square adjusted
Behavioural intention	**0.336**	0.329
Consumer intention to adopt m-commerce	**0.311**	0.308

Multigroup Analysis (MGA). To assess whether predefined data groups present significant differences for the group-specific model estimations, we used multigroup analysis. For this purpose, we decided to use the PLS-MGA (partial least squares-multigroup analysis) approach. It focuses on the bootstrapping results for each group [41]. The PLS-MGA method [42] represents an extension of Henseler's MGA [41] and an important non-parametric test for the comparison of the group-specific *bootstrapping* PLS-SEM results. The *p*-value is smaller than 0.05 or larger than 0.95 and indicates a significant difference from the probability of 0.05.

Table 7 shows that the two groups of gender are not significantly different as it may appear in the relationships "*Behavioural intention-> Consumer intention to adopt m-commerce*" (*p*-value = 0.308 > 0.05). In addition, paths coefficients' values for each gender group are fairly equal in absolute value (*path coefficient* = 0.591 – R^2 = 0.349 for the female group, and *path coefficient* = 0.534 – R^2 = 0.285 for the male group, as for the relationship "*Behavioural intention-> Consumer intention to adopt m-commerce*"). These values reveal that the female group is sensibly stronger than the male group, which means that female respondents sensibly have more effect on the relationship "*Behavioural intention-> Consumer intention to adopt m-commerce*" than males. For the same gender group, it also appears that these values are greater for the relationship "*Behavioural intention-> Consumer intention to adopt m-commerce*" although their contributions to R^2 are fairly equal.

Table 7. Multigroup analysis of the group "Gender"

	Path coefficients-diff (|Gender(F)-Gender(M)|)	*p*-value (Gender(F) vs Gender(M))
BI -> CIA	0.057	0.308

As for Table 8, the two groups of age are not significantly different for the relationships "*Behavioural intention-> Consumer intention to adopt m-commerce*" (*p*-value = 0.059 > 0.05). In addition, paths coefficients values for each age group are different in absolute value (*path coefficient* = 0.607 – R^2 = 0.368 for the age range 18–25 and *path coefficient* = 0.373 – R^2 = 0.139 for the age bracket 26–35 for the relationship "*Behavioural intention-> Consumer intention to adopt m-commerce*"). These values reveal that the group with the age range 18–25 is sensibly stronger than the one with the age range 26–35. In other words, younger respondents sensibly have more effect on the relationship "*Behavioural intention-> Consumer intention to adopt m-commerce*".

Table 8. Multigroup analysis of the group "Age"

	Path coefficients-diff (|Age(18–25)-Age(26–35)|)	*p*-value (Age(18–25) vs Age(26–35))
BI -> CIA	0.234	0.059

Based on these results, we concluded that the hypotheses H9 and H10 are not supported.

5   Discussions and Limitations

Our study should certainly contribute to enriching the literature on IT adoption research, especially by disseminating relevant experience from a developing country context like Cameroon. In fact, the relevant literature on IT adoption and usage in sub-Saharan African countries is still a little bit poor, whereas gigantic strides are made in developed countries and other regions about the subject. In addition, by proposing a research model integrating variables from TAM and UTAUT and by adding variables such as Trust and Uncertainty avoidance (cultural dimension), we have been able to identify the influence of such variables on the intention to adopt m-commerce, which is an important contribution to the extant literature on m-commerce. Findings can be summarized as follows: (i) Uncertainty avoidance has a positive influence on Trust, Perceived ease of use and Perceived usefulness; (ii) Trust, Perceived ease of use and Perceived usefulness have a positive influence on Behavioural intention, which also strongly influences the consumer's intention to adopt m-commerce: (iii) factors such as age and gender are not significantly different between the relationship "*Behavioural intention-> Consumer intention to adopt m-commerce*".

Out of the factors that can predict the adoption of m-commerce among Cameroonian consumers, our research has revealed that trust, perceived ease of use and perceived usefulness significantly influence behavioural intention, and therefore the consumer intention to adopt m-commerce.

In terms of implications, this study has driven some of them: Firstly, Trust has a positive influence on the behavioural intention to take adoption decision. Therefore, companies dealing with m-commerce should invest to increase the customer's trust about their m-commerce platforms. They should consider developing a secure platform for mobile businesses in order to attract more customers. Secondly, uncertainty avoidance is found to positively influence perceived usefulness and perceived ease of use, both of which strongly influence behavioural intention. In consequence, businesses investing in m-commerce in Cameroon should initiate sensitization campaigns to raise customer confidence and alleviate feelings of discomfort with uncertainty and ambiguity. Thirdly, the results also show that demographic variables of respondents (like age and gender) are not in general good predictors of m-commerce adoption. There was no significant difference between groups of respondents according to age (Age(18-25) vs Age(26-35)) and gender (Gender (F) vs Gender (M)). Finally, this research is also contributing to the literature by providing information of interest about some factors that can influence the adoption of m-commerce in a developing country like Cameroon.

The present study bears some limitations. The first limitation relates to the geographical restriction of the study area to only Douala and Yaounde whereas more other Cameroonian towns (Buea, Bamenda, Maroua, Ngaoundere, or Dschang) could well be involved. This is a setback to be considered the future research attempts. The second one is the absence of a qualitative study of the subject. It could have provided more information in order to have the better understanding of the phenomenon in Cameroon. Lastly, additional adoption factors, such as the variety of services, social influence, innovativeness and compatibility, could also be integrated with the research model, and future works should take all of this in account.

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