Electronic Shopping Behavior in Mobile Commerce Context:
An Empirical Study and a Predictive Model for Developing Countries

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ELECTRONIC SHOPPING BEHAVIOR IN MOBILE COMMERCE CONTEXT: AN EMPIRICAL STUDY

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Abstract:

Today customers are able to shop via the Wireless Internet, using web browser as an e-shopping channel to access retailers’ websites. Although most available studies have theoretically proposed the relationships between different variables and e-shopping behavior, comparatively little research has tested this phenomenon empirically in the m-commerce context. Another key limitation of the existing literature concerns their focus on developed countries, while the worldwide growth of m-commerce has shown the need to extend this research to other unstudied developing countries with different cultures and from different perspectives. Thus, the current paper is one more attempt to fill these gaps in the current body of literature. This study aimed to propose a model for examining and validating empirically the critical factors that have the most significant influence on customer’s behavioral intention to use wireless Internet as an e-shopping channel. In contrast to previous works, the current empirical study extended the research scope by combining the most critical factors identified in literature and applied them in the local context, therefore our model contained variables that have not been integrated into one framework, to examination simultaneously for validation and relationship.

Keywords: E-Commerce, E-Shopping Behavior, E-Stores, M-Commerce, Online Customers, Wireless Internet.

1. INTRODUCTION

The rapid expansion of electronic commerce (e-commerce) with the development of Internet technology advanced many e-business models, among which is the electronic shopping [2, 8, 12, 32, 37 and 39]. Today customers are able to shop via the Internet, using web browser as a shopping channel to access retailers’ websites (e-stores). This new type of shopping mode, coming in different names like Internet shopping, e-shopping, net shopping web-based shopping or online shopping, featuring in free customers from having to personally visit physical stores [22, 25, 36 and 43]. The previous terms of electronic shopping are often used interchangeably in e-commerce literature [1, 21 and 29].

Electronic shopping as a mobile commerce (m-commerce) application is the wireless Internet shopping, based on the convergence of Internet, wireless technology and mobile devices, in which customers can instantly access vendors’ websites via their mobile devices and perform, in comparison to the traditional shopping, a wider range of shopping activities anywhere and anytime, make information about products available and receive up-to-the-minute services, limited only by coverage provided by the mobile networks [3, 10, 23, 29, 39 and 42]. Given that several e-commerce applications are now in the process of being converted into m-commerce applications, e-marketers have increased their investment in mobile internet shopping, as a crucial aspect of marketing strategy, to deliver content, services and promotions to customers, and support online organizations-customer interactions like never before [8, 31, 35, 39 and 42].

Consistent with above, others such as Soopramanien and Robertson [41] recommended that when studying e-shopping behavior, we should bear in mind that the internet as a shopping channel is still competing with the long established in-store channel and that the former has not yet reached the mainstream status that many had predicted. However, m-commerce applications are still at the initial stage and hence require extensive research in various disciplines [23].
Other empirical evidences support this conclusion, for example Zhou et al. [47] pointed out that many users have tried e-shopping but indicated that may stop doing it in future, therefore it is important to identify factors leading customers to use this application.

In summary, today many customers use both physical stores (traditional outlets) and electronic shops (virtual storefronts) when engaging in shopping behavior. Being exposed to the two channels, customer shopping behavior is affected by perceptions of both [43]. Therefore, identifying and examining the factors contribute to customer’s behavior in electronic shopping considered a fundamental requisite for developing this type of m-commerce application [29, 35 and 46].

The current study is carried out from a behavioral oriented perspective taken from relevant literature, and focused particularly on customer’s e-shopping behavior, in contrast to the technology oriented approach, which has been the main topic of m-commerce literature. Here we adopted the concept that described m-commerce as the applications of wireless devices and data connection to conduct transactions, which results in the transfer of value in exchange of information, services or goods (see [23]).

1.1 RESEARCH PROBLEM

Although most available studies have theoretically proposed the relationships between different variables and e-shopping behavior, comparatively little research has tested this phenomenon empirically in the m-commerce area. Another key limitation of the existing literatures concerns their focus on developed countries, with a greater predisposition toward the wireless Internet, while the worldwide growth of M-Commerce has shown the need to extend this research to other unstudied developing countries with different cultures and from different perspectives [2, 17, 38 and 41].

This relatively inadequate coverage poses problems for e-retailers in developing countries because limitations in this area mean difficulties for them to properly plan strategy for attracting and retaining online customers.

It will be worthwhile to mention that our preliminary study, which conducted in the early stages of our research, suggested that mobile Internet shopping still relatively unnoticed by many Egyptian online customers. Thus, the current paper is one more attempt to fill these gaps in the current body of literature, specifically in the developing countries context.

1.2 RESEARCH OBJECTIVES

This paper aimed to develop and extend the research context from electronic shopping in e-commerce to wireless Internet shopping in m-commerce environment through proposing a model to examine and validate empirically the critical factors that affect customer’s behavioral intention to use wireless Internet as a shopping channel and test their actual behavior.

More specifically, the present investigation adds to literature through achieving the following objectives: (1) identify the potential critical factors that have the most significant influence on customers’ behavioural intention to use wireless Internet as an e-shopping channel in m-commerce, (2) determine the relative importance of each of these factors to help e-markers for attracting online customers, (3) develop and validate a mathematical model, that can systematically predict e-shopping customer behaviour in Egypt as an example of developing country based on empirical evidence, (4) test the actual behaviour of customers regarding using mobile e-shopping.

With these objectives in view, the current paper has been structured as follows: the literature and relevant studies were reviewed and analyzed. Then a research model was proposed and hypotheses were formulated to be tested in the study. This was followed by an explanation of the procedures used to obtain empirical data, measurement, and validation processes, as well as the testing of the hypotheses stated. Finally, based on our findings a series of conclusions with managerial implications and final thoughts that emphasize the great interest in the topic under analysis were presented; and then certain limitations and future lines of research with regard to this issue were highlighted.

2. LITERATURE REVIEW

Relevant literature and past available research were extensively reviewed and integrated sequentially, including a wide range of recently
published works, in order to develop more effectively the study’s hypotheses and the research model. This extensive revision, which provided the conceptual foundation for our study, revealed that drivers which affect customer’s intention to shopping over the Internet in m-commerce are not the same as those influencing offline customer in traditional commerce [15, 17, 18, 30 and 37], and addressing the behavioral features of m-commerce or proposing a behavioral model not only allows us to identify which are the relevant explanatory variables, but also determine how they influence e-shopping behavior [9 and 15].

Given the widespread nature of such views, it is perhaps not surprising to find other works that agreed with this contention, for example Weisberg et al. [45] argued that shopping on the Internet has unique features that make it different from the traditional shopping process. Similarly a recent study on customer behavior in e-commerce by Hernandez et al. [17] concluded that the growth of e-commerce applications have made it clear that customer behavior has evolved. Nevertheless, Gounaris et al. [13] and Grant et al. [15] emphasized that it is well recognized though that the Web represents a fundamentally different shopping environment than a traditional shopping channel. As such, classical marketing paradigms, theories, and activities as well as customer attitudes and behaviors need to be re-evaluated in this new context.

Scholars and past researchers identified some factors that have a significant impact on customers’ behavioral Intention to use e-shopping. For example, Kim et al. [24]; Lu et al. [32] and Kim et al. [25] found that perceived trust of e-store positively influences the future e-shopping intention and considered as a critical success factor for conducting e-commerce transactions. Similar findings can be found in other previous works (e.g. [6, 21, 27 and 40]). According to Ho and Oh [19] customers seriously consider the circumstances when making virtual transactions with e-vendors because of the uncertainty and perceived risks existing in the virtual environment.

Consistent with the above, Hong and Cho [21] argued that in e-commerce, perceived trust remains critical factor because consumer face challenge of buying online from an unfamiliar merchant a product or service that they cannot actually see or touch. Thus, Becerra and Korgaonkar [4] recommended online vendors to enhance the perceived trust of their customer to increase online sales. In e-commerce context, perceived trust is defined as a belief the vendors are willing to behave based on an individual’s expectation [16]. Other factors which may have a positive impact on e-shopping behavior are perceived usefulness of m-commerce applications, ease of use of m-commerce of m-commerce applications (usability) and wireless Internet experience [6, 9, 17 and 18].

On the other hand, literature related to online shopping showed that perceived risk is associated with an unwillingness to adopt e-shopping. Therefore, e-shopping intention can be negatively affected by perceived security risk of electronic transaction in e-commerce [2, 20, 26, 33, 34 and 34]. This finding is in agreement with that provided by Cho [7] who found a negative relationship between perceived security risk and customer’s e-purchase behavior, which implies that online customers worry about the security issues regarding the electronic transaction of m-commerce. Perceived risk can be described as the customers feeling of tension or anxiety caused by e-shopping.

Other researchers [28, 45 and 47] attempted to examine the impact of some personal factors such as age, educational level and income on customers’ e-shopping behavior. They concluded that these variables considered important for understanding the future intention to purchase in e-commerce.

In contrast to previous works, the current study extended the research scope by combining the most critical factors identified in literature and developed an empirically-based model including these factors, which have never been integrated into one framework, to examination simultaneously for validation and relationship.

3. THE RESEARCH MODEL AND HYPOTHESES

The preceding discussion of literature as well as the feedback obtained from our preliminary study formed the theoretical foundation of the research model illustrated in figure 1, which incorporated many of the relevant features of m-shopping identified in the literature and applied these to our local context.
As suggested in the relevant literature the research model ([e.g. 6, 14 and 45]) considered e-shopping behavioural intention as a prerequisite for e-shopping actual behaviour. In the context of m-commerce, e-shopping behavioural intention reflects the desire of consumers to make shopping over the wireless Internet, while e-shopping actual behaviour refers to who customer as a wireless Internet shopper behave. In this connection, three types of e-shopping behaviour have been identified: (a) buying (when customers use the wireless Internet to buy online), (b) browsing (when customer uses the wireless Internet for product information searching but buy in-store), (c) Entertainment (when customer uses wireless Internet for enjoyment (see [41]).

The research model suggested, as shown in the previous figure, nine structural links between the construct involved in e-shopping behavior, which representing its hypothesized relationships. These links advanced the following hypotheses to be simultaneously tested:

- **H1**: Customers’ behavioral intention to use wireless Internet as an e-shopping channel is positively influenced by certain factors such as:
  - H1a: Perceived trust of e-store
  - H1b: Perceived usefulness of m-commerce applications
  - H1c: Perceived ease of use of m-commerce applications.
  - H1d: Customer experience with wireless Internet.
  - H1e: Customer educational level.
  - H1f: Customer income.

- **H2**: Customers’ behavioral intention to use wireless Internet as an e-shopping channel is negatively influenced by factors such as:
  - H2a: Perceived security risk of m-commerce transactions.
  - H2b: Customer age.

- **H3**: Customers as e-shoppers use wireless Internet mainly for browsing product information but buy in-store.

Symbolically, the initial multiple regression equation (EQ1) can be presented as follows to predict the customer’s behavioural intention to use wireless Internet as an e-shopping channel (criterion variable), served as regress, given known values from a set of predictor variables, used a regressor.

**EQ1:**

\[ Y_{INT} = a + b_{PTR} PTR + b_{PUS} PUS + b_{PES} PES + b_{WIE} WIE + b_{EDU} EDU + b_{INC} INC - b_{PSR} PSR - b_{AGE} AGE \]

Where:
- PTR = Perceived trust of E-Store
- PUS = Perceived usefulness of mobile commerce application
- PES = Perceived ease of use of mobile commerce application
- WIE = Wireless Internet experience
- EDU = Educational level
- INC = Income
- PSR = Perceived security risk of M-Commerce transactions
- AGE = Age
- YINT = E-Shopping behavioral Intention
- BEH = E-Shopping actual behavior

In order to validate this model a number of validity tests have been applied and relationships among its variables have been empirically examined.

**4. RESEARCH METHODOLOGY**

To test our research model we employed an empirical study. A richer research methodology is used in this study combining quantitative and qualitative methods to validate the research model. Thus, the research process involved multi-stage procedures as follows:

**4.1 PRELIMINARY QUALITATIVE STUDY**

In this stage, a series of in-depth interviews were carried out to enhance our understanding of the nature and essence of the phenomenon under investigation, the issues arising from this stage, were used as a basis for the next quantitative study.
4.2 QUANTITATIVE STUDY

The quantitative stage in the form of personally-administrated questionnaire survey was conducted to collect empirical data from undergraduate, postgraduate and graduate students of the Egyptian government and private universities. The underlying assumption for sampling higher education students is that they considered appropriate candidates for the investigation of e-shopping due to their basic computer skills and activity in using mobile applications, which form the necessary technology infrastructure to conduct e-shopping in m-commerce environment (e.g. [5, 6, 32 and 35]). Simple random sampling was carried out in order to gain as many representative samples as possible. To increase generalizations of the results the respondents were spread across five universities located in four different Egyptian major cities.

4.4 INSTRUMENT AND VALIDITY

To develop our instrument a number of prior relevant studies and corresponding scales were reviewed to ensure that a comprehensive list of measures were included. Multi-items measures were generated for each construct and assessed for the reliability and content validity. The questionnaire consisted of two parts including a portion for respondent’s personal data and another dealt with the perceptual variables. Each questionnaire items of perceptual constructs were measured on 7-point multi-item Likert scales, in which 1 indicates “completely disagree” and 7 “completely agree”. Prior to the conduct of a formal survey, a pre-test was carried out to validate the initial version of the survey questionnaire. The results from the pre-test study led to the final version of the questionnaire, and the instrument has confirmed content validity.

4.5 RESEARCH DESIGN AND RELIABILITY

The research design for this study involved a cross-sectional survey methodology, which was conducted between April and May, 2011. The questionnaire was originally developed in English, and subsequently translated into Arabic language. To reduce the possibility that a respondent participated in the survey more than once, each respondent was required to provide his or her university identification number (Student ID) in the survey.

Among a total of 800 questionnaires that were distributed in classrooms, study area and laboratories, 437 valid responses were received and used in data analysis, after removing invalid answers, achieving a 54.62 percent usable response rate for the overall survey. Despite the relatively low response rate, which thought to be expected for our local context, the fact that the respondents were as representative of the population as possible, led to their contribution being regarded as providing information applicable to the larger population. The reliability and internal consistency of instruments was assessed using Cronbach's alpha coefficient. All alpha values exhibited strong reliability (alpha > 0.7).

5. DATA ANALYSIS AND TESTING

The empirical data obtained were processed using statistical software packages (SPSS). Multiple regression analysis with its associated statistical inference tests (F test and t-test on b) was performed, to investigate the strength and direction of the hypothesized relationships among the model’s constructs.

5.1 MULTICOLLINEARITY TESTS

To determine whether any multicollinearity effects existed, total correlation matrix of the research model was reviewed in-depth, and the results showed that there was no evidence detected of severe multi-collinearity problem among regressors. The results of testing each of the three hypotheses are given below:

5.2 THE RESULTS OF HYPOTHESES TESTING (H₁ and H₂)

As shown in Table 1, the results of multiple regression analysis indicated strong support for the hypotheses; also the significant testing findings presented in table 2 provided further evidence for this acceptance.

<table>
<thead>
<tr>
<th>Coefficients a</th>
<th>Symbols</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Correlation</td>
<td>Multiple R</td>
<td>0.92487685</td>
</tr>
<tr>
<td>Coefficient of Multiple Determination</td>
<td>R²</td>
<td>0.85539719</td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>Adjusted R²</td>
<td>0.85269434</td>
</tr>
<tr>
<td>Standard Error</td>
<td>SEE</td>
<td>0.81763691</td>
</tr>
<tr>
<td>Observations</td>
<td>N</td>
<td>437</td>
</tr>
</tbody>
</table>

ANOVA —
Table 1: Summary Output of the Multiple Regression Analysis

<table>
<thead>
<tr>
<th>Factors</th>
<th>Regression Coefficients</th>
<th>Beta Coefficients</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Symbol</td>
<td>Value</td>
<td>Symbol</td>
</tr>
<tr>
<td>PTR</td>
<td>$b_{PTR}$</td>
<td>0.3902</td>
<td>$\beta_{PTR}$</td>
</tr>
<tr>
<td>PUS</td>
<td>$b_{PUS}$</td>
<td>0.5393</td>
<td>$\beta_{PUS}$</td>
</tr>
<tr>
<td>PES</td>
<td>$b_{PES}$</td>
<td>0.2504</td>
<td>$\beta_{PES}$</td>
</tr>
<tr>
<td>WIE</td>
<td>$b_{WIE}$</td>
<td>0.1464</td>
<td>$\beta_{WIE}$</td>
</tr>
<tr>
<td>EDU</td>
<td>$b_{EDU}$</td>
<td>0.0053</td>
<td>$\beta_{EDU}$</td>
</tr>
<tr>
<td>INC</td>
<td>$b_{INC}$</td>
<td>0.0580</td>
<td>$\beta_{INC}$</td>
</tr>
<tr>
<td>PSR</td>
<td>$b_{PSR}$</td>
<td>0.1227</td>
<td>$\beta_{PSR}$</td>
</tr>
<tr>
<td>AGE</td>
<td>$b_{AGE}$</td>
<td>0.0492</td>
<td>$\beta_{AGE}$</td>
</tr>
<tr>
<td>Intercept</td>
<td>$a$</td>
<td>1.07269</td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>$n-k-1$</td>
<td>428</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Variables Included in the Research Model Equation

A strong significant meaningful correlation is found between e-shopping behavioral intention and the independent variables mentioned earlier (Multiple correlation coefficient: $R^2 = 0.924876855$). The F statistic value ($F = 316.4789975$ at $p < 0.0000$ level) is statistically significant indicating that the results of the model could hardly have occurred by chance.

The coefficient of determination, multiple R-square showed that these predictor factors explained the major proportion (85.54 %) of the variability observed ($R^2 = 0.855397197$), which reinforce our confidence in the hypotheses testing results and provides support for the above mentioned association.

Furthermore, the adjusted $R^2$ of the model, which is a more conservative estimate of variance by considering error variance, is $0.852694341$. Thus, the overall explanatory power of the research model is considered high and quite capable of explaining the variance of customers' intention.

Using the values of the regression coefficients, shown in table 2, the future intention of using wireless Internet as an e-shopping channel can be predicted, in this study, by the following equations (EQ2):

$$Y_{INT} = 1.07 + 0.39 PTR + 0.54 PUS + 0.25 PES + 0.15 WIE + 0.01 EDU + 0.06 INC - 0.12 PSR - 0.05 AG$$

Based on the standardized Beta coefficients of each predictor variables and t-tests in Table 2 it can be stated that that within 8 independent variables, included in EQ2, only 4 variables considered highly significant predictors positively affecting the criterion variable $Y_{INT}$. Those variables are perceived trust ($\beta_{PTR} = 0.370$, $p < 0.0000$), perceived usefulness ($\beta_{PUS} = 0.293$, $p < 0.0000$), perceived ease of use ($\beta_{PES} = 0.189$, $p < 0.0000$) and wireless Internet experience ($\beta_{WIE} = 0.162$, $p < 0.0001$). While perceived security risk has a significant negative impact ($\beta_{PSR} = 0.021$, $p < 0.0000$).

More specifically perceived trust was found to be the most important determinant of customers’ intention to use wireless Internet as an e-shopping channel (highest beta value and t-value). This implies that if customers trust e-store, they become more willing to shop online.

5.2 THE RESULTS OF TESTING HYPOTHESIS H3

The analysis outputs in Table 3 corroborated what we argued in the section dealing with hypotheses formulation. A small percentage of customers (2.29%) as e-shoppers buy online, while a large proportion either use wireless Internet for product information searching but buy in-stores (76.66%) or entertainment seekers (21.05%). As such, our results support hypothesis H3.
In the light of our result obtained, it seems logical to suppose that this phenomenon occurs when customers feel that m-commerce transaction is not secure, or a limited trust is existed toward e-stores. The graphical presentation in Figure 2 clearly showing the relative size of each behavioral value discussed earlier.

<table>
<thead>
<tr>
<th>E-Shopping Behavior</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buying Online</td>
<td>10</td>
<td>2.29%</td>
</tr>
<tr>
<td>Browsing Online but Buying in Store</td>
<td>335</td>
<td>76.66%</td>
</tr>
<tr>
<td>Entertainment</td>
<td>92</td>
<td>21.05%</td>
</tr>
<tr>
<td>Total</td>
<td>437</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table 3: Summarized Analysis Output of H3

More specifically, this study has made a number of important practical implementations for online retailers or e-stores and theoretical contributions. In term of practical implications, our empirical results suggested that in order to attract customers to buy online, particularly in developing countries, e-retailers (e-stores) must continuously work to build trust mechanisms to encourage e-shopping adoption and special attention should be paid to secure mobile shopping transactions.

From an academic and research standpoint, this study provides empirical evidences and validation for the existing specialized literature concerning m-commerce. Our findings provide support for the research model and for the hypotheses regarding the directional linkage among its variables. The high overall explanatory power of our model indicated that this model is capable of explaining high proportion of variance observed in e-shopping behavioral intention.

Our research attempted to integrate and encompass the most frequently cited factors in the literature, and applied them in the local context in order to best examine the phenomenon. Therefore, the proposed model contained variables that have not been tested simultaneously in previous works.

6. CONCLUSION AND IMPLICATIONS

As stated previously, the main objective of this paper was to contribute to both theory and practice of m-commerce applications and to help address some gaps in the current body of literature, through expanding the research in this area by developing a comprehensive empirically-based model that identify and predict and the critical factors that have the most significant influence on the customers’ behavioral intention to use wireless Internet as e-shopping channel, which have never been integrated before into one framework, to examination simultaneously for validation and relationship.

More specifically, this study has made a number of important practical implementations for online retailers or e-stores and theoretical contributions. In term of practical implications, our empirical results suggested that in order to attract customers to buy online, particularly in developing countries, e-retailers (e-stores) must continuously work to build trust mechanisms to encourage e-shopping adoption and special attention should be paid to secure mobile shopping transactions.

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7. LIMITATIONS AND FUTURE RESEARCH

Although this paper is differentiated from other previous work and expanded the research scope, as in any study, there are a few limitations that should be considered when interpreting the results. First, the research model was validated using empirical data gathered from Egypt and therefore the findings may be specific to the culture in this developing country. Since the study is cross-sectional in design, a further examination of our argument using a longitudinal study is recommended in the future to investigate our model in different time periods. Finally, we must point out that although the majority of the hypothesized relationships were validated, and significant, and the proposed model yielded a relatively high level of coefficient of multiple determination; the obtained value of R² indicated that there is still need to find additional variables, to improve our model’s ability to predict the future customers’ behavioural intention to use wireless Internet as an e-shopping channel.
However, there are other opportunities to build on this study in future research. Suggested areas include examining the proposed model in other countries with different cultures, and make comparisons, to see whether it can be applied, also future studies can use other theoretical bases or different methodologies to derive predictions of customers’ e-shopping behaviour.

REFERENCES:


[42] Sumita, U. and Yoshii, J., “Enhancement of E-Commerce via Mobile Accesses to the


