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# Adoption of mobile commerce: a confidence model

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# ADOPTION OF MOBILE COMMERCE: A CONFIDENCE MODEL

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## ABSTRACT

*This study was driven by three underlying motivations. One of them is the gap between high penetration rate of mobile phone and relatively low adoption rate of m-commerce. The second is to reconcile the inconsistent findings in prior IT adoption research regarding the consistency of the relationship between attitude and intention. Finally, we hope to provide the theoretical underpinning for various interventions to promote m-commerce adoption. In this study, we extended the theory of planned behavior (TPB) by integrating confidence as a moderator for the relationship between attitude and intention. Furthermore, trial, communication and observation are identified as the sources for confidence with m-commerce and their effects are mediated through exposure. The research model was empirically tested and supported. Both theoretical and practical implications are discussed.*

**Keywords:** Mobile commerce; Theory of planned behavior; Confidence; Exposure

## INTRODUCTION

M-commerce refers to conducting any transaction, involving the transfer of ownership or rights to use goods and services, which is initiated and/or completed by using mobile access to computer-mediated networks with the help of an electronic device. Nowadays, m-commerce has become a booming market with increasing integration with Internet applications. By 2015, m-commerce will grow into a \$119 billion global industry, up from \$18.3 billion in 2008, according to ABI Research<sup>1</sup>. Growth in m-commerce can be attributed to the increasing number of consumers with Smartphone's or other mobile Internet-capable phones and the increased competition among firms to offer services through multiple channels, especially the mobile channels. However, user adoption of mobile services and/or products is the key to transform the number of consumers with Internet-enabled phones to profits. Thus, it is critical for practitioners to understand the adoption of m-commerce.

Most prior research considers m-commerce as a subset of IT applications and applied behavioral models to investigate its adoption, such as the technology acceptance model (TAM) of Davis et al. [22], Triandis' model [62] and the theory of planned behavior (TPB) of Ajzen [1]. All of these models assume that a positive attitude towards using m-commerce will lead to m-commerce adoption, where attitude refers to the individual's

feelings of favorableness or unfavorableness towards performing a behavior (in this case, adopting e-commerce). However, the consistency between attitude and intention has been questioned and researchers have demonstrated that the various attitudinal qualities moderate the attitude-behavior relationship, such as direct experience [27], information [21] and attitude confidence [12, 21, 27, 55], which unfortunately have been overlooked in m-commerce adoption studies [16, 39].

Among these moderators, of particular interest to this study is attitude confidence which refers to the level of certainty of an individual in his/her attitude [26, 46, 64], reflecting the degree of conviction or certainty with which a belief or attitude is held [13, 33, 57]. Conventionally, attitude confidence plays a significant role in explaining intention, attitude change, and attitude-intention consistency [36]. Particularly, it is a focal construct in studying consumer behavior as it is more susceptible to marketing intervention [10]. Including this construct in m-commerce adoption research not only extends previous IT adoption theories to account for the important contingency, but also entails significant practical implications on marketing practices.

Thus, in this study, we build upon the TPB and prior consumer studies on attitude confidence to develop and empirically test a research model on m-commerce adoption, where attitude confidence moderates the relationship between attitude and intention. To gain further insight about the effects of potential marketing intervention on attitude confidence, we also identify three important sources influencing attitude confidence, i.e., trial, observation, and communication, and their effects on attitude confidence are subject to the level of exposure, which refers to the degree to which an individual has acquired or exchanged information about the technology and its usage.

The paper proceeds as follows. In the next section, we present our research model and its theoretical foundation. This is followed by a description of an empirical study designed to test the proposed model. We then discuss the empirical results and their implications.

## RESEARCH MODEL AND THEORETICAL DEVELOPMENT

As illustrated in Figure 1, our research model extends the TPB to account for the contingency role of attitude confidence in the adoption of m-commerce.

### Confidence in Attitude-Intention Relationship

Extensive research on attitude confidence can be found in the field of marketing and consumer behavior in terms of belief

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1. <http://www.telecomasia.net/content/ebay-emerging-mobile-commerce-market-leader>

confidence (Fishbein's expectancy value model of attitudes) and brand attitude confidence [6, 28, 60]. The construct of confidence was first proposed by Howard and Sheth [36] as one of the determinants of purchase intentions. They postulated confidence is the buyer's belief that he/she can estimate the payoff of purchasing a particular brand. Ostlund [48] operationalized confidence as the degree of certainty regarding product performance risk and psychological risk. The study of Wright [67] clearly defined the generalized information processing confidence is the degree of certainty or confidence an individual feels in his/her ability to form judgments in response to information exposure. Bennett and Harrell [6] suggest that confidence plays a major role in predicting brand attitudes and intentions to buy. In psychology literature, Sample and Warland [55] demonstrate that confidence with which a person makes attitudinal judgments reflects the extent to which the person has actually formed an attitude toward a focal object. Later on, confidence is found to have significant positive effect on the attitude and behavior consistency [27, 59]. These studies already explicitly imply a close relationship between confidence and attitude.

The moderating effect of confidence on the relationship between attitude and intention is solidly confirmed by the study stream of attitude strength, which identified confidence as an attitudinal quality of attitude [30, 42-43, 52-53]. The confidence of attitude refers to the level of certainty of the individual in his/her attitude [26, 46, 64]. To sum up, these evidences proved confidence is the moderator on the relationship between attitude and intention. In other words, attitude that is more confidently held will give a higher attitude-intention consistency as captured in  $H_1$  of the research model.

$H_1$ : Attitude confidence with m-commerce moderates positively the relationship between attitude towards m-commerce and intention to adopt m-commerce.

### Developing Confidence through Exposure

Attitude confidence reflects the degree of conviction or certainty with which a belief or attitude is held [7-8, 13, 33, 54, 57]. From a learning perspective, confidence is a function of the amount of information the individual has available to form his or her judgment of the relevant attribute [51]. Exposure refers to the degree to which an individual has acquired or exchanged information about the technology and its usage. The support of the relationship between exposure and confidence is grounded on the discussion of the antecedents of confidence. A number of studies have shown that an important determinant of confidence is the quantity of information to which the individual possesses [2, 11, 23, 25]. Koriati, et al. [41] suggested that perception of evidential support for an attitude is more important in determining the attitudinal confidence regardless of the actual quality of these support. Their findings further support the claim that an increase in exposure will result in higher level of attitudinal confidence due to increased amount of information. Practical support for the positive effect of exposure on confidence can be found in marketing activities. Exposing consumers with various product information and/or experiences is widely practiced in enhancing persuasion and intention to buy because it is believed that consumer will be more certain and more confident in making buying decisions with a higher level of product knowledge [8]. Therefore, we hypothesize that:

$H_2$ : The individual's exposure of m-commerce has a positive effect on his/her level of attitude confidence with m-commerce.

Exposure refers to the degree to which an individual has acquired or exchanged information about the technology and its

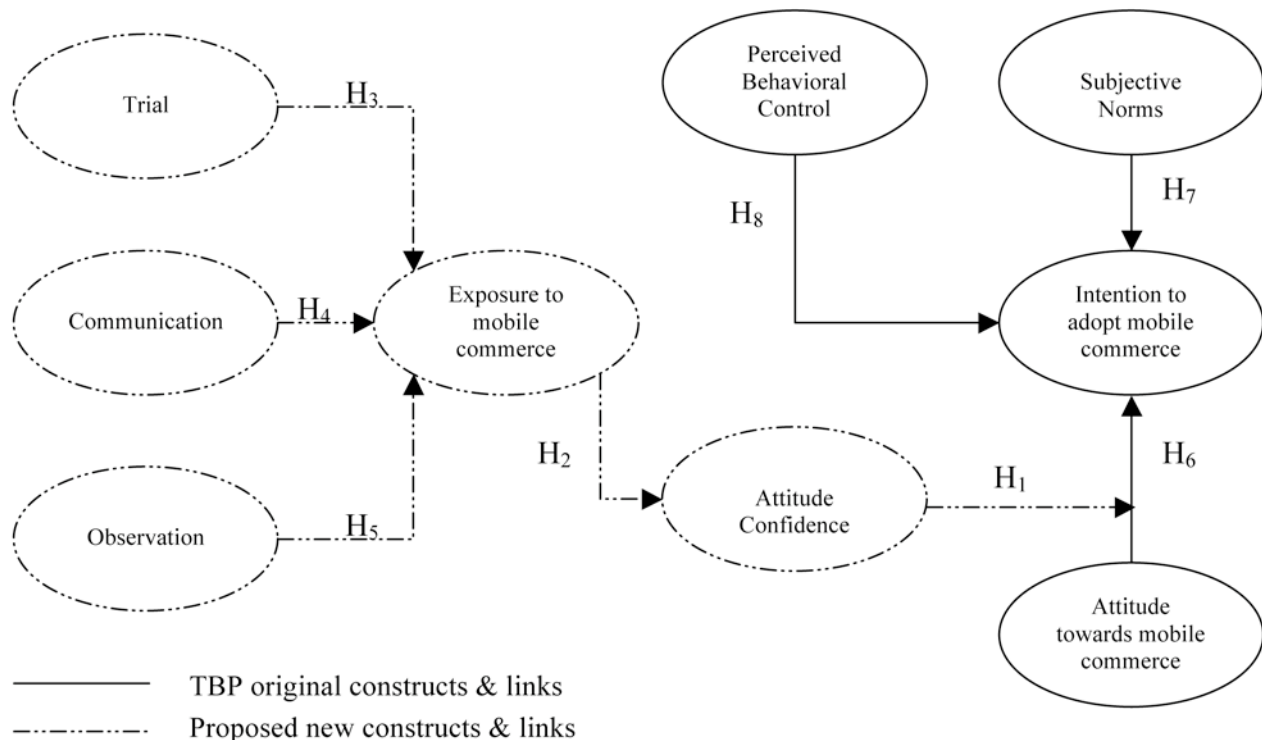


FIGURE 1: Research Model of M-Commerce Adoption

usage. It serves as a learning mechanism through which users acquire information related to m-commerce. Existing learning theories have identified multiple channels leading to exposure, e.g., conversation [50], trial and error experience, perception of the object, observation of another's response to the object, modeling, instruction about the object and exhortation [32], and word-of-mouth [24]. Such channels may be readily grouped into three types of user behavior, i.e., trial, communication and observation.

Research in marketing and psychology has consistently shown that trial is a powerful source of information for the formation of brand beliefs and attitude [45, 57-60]. These studies have operationalized trial as the source of direct experience, and advertisement as indirect experience. Trial provides reasonably unambiguous evidence about experience claims [66]. Since people rarely discount the trustworthiness of their own experiences, trial-based beliefs tend to be strong and/or confidently held, representing a powerful base for attitudinal development [58-60].

Moreover, trial is an important component of consumer learning as it provides evidence that is both shaped by and integrated with prior beliefs and hypotheses about product performance [35, 44]. To conclude, trial actually is a source of information, which represents direct experience of an object. Several mobile service carriers set up booths or Internet-based simulators for potential customers to try out m-commerce applications such as checking stock prices and ticketing. Through trial, the individual acquires information about the capabilities, usability and limitations of m-commerce. The extent to which the individual experiments with m-commerce affects positively the level of his/her exposure.

*H<sub>3</sub>: The individual's trial of m-commerce has a positive effect on his/her level of exposure to m-commerce.*

Different from trial which provides potential adopters direct experience with m-commerce, communication with others who show interest in and/or have experience with m-commerce brings indirect experience of m-commerce to potential adopters. Communication may take forms as reciprocal as in a live conversation (i.e. word-of-mouth), or as the exchange of written words between individuals through different type of mediums/channels (e.g. newsgroup, electronic bulletin board and instant messaging software like Twitter, MSN messenger etc.). We argue that such indirect experience arising from communication with others can also enable the individual to acquire new information and to crystallize his/her perceptions of m-commerce. By exchanging meaningful information, consumers will acquire more relevant and meaningful information about m-commerce. Information sharing is one of main components in marketing communication whereby employees give advices, impart knowledge and/or gather information from the customer in the interaction to understand the customer more thoroughly and better serve him or her [31]. Recently the extensive usage of social media revives another form of communication, word-of-mouth, which has been proved to be another important information source influencing consumer information processing [e.g. 20, 24, 37]. Thus, we hypothesize that:

*H<sub>4</sub>: The individual's communication with others regarding m-commerce has a positive effect on his/her level of exposure to m-commerce.*

Observation may be the most common source of exposure. Referring back to the notion by Kolb and Fry [40] and Griffin and Griffin [32] mentioned earlier, observation had been identified as a source of learning. According to the social learning theory [5], most human behavior is learned observationally through modeling: from observing others. In this way, one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action. Given the rapid advancement in m-commerce, observation is as important, if not more, as the other two approaches. Practically, description and advertising are the principal tools to convey the product/service knowledge to consumers. Therefore, we hypothesize that:

*H<sub>5</sub>: The individual's observation of others conducting m-commerce has a positive effect on his/her level of exposure to m-commerce.*

### **Hypotheses based on TPB**

The remaining hypotheses (H<sub>6-8</sub>) refer to relationships between intention and its immediate antecedents, i.e., attitude, subjective norms and perceived behavioral control, as stipulated in the TPB. Each of these determinants is hypothesized to have positive relationship towards behavior intention, and such relationship had been validated and supported by previous research using TPB.

*H<sub>6</sub>: The individual's attitude towards using m-commerce has a positive effect on his/her adoption intention on m-commerce.*

*H<sub>7</sub>: The individual's subjective norm has a positive effect on his/her adoption intention on m-commerce.*

*H<sub>8</sub>: The individual's perceived behavioral control has a positive effect on his/her adoption intention on m-commerce.*

## **RESEARCH METHODOLOGY**

A survey study was conducted with part-time MBA students who had full-time job. Over 50% of the students had at least one graduate degree (e.g., MBA) and were enrolled in a second (and sometimes third) degree, i.e., a master's program in electronic business. We first screened the students to identify those who had mobile phones but had not adopted m-commerce yet, and distributed the survey to the non-adopters. Out of 220 distributed questionnaires 202 were returned. Giving gift coupons to the respondents helped obtain this high response rate (over 91%). High response rate provided supporting evidence for the representativeness of our sample. The demographic profile of the respondents is described in Table 1. Noticing that the majority of the sample was below 45 and over half of the sample was below 30. Thus, our sample was characterized with young professionals who are typically targeted consumers of m-commerce.

### **Measures**

In order to ensure measurement reliability in the operationalization of the constructs, we tried to choose those items that had been validated in previous research. All constructs were measured with reflective items. The scales for the TPB constructs, i.e., subjective norms, perceived behavioral control, attitude and intention were adapted from Taylor and Todd [61] by specifying the target behavior as using m-commerce. A sample item for

attitude, for instance, was like “Using e-commerce is a (bad/good) idea”.

For the remaining variables, we developed the scales according to Churchill’s [17] paradigm. In order to ensure face and discriminant validity of the measurement scales we used the card sorting procedure proposed by Moore & Benbasat [47]. We then pre-tested the questionnaire with 40 students. After examination of the Cronbach’s alphas and correlation matrices, we realized that no changes were required. We ended up with 23 items for the nine constructs.

### Data Analysis

The analysis of the data was done using Partial Least Square (PLS), which is a procedure that enables the specification of both the relationships among the constructs and the measures underlying each construct [65]. The PLS analysis indicates how well the measures relate to each construct and whether the hypothesized relationship at the theoretical level are empirically true. PLS-Graph was used to perform the analysis. In evaluating the measurement model, path loadings of 0.7 or higher were considered as acceptable. For the evaluation of the structural model (hypothesized links) the bootstrap resampling procedure [19] was applied to test the significance of the paths coefficients. In assessing the internal consistency, we looked at the composite reliability measures ( $\rho$ ) developed by Werts et al. [63]. In formulating and testing the moderating effect of exposure on the relationship between attitude and intention, we applied the procedure described by Chin et al. [15]. More specifically, we followed a hierarchical process similar to multiple regressions where we compared the results of two models (i.e., one with and one without the interaction construct: confidence x attitude). The standardized path estimate from the product construct (confidence x attitude) to intention indicates how a change in the degree of the moderator construct (confidence) would change the influence of attitude on the dependent construct (intention). Thus, if attitude has an estimated beta effect of B on intention, a beta of M for the interaction path can be interpreted as a beta change of B+M for the estimated path from attitude to intention when exposure increases by one standard deviation from the baseline of zero. By comparing the R-square for the interaction model with the R-square for the main effect model (which excludes the interaction construct), we can assess the strength of the moderating effect. The significance of the difference in R-squares is estimated with  $(f^2)^2$  where  $f^2$

**TABLE 1. Demographic profile of respondents**

Mobile phone	WAP Enabled Without WAP	22.8% 77.2%
Gender of the Respondents	Male Female	53.5% 46.5%
Age of the Respondents	22-22 27-27 32-32 37-37 42-42 47-47 > 47	48% 5.4% 10.4% 19.3% 12.4% 1.0% 0.5%
Educational Background	Undergraduate Graduate	49.5% 50.5%
Years of Experience with the Internet	0-2 Years 3-4 Years 5-6 Years 7-8 Years 9-10 Years	24.8% 48% 19.8% 5.5% 1.5%
Number of Friends using WAP for m-commerce	None 5-5 10-10 20-20 >20	49.5% 41.1% 5.4% 1.0% 2.0%

**TABLE 2: Loadings, significance and composite reliability ( $\rho$ )**

Construct	Measurement Item	Loading	Standard Error	t-Statistic
Intention $\rho = 0.9277$	I1	0.8794	0.0168	52.2316
	I2	0.9084	0.0144	62.8885
	I3	0.9129	0.0115	79.4822
Attitude $\rho = 0.8937$	A1	0.8640	0.0215	40.1964
	A2	0.8636	0.0216	39.9675
	A3	0.8479	0.0262	32.3315
Exposure $\rho = 0.8923$	E1	0.8453	0.0226	37.4746
	E2	0.8526	0.0250	34.0819
	E3	0.8726	0.0149	58.5916
Trial $\rho = 0.8968$	T1	0.9001	0.0172	52.2290
	T2	0.9031	0.0159	56.8336
Communication $\rho = 0.9293$	COM1	0.9306	0.0117	79.6845
	COM2	0.9327	0.0102	91.7575
Observation $\rho = 0.8808$	O1	0.8851	0.0165	53.6664
	O2	0.8891	0.0162	54.7179
Attitude Confidence $\rho = 0.8901$	C1	0.8836	0.0263	33.5656
	C2	0.9073	0.0160	56.7919
Subjective Norms $\rho = 0.8969$	S1	0.7874	0.0324	24.2789
	S2	0.8953	0.0173	51.7776
	S3	0.9007	0.0137	65.9679
Perceived Behavioral Control $\rho = 0.8538$	P1	0.7985	0.0349	22.8922
	P2	0.8645	0.0259	33.4043
	P3	0.7737	0.0470	16.4621

$$2. f^2 = [R^2(\text{interaction model}) - R^2(\text{main effects model})] / [1 - R^2(\text{main effects model})]$$



scores of 0.03, 0.15 and 0.35 suggest small, moderate, and large interaction effects respectively [18]. It is important to understand that a small  $f^2$  does not necessarily imply an unimportant effect. If there is a likelihood of occurrence for the extreme moderating conditions and the resulting beta changes are meaningful, then it is important to take these situations into account.

**Results**

Table 2 presents the loading, standard error and t-statistic of the items to their respective constructs. For all constructs, most of the items had reasonably high loadings (i.e. above 0.70) with the majority over 0.80, therefore demonstrating convergent validity (see Table 2). Furthermore, all items were found to be significant (almost all at the 0.01 level). The composite reliability measures (see  $\rho$  in Table 2) provided additional support for the reliability and the convergent validity.

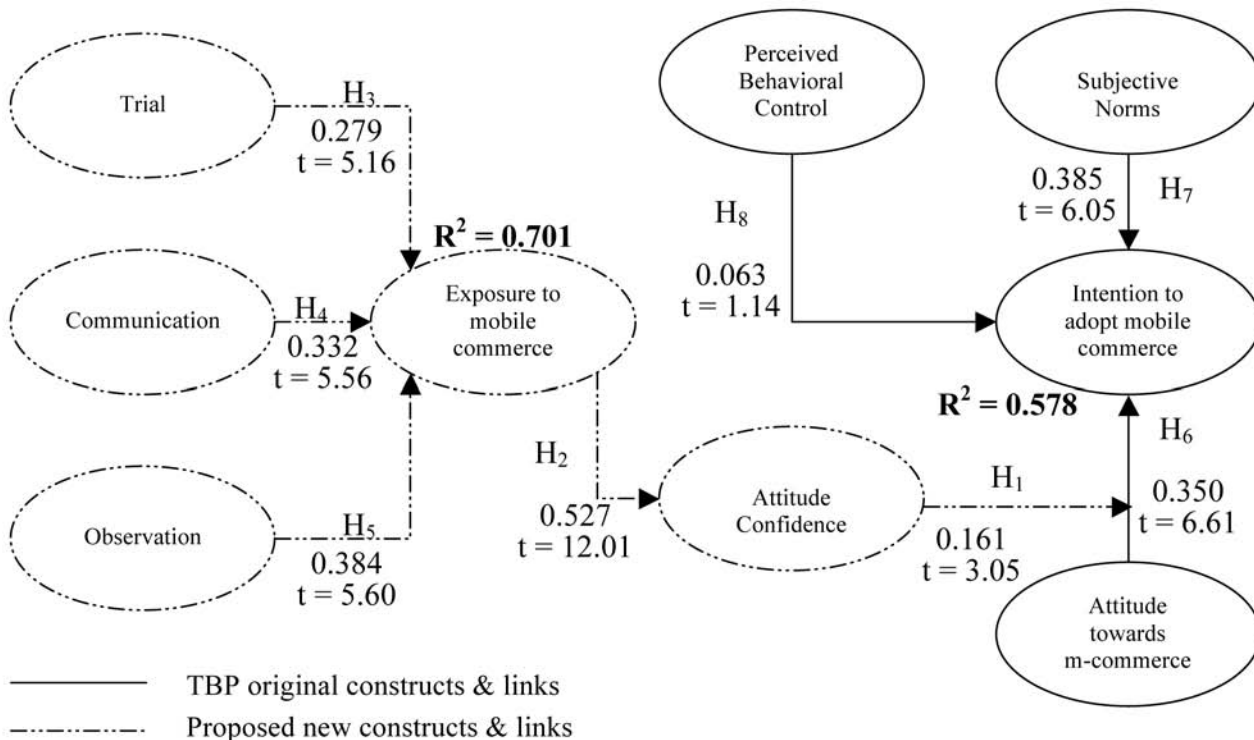
The correlation matrix (Table 3) demonstrated the correlation among the latent variables and the square root of the AVE (Average Variance Extracted) which shows the ratio of the sum of a measurement item variance as extracted by the construct relative to the measurement error attributed to its items. As indicated in Table 3, the square root of the AVE of each construct was larger than the correlation of the specific construct with any of the other constructs in the model and exceeded the cutting value of .5 [14, 29], demonstrating discriminant validity.

Noticing the high correlations among some variables, we conducted chi-square difference tests for each pair of constructs. The chi-square differences between the unconstrained and constrained model were all significant at the 99.9% level, demonstrating that each pair of constructs was much better when treated as distinct [3-4].

Structural model of PLS was tested on the basis of path strengths and variance explained. The estimated path coefficient

**TABLE 3: Correlation Matrix** (The diagonal value is the square root of AVE)

	I	A	T	E	O	C	S	Con	PBC
Intention (I)	<b>0.900</b>								
Attitude (A)	0.645	<b>0.859</b>							
Trial (T)	0.427	0.306	<b>0.902</b>						
Exposure (E)	0.497	0.358	0.658	<b>0.857</b>					
Observation (O)	0.544	0.434	0.550	0.737	<b>0.887</b>				
Communication (C)	0.439	0.330	0.506	0.705	0.603	<b>0.932</b>			
Subjective Norms (S)	0.661	0.543	0.527	0.708	0.712	0.584	<b>0.863</b>		
Attitude Confidence (CON)	-0.668	-0.530	-0.403	-0.527	-0.604	-0.458	-0.711	<b>0.896</b>	
Perceived Behavior Control (PBC)	0.396	0.409	0.367	0.400	0.389	0.406	0.410	-0.482	<b>0.813</b>



**FIGURE 2:** Result of PLS Analyses

(standardized) and its associated t-value are specified next to each link in Figure 2. The  $R^2$  statistic is indicated next to each of the dependent construct. The empirical results support the hypothesized role of confidence in intention formation. Both hypotheses  $H_1$  and  $H_2$  were verified. Positive influence from exposure to confidence is significant at 1% level with a path coefficient of 0.527. Meanwhile, the moderating effect of confidence was found to be significant at the 1% level with a path coefficient of 0.161. The interaction effect has an effect size  $f^2$  of 0.03, which represents a solid small effect. We also tested for a possible direct link between confidence and intention, but we did not find it to be significant. With the moderating effect, confidence strengthens the relationship between attitude and intention through confidence, in other words the consistency on the relationship between attitude and intention. Attitude of the individuals who are more familiar with m-commerce are more confidently held, resulted in more likely to translate their favorable attitudes into intentions to adopt m-commerce. The significant moderating effect of confidence on the link between attitude and intention may explain why some studies did not find this link to be significant. These studies might have involved subject that were not familiar with the technology under consideration, regardless of the subject's level of confidence on the technology under study and hence these subjects did not have attitudes that were strong enough to affect the subjects' intentions significantly.

Referring to Figure 2, trial, communication and observation explained 70% of the variance of exposure. The effects of trial, communication and observation on exposure were found to be significant at the 1% level with path coefficient of 0.279, 0.332 and 0.384 respectively, hence verifying both hypotheses  $H_{3,5}$ . These empirical results suggest that trial, communication and observation represent important sources of exposure (with  $R^2$  exceeding 70%). Specifically, observation contributes a lot in terms of exposure. This result indicated that both active and passive means of exposure are significant.

Except  $H_8$ , all the hypotheses associated with the TPB ( $H_{6,7}$ ) were also verified, providing yet another supportive case for the suitability of the TPB. Attitude and subjective norms both have strong effect on intention with a path coefficient of 0.350 and 0.385 respectively. Nonetheless these effects are significant at the 1% level. The result highlights the social influence is as important as the attitude of an individual in the adoption of m-commerce. Obviously, the media could play a key role in this regard other than attitude. The effect of perceived behavioral control was not found to be significant, a possible explanation is the respondents are heavy users of mobile phone, thus possess of high self-efficacy that made perceived behavioral control not a valid factor in affecting the m-commerce adoption intention.

## DISCUSSION AND IMPLICATIONS

In this research we investigated the moderating role of confidence in intention formation within the context of m-commerce adoption and the important sources for developing confidence with m-commerce. More specifically, we developed and empirically tested a model that integrates confidence and exposure with its various sources, i.e. trial, communication and observation into the TPB. Through an empirical test of the proposed model, the result reported that trial, communication and observation were the important dimensions of exposure. The

result implies that interactive (i.e. trial and communication) and passive (i.e. observation) approaches are mutually significant in the delivery of the information about m-commerce.

## Theoretical Implications

The findings of this study entail several important theoretical implications. First, we demonstrate that depending on the level of confidence of an individual's attitude towards m-commerce, the strength of the relationship between attitude and intention can vary considerably. In brief, if the confidence level of an individual's attitude towards m-commerce is high, then it is more likely to achieve a high attitude-intention consistency and vice versa. It is therefore important to take a contingency approach when applying attitude-based models to explain m-commerce adoption. Prior studies on IT adoption have considered some other moderators on individual characteristics. Extending this line of thought, we suggest that the attitudinal quality should be an important moderator in investigating IT adoption.

Second, extending the prior research on exposure effect, we confirm the positive role of exposure in intention formation and reveal the theoretical underpinning of its impact. Our findings indicate that exposure, describing the information acquired by the consumers, does not affect attitude or intention directly. Instead, its impact on intention formation is mediated through confidence. In other words, the impact of information acquired from different channels on intention formation happens only when such information is sufficient to change the attitudinal quality. This significant contingency of confidence also suggests the existence of a threshold for the impact of exposure.

Third, three important sources for enhancing exposure and developing confidence with m-commerce are identified and testified. Regarding the interactive approach of exposure, both trial and communication are found to be the significant dimensions of exposure. Such findings do consistent with the accepted views in marketing and psychology, which highlight the important role of direct product experience in communicating information in general. Paivio [49] conclude that information in form of experience is more vivid and concrete as it requires more elaborative internal rehearsal and self-generation [56]. Diagnostic product experience plays an important role in consumer learning. Trial effectively communicate experiential attribute of m-commerce to the consumer [38, 66], which is perceived as more diagnostic, thus result in more confidently held beliefs. While trial can offer the firsthand information to a consumer, communication can yield secondhand information. Result of the current study reveals the role of communication in exposure; communication offers individual the information related to the m-commerce from time to time. An individual's confidence toward his/her attitude will be affected corresponding to the information at hand. Such notation also consists with the word-of-mouth studies by Cowley and Rossiter [20]. In addition to the interactive approach, the passive approach to enhance exposure and subsequent confidence is also confirmed in this study. Given the rapid advancement in m-commerce, observation is as important, if not more, as the other two approaches.

Finally, we also demonstrate the significant mediating effect of exposure in enhancing confidence with m-commerce. Our results suggest that the impacts of all three m-commerce related learning behaviors on confidence are contingent upon the amount of embedded information. Thus, it is important to enhance the information load in various learning activities.

## Practical Implications

On the practical side, a number of issues are worth mentioning. First, it seems that the high hopes for the diffusion of m-commerce are not completely unfounded. With the high penetration of mobile phones and the aggressive marketing tactics of mobile carriers, exposure to m-commerce technology is increasingly high. According to our results, such exposure is likely to enhance the users' confidence. Second, marketers of m-commerce should encourage potential adopters to try out the technology and discuss it with support staff and other adopters. Practically, this can be done through inviting the potential adopters to join the corresponding trial plan offered by the company, which participate in m-commerce. Take a bank as an example, the promoter of mobile banking could actually offer a free trial of mobile banking service; the mobile financial services are just that: financial services delivered through the medium of mobile handsets. Users can make basic inquiries about their balances or, in a more complicated maneuver, their payments. By offering such trial plan for the potential users, they are given the opportunity to experience what exactly mobile commerce look likes, what they can do with it or what is it all about on the whole. Exhibition, road show or organizing promotion campaign would be the other advisable ways to increase the communication with the potential users so as to deliver the information interactively and efficiently. We have to bear in mind that those campaign organized for promotion purpose are all treated as vest-interest source of information from individual's view point, but these campaign definitely do deliver the search attribute of the product/service associated with mobile commerce, thus they still encounter a slight influence through exposure on intention formation. Again as these two dimensions do follow the interactive approach should result in better effects on the individual's exposure than observation methods such as mass advertising.

Finally, social factor is found to be a significant determinant of intention in the current study as well. Generally speaking, subjective norms can be classified into peer influence, family influence and media influence corresponding to the context of the current study. Marketer of m-commerce have weak or even no control upon the first two antecedents of subjective norms, whereas the only possible way that they can do in altering the antecedent of subjective norms is done it through the mass media. This emphasizes the importance of advertisement in creating a general favorable environment for the adoption of m-commerce, putting social pressure on an individual to adopt it sooner or later.

## Future Research

Though the findings do verify the proposed model as well as most of the hypotheses, there is still room for improvement and investigation. Obviously, the major source/dimension of exposure had been identified, namely trial, communication and observation, but the attributes of these source/dimension was not being taken into consideration in the current study. As suggested by Smith and William [58-60], the attributes of the information received by an individual does affect the attitude of that individual and intention formation ultimately. Therefore, a number of aspects could be consider in the future research, especially focusing the direction around the attributes of the information received by an individual, such as what type of information is the individual being exposed to, how frequent is the information exposed to the individual, the

presentation format and quality of the information at the time it is being exposed to the individual, and etc. All of these should be addressed in the future research.

In addition, it is also worthwhile to look at the other forms of attitudinal quality. Krosnick et al. [42] reviewed the literature and identified several attitudinal qualities such as extremity, intensity, certainty, accessibility, clarity or latitude of rejection and affective-cognitive consistency. The moderating effect of these attitudinal variables/attributes upon attitude-behavior relationship was explored in the fields of attitude-behavior consistency, attitude strength as well as attitudinal variables/attributes [8-9, 34, 46, 64]. The traditional IT adoption/acceptance research should be extended to account for these attitudinal qualities.

Finally, more research is necessary to examine different demographic, economic and cultural groups. In this study, our sample was characterized with young professionals from one country. However, it is worthwhile to examine whether the other types of potential adopters from different countries or cultures may rely on the similar sources for exposure. Findings of these studies will provide insightful input for developing more individualized marketing practices in various contexts.

## CONCLUSION

This study was driven by three underlying motivations. One of them is the gap between high penetration rate of mobile phone and relatively low adoption rate of m-commerce. The second is to reconcile the inconsistent findings in prior IT adoption research regarding the consistency of the relationship between attitude and intention. Finally, we hope to provide the theoretical underpinning for various marketing interventions to promote m-commerce adoption. By integrating confidence as a moderator in the TPB and identifying its antecedents, we developed a model explaining m-commerce adoption. Our findings imply the necessity to incorporate attitudinal quality (confidence) in applying the TPB in IT adoption research in general. We also extend existing research on exposure effect by identifying the contingency in intention formation. Finally, we identify three important channels for exposure, i.e., trial, communication and observation, and suggest that the information load acquired by the users should be an important criterion in designing various marketing interventions. To conclude, this study serves as an attempt to yield contribution to the existing IS literature by enhancing the understanding the role of exposure and confidence on the intention formation in the context of m-commerce. Practically, marketer can treat this study as a reference, providing a new insight about the effectiveness of the information delivery format as well. Finally, it does exploit new area for examining the adoption issue of information technology afterward.

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