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# DETERMINANTS OF BEHAVIORAL INTENTION IN MOBILE PHONE ADOPTION: AN EMPIRICAL EVIDENCE FROM GHANAIAN MARKET WOMEN

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## Abstract

This paper seeks to explore the dynamics of mobile phone adoption among market women. Using the theory of planned behavior (TPB), a theoretical model was conceptualized to examine the factors which influenced the adoption of mobile phone by market women. Aside the use of self-designed questionnaire to collect data from 196 respondents, an interactive face-to-face interview of two cases was conducted in order to solicit detailed information from the market women. After these rigors quantitative and qualitative data analysis, findings show that in microtrading activities, beside attitude, subjective norm, personal innovativeness like the beeping ("flashing") could also influence the intention of the trader to adopt mobile phone. The paper concluded that, all these predicting factors provided useful insights for the service provider to design more relevant but affordable products and services for the betterment of micro-trade. The conceptual model developed together with the contributions found can serve as a preparatory ground for future research on mobile phone adoption from a diverse perspective.

Keywords: Adoption, Phenomenon, Micro-Trade, Conceptual Model, Subjective Norm.



### INTRODUCTION

The increasing proliferation of mobile phone has seemingly given rise to numerous use of the digital device. Generally, there is a growing body of studies that evidently concluded that the hand-held device has a wide range of applications in business (Boadi et al., 2007; Wu and Wang, 2005; and Frempong et al. 2008). But, the use of mobile phone to facilitate micro trade in particular is an emerging phenomenon that provides a new area of research. For instance, can voice call serve a market woman with her trading partners better than any other form of communication? What will motivate the micro trader to acquire and use mobile phone for trading purpose? A good understanding of these issues is crucial for effective use of the cellular phone for micro trading. Thus, this paper rigorously examined some influencing factors that affected the behavior of some market women towards the adoption of mobile phone.

### THEORITICAL LITERATURE ON FACTORS OF MOBILE PHONE ADOPTION

The Theory of Planned Behavior (TPB) is one of the most - established social psychology theories employed to explain many human related phenomenon in recent years. This theory postulates that, the psychological process to put up a behavior is stimulated by intention which is also influenced by some underlying beliefs (Ajzen, 1985; 1988; 1991). The Ajzen's TPB is an extension of Theory of Reason Action (TRA) (Fishbein and Ajzen, 1975a) that seeks to explain why an individual has no total control over a situation (Madden et al., 1992) normally encountered with. By the above explanation, intention is the central pivot around which behavior revolves – meaning that people's action is backed by their intention. The TPB Variables that Predict behavioral intention include Attitude, Subjective Norm and Perceived Behavioral control (PBC). According to Fishbein and Ajzen (1975b), attitude is the extent to which a person has a positive or negative outcome of behavior. Theorists have established beyond reasonable doubt that, attitude is the principal determinant of behavioral intention (Ajzen and Fishbein, 1980).

Subjective Norm refers to one's perception about other people's force of influence (social pressure of some sort) to perform or not to perform the behavior (Fishbein and Ajzen, 1975c). Ajzen (1991) argued that there is positive correlation between subjective Norm and behavioral Intention.

PBC is defined as the perceived belief of the existence of some impediments in undertaking the behavior. Cheng and Chan (2000) theorized that PBC is further classified into self-efficacy and controllability. Whereas self - efficacy is seen as the feeling of oneself being capable of influencing behavior (Bandura, 1986), controllability is perceived as the external factors such as competition, nature of industry etc. that predict behavior. Relating these three variables in the application of m-commerce, Paul and Ting (2006b) has clearly established that



consumer behavioral intention is stimulated by his attitude, subjective norm and perceived behavioral control to getting information, giving information and ultimately making a purchase.

In effect, the above body of studies revealed that, attitude, intention and behavior are important constructs in technology adoption. For instance, in theory of reasoned action proposed by Fishbein and Ajzen in the 1970s, attitude, intention and behavior are considered as the three major constructs. This theoretical concept illustrates the psychological process by which the relationship between attitude and behavior is observed (Fishbein and Ajzen, 1975; Fishbein et al). Thus, it can be hypothesized that for a given behavior of a mobile phone user, variables such as attitude, personal innovativeness, affordability, peer pressure and technical support can affect his intention and subsequent behavior to adopt mobile phone. Figure 1 below illustrates how these parameters are linked together which is an extension of Theory of Planned Behavior.

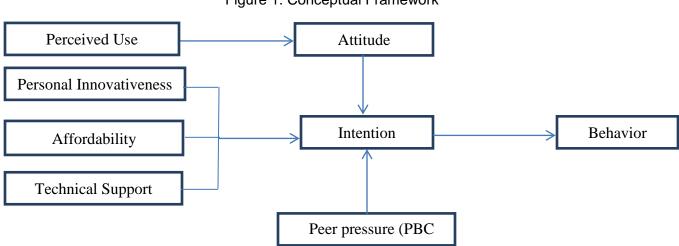


Figure 1: Conceptual Framework

From the above diagram (figure 1), we construct a conceptual framework to illustrate how some influencing factors are related to attitude and intention to predict behavior in adoption of mobile phone for micro trading. In this model for instance, user's intention to buy and use mobile phone is influenced by her attitude, personal innovativeness, affordability, peer pressure and technical support. Intention in turn translates all these predispositions into actual action (behavior) of adoption. Five set of hypothesizes are modeled from the above framework:

Hypothesis 1: Personal innovativeness (like beeping) can predict mobile phone adoption behavior through intention.

Hypothesis 2: The perceived use of mobile phone in trade can influence the trader's attitude towards mobile adoption.



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**Hypothesis 3:** Service Cost (affordability) can affect the trader's intention for mobile adoption.

Hypothesis 4: A trader may adopt (backed by intention) mobile device due to his/ her peers (due to peer pressure) and the perceived advantage arising from its use.

Hypothesis 5: Technical support positively influences mobile adoption (i. e. behavior) through intention.

#### METHODOLOGY

The study adopted a descriptive research design. A field survey was conducted to test the veracity of the above stated hypothesizes. To this effect, a questionnaire was designed to collect data. Based on a scientific approach Krejcie and Morgan, (1970), a sample size of 175 out of a population of 320 market women (a female traders' association) was determined using random sampling technique. 181 guestionnaires were returned out of a total of 196 given to the respondents in two separate markets and female traders along major roads close to the markets in Accra. Data was collated and inputted in SPSS for further process. Cross tabulation, Correlation and Chi square test were largely the statistical tools used for the analysis.

Further, two detailed interviews of market women labelled CASE A and CASE B respectively were conducted to confirm some of the hypotheses made out the theoretical model.

# ANALYSIS AND FINDINGS **Quantitative Data Analysis**

		PERCIEVED USE				
				FALSE	TRUE	Total
ATTITUDE	POOR	Count		26	9	35
		Expected Co	ount	5.0	30.0	35.0
		% within USE	PERCIEVED	100.0%	5.8%	19.2%
	GOOD	Count		0	147	147
		Expected Co	ount	21.0	126.0	147.0
		% within USE	PERCIEVED	.0%	94.2%	80.8%
Total		Count		26	156	182
		Expected Co	ount	26.0	156.0	182.0
		% within USE	PERCIEVED	100.0%	100.0%	100.0%

Table 1: Cross Tabulation Indicating the Relationship between Attitude and Perceived Use of a Mobile Phone



Chi-Square Tests						
	Value	df	Asymp. Sig. (2- sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)	
Pearson Chi-Square	1.274E2 <sup>a</sup>	1	.000	-	·	
Continuity Correction <sup>b</sup>	121.406	1	.000			
Likelihood Ratio	109.379	1	.000			
Fisher's Exact Test				.000	.000	
Linear-by-Linear Association	126.700	1	.000			
N of Valid Cases <sup>b</sup>	182					

Table 2: Result of Chi-square Test of Independence – an Extension of table 1

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.00.

b. Computed only for a 2x2 table

From the above Attitude-Perceive Use cross tabulation (i.e.Table1), the percentage of market women who say it is true that, good attitude of mobile phone adoption is influenced by perceived use, is 94.2% higher than those who say it is false that, good attitude of mobile adoption is influenced by perceived use of mobile phone. There is also some percentage point difference when you consider poor attitude of mobile adoption being influenced by perceived use. This difference in ratios is empirical evidence showing that there is obvious relationship between perceived use of mobile phone and its adoption attitude. The p-value of 0.000 in Table2 is a further statistical revelation indicating that the relationship is significant and the occurrence is not by mere chance. To this effect, it means that perceived use of mobile phone can affect user's attitude towards adoption. Thus, hypothesis 2 is supported.

Correlations					
		User's Intention	Beeping As Innovation		
User's Intention	Pearson Correlation	1	.874**		
	Sig. (2-tailed)		.000		
	Ν	180	180		
Beeping As Innovation	Pearson Correlation	.874**	1		
	Sig. (2-tailed)	.000	*		
	Ν	180	180		

Table 3: Result of Correlation Analysis between User's Intention to Adopt Mobile Phone and Beeping as Innovation Initiated by the User

\*\*. Correlation is significant at the 0.01 level (2-tailed).



Table 4: Result of Correlation Analysis between User's Intention to Adopt Mobile Phone
and the Mobile Phone Affordability

Correlations			
		User's Intention	Affordability
User's Intention	Pearson Correlation	1	.557**
	Sig. (2-tailed)		.000
	N	180	180
Affordability	Pearson Correlation	.557**	1
	Sig. (2-tailed)	.000	
	N	180	180

\*\*. Correlation is significant at the 0.01 level (2-tailed).

Table 5: Result of Correlation Analysis between User's Intention to Adopt Mobile Phone and the Technical Support Provided by a Network Operator

Correlations			
		User's Intention	TechnicaSupp ort
User's Intention	Pearson Correlation	1	.327**
	Sig. (2-tailed)		.000
	N	180	180
TechnicalSupport	Pearson Correlation	.327**	1
	Sig. (2-tailed)	.000	
	N	180	180

\*\*. Correlation is significant at the 0.01 level (2-tailed)

Beeping as innovation (Personal innovativeness), Affordability and Technical support are positively correlated with user's intention as shown in table 3, table 4 and table 5 respectively. The correlation coefficients of these independent variables are not only greater than zero (indicating good association), but also their p-values demonstrate that the relationship of each to the dependent variable (intention) is of statistical significance. Hence, Hypotheses 1, 3 and 5 are experimentally supported by these results.



			ADOPTION ATTITUDE			
			POOR	GOOD	Total	
INTENTION of USER	Short Time	Count	35	25	60	
	=	Expected Count	11.5	48.5	60.0	
	-	% within ADOPTION ATTITUDE	100.0%	17.0%	33.0%	
	Mean Time	Count	0	60	60	
	-	Expected Count	11.5	48.5	60.0	
		% within ADOPTION ATTITUDE	.0%	40.8%	33.0%	
	Long Time	Count	0	62	62	
		Expected Count	11.9	50.1	62.0	
	-	% within ADOPTION ATTITUDE	.0%	42.2%	34.1%	
Total		Count	35	147	182	
	=	Expected Count	35.0	147.0	182.0	
	_	% within ADOPTION ATTITUDE	100.0%	100.0%	100.0%	

Table 6: Cross Tabulation Indicating the Relationship between Attitude and

Intention of a Mobile Phone User

There is a statistical relationship between mobile phone user's attitude towards adoption and his intention to acquire it as can be seen in the results shown in table 6. Indeed, table 6 revealed that the proportion of traders whose long time intention is positively affected by good attitude is 42.2 greater than long time intention influenced by poor attitude. The ratios are equally different with mean time intention and short time intention with regards to good attitude and poor attitude respectively. This means that attitude is a fundamental determinant of intention as found in Ajzen and Fishbein, (1980).

Table 7 <sup>.</sup> A Result of Corr	elation Analysis betw	een Intention and Behavior
	clation / that you betw	

		INTENTION	Behavior
INTENTION	Pearson Correlation	1	.282**
	Sig. (2-tailed)		.000
	N	182	182
Behavior	Pearson Correlation	.282**	1
	Sig. (2-tailed)	.000	
	Ν	182	182

\*\*. Correlation is significant at the 0.01 level (2-tailed).



The behavior of the respondents was reflected in the adoption and usage of the mobile phone which was fundamentally triggered by the respondent's intention. The correlation coefficient of 0.282 as shown in table 7 (a result of field data), revealed a significant and positive relationship between intention and behavior. Thus, the results of this survey rigorsly supported the assertion that all the influencing factors (as seen in the conceptual framework) affected the mobile phone user's behavior through his intention.

#### Qualitative Data Analysis

Two detailed interviews of market women labelled CASE A and CASE B respectively were conducted to confirm some of the hypothesizes made out the theoretical model. The analysis of this qualitative data would also give us a different perspective towards achieving the basic objective of the study. The interviews were recorded and transcribed as illustrated below.

#### Case A: Banana Seller

Aunty Araba is a female banana seller in the Madina market. She is a Junsior High School graduate with about five years trading experience. Banana is a perishable fruit that is normally cultivated far outskirt - long distance from Accra city center. This extensive traveling trade that links up the rural farmers and the urban traders certainly needs a very reliable communication technique that can save some cost of traveling and cost of preservation of perishable good like banana. Mariyam who was formally a female head porter is working for Aunty Araba. Mariyam normally travels over 60km to the rural farmers and entrepreneurs in and around Akim-Assamen to buy banana in bulky quantities. The duties of Mariyam also include informing Auntie Araba about the availability of commodity and the producer prices at the village and the decision as how much to buy and at what price, or not to buy at all. In any of these situations, Mariyam's action will depend largely on the feedback she gets from Aunty Araba. The content of the feedback also depends on such factors as Aunty Araba's stock level and the general prevailing demand and supply situation. Mariyam is asked to buy only if there is high demand which cannot be satisfied by Aunty Araba's stock otherwise, Mariyam has to wait for some time.

In the event when Aunty Araba runs short of supply and does not get access to such information from the rural entrepreneurs, then she is forced to buy from other traders in Accra at an extra cost. The consequence of this reduced her income level and ultimately affected profit margin negatively. In order to arrest this relatively unprofitable venture, Aunty Araba decided to acquire two Motorola C115 phones - one for herself and the other for Mariyam. Part of Mariyam's commission was agreeably used to defray the cost of hers. Both subscribed to the same network operator. The communication between them is enhanced and the bargaining



power of Aunty Araba improves as she has now access to quick and reliable information from other trading partners.

Auntie Araba capitalizes on the "flash" (beeping) function of the mobile phone to effectively communicate with customers and suppliers whose numbers are stored on her handset but are with different network operator. According to her, single beep means negative and double beep means positive. One of her customers, Mama Rose explained further:

"Each time I go to take a basin of banana from Aunty Araba, she will tell me when (the particular date) the next consignment will be ready. And on this future day, when she 'flashes' twice, it means it is ready but when she 'flashes' once, it means she has not gotten banana and for that matter I should look elsewhere. And when I also 'flash' back twice, it means I am coming for it but if I 'flash' back once, it means my old stock is still available and for that matter she should sell it out to any other customer".

Mama Rose admitted that such innovative way of communication does not only minimize her communication bill and consequently she introduced the same beeping innovation with her petty trade customers down the chain of supply.

Such effective management of communication is expected to lower cost of operation so that Aunty Araba can maintain reasonable profits. This has really enhanced the communication between her and the customers as well as her suppliers. According to aunty Araba, the beeping method of communication is rapidly gaining patronage as most of her trading partners with their customers and suppliers are adopting mobile phone for this purpose. Probably this is so because, users are not required to have any special knowledge or technical knowhow before they can 'flash' one another. The function is therefore available for both literate and illiterate traders as theoretically explained by Nambisan and Wang (2000).

#### CASE B: Beans Seller

Peace is a mother of four who has been selling beans for the past twelve years in Agbogbloshie market - one of the biggest foodstuff (especially cereal) markets in Accra. For Peace, trading in cereal is like a genetic motivating venture as she learnt it from her mother who is at the verge of retiring, also sells at one corner of the market. Currently Peace is being assisted by her younger sister whom she is training to take after her. Peace supplies to some retailers in Nima market - a satellite market which is about 15km away from Accra Central. She at the same time sells to final consumers who normally buy in small quantities. Baby, the younger sister coordinates activities between Timber Market (their source of supply), their old mother and other trading partners. Baby's daily task includes going on errands to collect money from their debtors. But most often, she comes back disappointed, either because the debtor is not seen or has no



money to settle the debt. This was actually frustrating as she spent a lot of money on taxi and time in traffic. Thus, there must be a reliable communication technique to handle the situation. Both sisters who have some basic education background decided to buy two Nokia phones last year after observing their competitors' mobile phone usage and believe that the cell phone would be useful enough to solve their communication problems in trade. Post mobile phone adoption experience has shown that, Baby now charter taxi to their debtors only when it becomes necessary. What she just needed to do was to call the customer in advance to find out if the money was ready and quickly she would get a feedback regardless of the where about of the client. This saved her the cost of taking taxi unnecessarily and the time spent in traffic could now be used to do something else productively.

The cell phone communication enabled Peace with her sister to monitor market prices effectively as they easily get access to relevant information from other markets and were also able to bargain very well with the supplier.

Communication among traders with common interest offered Peace an opportunity to establish a social network of colleague traders who also dealt in cereals. The cardinal objective of this group was to ensure that all group members enjoy stable and reasonably low producer price. Through this association, a friend introduced Peace to a Producer entrepreneur who comes from Bawku - a town in the Sahel – Savanna zone of Ghana (a climate that is suitable for the cultivation of cereals) which is almost 1000km away from Accra.

Mallam Abu, the beans farmer and producer stayed in Bawku and only comes to Accra once a while. He served Peace faithfully and quickly as soon as he received her request via the mobile phone. She payed the same producer price (which is far less than what is prevailing at Timber market) like any other member of the association payed. When Peace was asked whether she knew Bawku, below was her response.

"No, I don't need to know Bawku before I get my supply of beans. All that I have to do is to wire money to Mallam Abu through the GCB Xpress money transfer, pick my cell phone, talk to him and place an order. I would then have my commodity within the next forty – eight hours. Is it not better than risking my life traveling all the way up north which can take me a week or two and can cost me thousands of cedis?"

With this improved communication, Peace has stopped ordering her stuff from Timber market. The reason is that, supplying from Bawku is cheaper than getting it from the intermediary suppliers at Timber market who probably had their supply also from the same source, Bawku.



#### **Discussion of Cases**

In all the cases, trader embraced and sustained mobile phone up to date in their trading activities because they have developed a positive attitude towards the outcome of its adoption.

#### Case A

In this case, Aunty Araba and her trading partners intuitively develop a new innovation (beeping) of communication among them to reduce cost of operation as the use of "flashing" is more economical than "texting" and voice calls. Perhaps, they were able to take advantage of this innovativeness, which can potentially improve their profit, due to the fact that there is no requirement of formal education and the simplicity of the C115 Motorola handsets which most of them are using. Device maneuverability, innovativeness and the ability to vary different methods of getting information are all fundamental elements of self-efficacy (a constituent part of Perceived Behavioral Control). After a comprehensive investigation about the meaning of personal innovativeness, Agarwal and Prasad (1998) empirically established that the issue of perception in technology adoption, decision analysis is precisely dealt with by personal innovativeness.

These findings are suggestive of the fist hypothesis:

In micro-trading activities, personal innovativeness like the beeping ("flashing") can influence the intention of the trader to adopt mobile phone. This finding was consistent with the quantitative analysis as illustrated by table 3.

#### Case B

Subjective norm is an external social force (as perceived by the individual) that can influence a trader's intention to adopt a hand set or otherwise. This is evidently manifested in Case C where Peace and her sister intention to acquire a mobile phone, having realized the communication need, was persuaded and facilitated by the usage of their peers in Agbogbloshei market. In line with this point, one of the respondents when interviewed put it that:

"Virtually all my major customers and suppliers have now had mobile phone and in order to satisfy their perpetual question "Nana Yaa when at all would you get a hand set?", I had to buy one so as to be relevant member of my peers".

According to Nana Yaa, the mobile has been of tremendous help to her ever since she adopted it as she is now able to manage producer price fluctuations effectively by taking advantage of advanced information from other trade partners. Nana Yaa disclosed that the gains she accrued from the adoption sometimes overlooked some constraints like high cost of airtime and network failure. This indicates conclusively that, the pressure (subjective norm) from



peers coupled with perceived advantage arising from mobile adoption can make a trader develop a positive intention to adopt mobile phone. Ajzen (1991), thus, argued that there is a strong positive correlation between subjective norm and intention. There are sufficient research findings which suggest that subjective norm plays an important role in technology adoption even though study on the effect of subjective norm on intention is still ongoing (Taylor and Todd, 1995 and Hsu and Lu, 2004).

The characteristic of this trader tends to be suggestive of our fourth hypothesis (proposition) that: A trader may adopt mobile device due to his/her peers (due to peer pressure) and the perceived advantage arising from its use.

#### CONCLUSION

Findings: This paper sought to investigate the factors that influenced mobile phone adoption and usage among Ghanaian market women. The analysis of the survey data empirically showed that self-initiated innovation like beeping, affordability and technical support influenced the adoption and usage (behavior) of mobile phone through intention of the user. Generally, the findings are consistent with TPB model and related literature of the subject.

#### IMPLICATIONS

Regarding research, the study has made some significant findings that can serve as literature review for the furtherance of trading with mobile phone for development concept. For instance, a detailed research investigation of beeping innovation should inform the designer or developer as how to come up with mobile technology that could differentiate between missed-call and missed-beep (and, if possible the number of times it beeped) so that the poor user would be able to economically response with the appropriate function as indicated by Sen (1999). The developer should also explore the possibility of using one beep for many users simultaneously.

#### RECOMMENDATIONS

As findings from this study have shown a significant number of gains in the use of mobile phone for micro trading, we therefore recommend that government policy should be geared towards making communication service relatively cheaper to enable more micro traders get access. The regulator of the industry should also ensure that guality of service is up to standard in order that challenges that customers might face are minimized.



### LIMITATION

The study was limited to only a few markets in Accra among micro traders which could have resulted in some sampling biases. Thus, future research direction can consider a wider context in terms of number of markets and other professionals in order to make a more bias-free generalization.

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