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Investigating Adoption/Non-Adoption of Cell Phones for Financial Transactions in South Africa

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Abstract

The adoption of cell phones in South Africa has been phenomenal, yet the use of cell phones for financial transactions has been minimal. This paper identifies and examines the process leading to the adoption/non-adoption decision in order to gain a better understanding of why this innovation has not as yet diffused widely. The study was conducted using a grounded theory approach. The factors that were found to have an influence on the adoption decision were resistance to change, exposure, relative advantage, perceived ease-of-use, perceived risk and cost. These were incorporated into a framework depicting the relationships and interactions between these categories.

Keywords

Cell phone adoption, m-commerce, mobile commerce, grounded theory, South Africa

INTRODUCTION

Cell phones have become a global mass-market sensation. This has led to the development of the mobile Internet, a new innovation that combines wireless capabilities with Internet technologies and infrastructure (Venkatesh et al., 2003; Rosenblatt, 2003). Building on this platform has been the use of wireless, handheld devices such as cell phones and personal digital assistants to conduct commercial and financial transactions (Pinheiro, 2003). This phenomenon, known as m-commerce, shares similar characteristics to e-commerce, but also has unique features and constraints, the most obvious being the restrictive user interface (Stafford & Gillenson, 2003; Venkatesh et al., 2003). Current m-commerce services include mobile banking and mobile payments (Mallat et al. 2004). Mobile banking allows customers access to their accounts in order to conduct typical transactions such as checking an account balance, viewing statements, transferring funds, bill payments, etc. Mobile payments are often classified as either micro- or macro-payments. Micro-payments are usually of the order of 10 euros, with macro-payments being much larger in value (Mallat et al., 2004). Examples of micro-payments include purchase of content and services such as news, games, and tickets, whilst macro-payments might involve payments at manned and unmanned point of sales for goods such as groceries, etc. (Mallat et al., 2004).

In this study, the focus is on the use of cell phones for financial transactions in South Africa. Cell phone services were launched in South Africa in 1994, with the establishment of two service providers. A third provider began operations in 2001 (e-Business Handbook, 2003). This competitive environment has resulted in the deployment of innovative product offerings to a mass market long starved of affordable telecommunications. As such there has been phenomenal growth, with estimates of up to 18 million subscribers currently – about 40% of the population (e-Business Handbook, 2004).

As in most countries, cell phones in South Africa are used primarily for voice and short message services (SMS). However, cell phone service providers, and banks in particular, have been quick to launch m-commerce offerings. Cell phone banking was available to South Africans as far back as 1998 (e-Business Handbook, 2003). Both WAP-enabled, as well as standard cell phones are catered for, the latter through the use of encrypted SMS technology (Brown et al., 2003). More recently 2.5G and 3G services have been released, aimed initially at the upper income market (e-Business Handbook, 2004). Overall, adoption levels for these more sophisticated services have been low. Cell phone banking, for example, has not widely diffused (Brown et al.,
2003). In 2003, there were estimated to be only about 70,000 subscribers to this service (e-Business Handbook, 2004). The purpose of this study was therefore to investigate the reasons for the low levels of adoption and provide an explanation for this phenomenon. Many prior studies examining the adoption of new innovations have employed quantitative techniques using standard theories of technology acceptance. A qualitative approach was taken in this instance in order to gain a richer understanding of the process leading to the adoption/non-adoption decision. Furthermore, an inductive theory-generating (grounded theory) methodology was employed to allow for new understanding to emerge. Existing theory was not totally discounted, but was used as a basis for labelling and refining concepts arising from the field data, and for clarifying relationships.

In the next section, a review of some key studies on mobile technology adoption will be undertaken before the research methodology for the study is outlined. The outcomes of data analysis will then be presented followed by a discussion of the findings and their implications. Limitations of the study and ideas for future research are delineated, before the paper is concluded.

### MOBILE TECHNOLOGY ADOPTION STUDIES

Several prior studies have attempted to examine the adoption of mobile technologies and applications, a few of which will be outlined in this section. The majority have been quantitative in nature, and have built on existing theories of technology adoption. Mattila (2003), for example, examined factors affecting the adoption of mobile banking services by conducting a survey in Finland. Rogers’ (1983) diffusion of innovations theory was used as the basis. The most significant influences on adoption were found to be the relative advantage gained, compatibility of the innovation with existing values and the complexity of use. Brown et al. (2003) examined the predictors of cell phone banking adoption in South Africa by modifying a framework of Internet banking adoption developed by Tan and Teo (2000). Their findings pointed to relative advantage, banking needs, trialability (the extent to which a user would like to try the innovation first), and perceived risk as influences.

Luarn and Lin (2005), in a study in Taiwan, used an extended technology acceptance (TAM) model as the basis for examining mobile banking adoption. They found that in addition to the TAM variables (perceived usefulness and ease of use), perceived credibility (the absence of risk), perceived self-efficacy, and perceived financial cost also have a bearing on adoption. These and other studies confirmed that existing theories of adoption to some extent explain adoption of mobile banking, but that additional variables such as perceived risk (or inversely credibility) and costs need also be considered. The major limitation of these studies is that they do not provide explanation as to the process of adoption, since they are based on variance cause-effect models.

In a welcome break from these standard ways of examining adoption, Sarker and Wells (2003) conducted a qualitative interpretive study in the USA using a multi-cultural group of informants. They ultimately conceptualised adoption of hybrid (voice and data) mobile handheld devices by using an input-process-output framework. The adoption and use process was deemed to encompass an exploration and experimentation phase followed by an assessment. This fed back into the exploration and experimentation phase. Inputs were categorised as individual characteristics, communications/task characteristics, modality of mobility, technology characteristics and context. The adoption outcome included two concepts - continuity of use over time, and resource commitment.

In a similarly innovative qualitative study, Carroll et al. (2003) investigated the appropriation of WAP mobile technology amongst young Australians. Carroll et al. (2003) suggested that users evaluate a technology at three distinct levels – as they encounter it (level 1), as they adopt and adapt it (level 2) then as they integrate it into their everyday practices (level 3). Level 1 relates to the first encounter with the new technology. At this stage there are attractors that encourage further exploration of the technology and inhibitors that may dissuade users from deeper evaluation. Level 2 reflects a deeper evaluation of use. Level 3 captures the longer-term evaluation of use. At this stage, the technology is appropriated and integrated into everyday practices. Adoption and appropriation are ongoing processes and at any stage, should perceptions about the technology change, then it may lead to non-adoption (Carroll et al., 2003). Attractors for WAP adoption were found to be expected usefulness, adaptability (extent to which users are able to personalise and customise the technology), fashion/style and familiarity with the technology. Non-adoption factors that emerged from the study were hidden costs, concerns over health issues, reception (reliability), ease of learning and usability.

The set of quantitative studies reviewed in this section examined specifically mobile banking (Matillia, 2003; Brown et al., 2003; Luarn and Lin, 2005) The qualitative study of Carroll et al. (2003), on the other hand, investigated appropriation of WAP cell phones, whilst that of Sarker and Wells (2003) investigated adoption and use of hybrid (voice and data) devices. In the latter two cases, furthermore, the research setting was experimental in that the technology was supplied to participants. This paper reports on a qualitative study pertaining to usage of cell phones for financial transactions specifically. The setting was not experimental, in that informants were not given access to mobile financial services as part of the research. Rather, opinions and perceptions were sought from cell phone users with bank accounts concerning services such as cell phone banking. In the next section the research methodology will be outlined.
RESEARCH METHODOLOGY

Grounded Theory Methodology

In order to conduct the study, the grounded theory methodology, as described by Strauss and Corbin (1998), was employed. This rendition of the grounded theory methodology provides systematic and clear guidelines (Locke, 2001), and is thus more suitable for novice researchers (Hughes and Jones, 2003) than other variations of the methodology. The outcome of applying the methodology is typically a grounded theory (Bryant, 2002). Grounded theory has been defined as theory that is derived from data systematically gathered and analysed through the research process (Glaser and Strauss, 1967). At the core of the method are three coding procedures (Strauss and Corbin, 1998):

Open Coding – The process through which concepts are identified, these being elaborated through definition of their properties and dimensions. The properties of a concept are the characteristics that define it and give it meaning, whilst a dimension is the range along which a property varies. Lower order concepts are usually grouped into a higher order concept called a category.

Axial Coding - The process of relating categories to other categories, termed “axial” because coding occurs around the axis of a category, linking categories at the level of properties and dimensions.

Selective Coding – The process of integrating and refining the theory. Included in this phase is the identification of a central category(ies), and organisation of other categories around these, trimming away excess categories, and defining more clearly poorly defined categories.

Although the coding is depicted as consisting of three major steps, these are typically not performed linearly. In reality, there is a constant iteration between the three steps, as new data is analysed, and new insights emerge. The process usually continues until saturation point is reached – i.e., no new information emerges, or that which does emerge does not add much to the explanation at that point in time (Strauss and Corbin, 1998).

Data Collection

Data collection, coding and analysis were done in an iterative manner with three of the researchers being involved throughout (Gordon et al., 2004). The fourth researcher supervised the process. Semi-structured interviews were conducted using a set of open-ended questions, designed to allow for unrestricted responses from the informants. The interviews aimed to find out firstly if the informants had used their cell phones for financial transactions. None of them had done so. Reasons for this were elicited, and their intentions as to possible future usage interrogated. All interviews were conducted face-to-face, were recorded, and lasted in the region of 45 minutes. After eleven interviews were conducted, it was agreed that a point of theoretical saturation had been reach and there were no new major concepts emerging from the data. The target population was any person who used a cell phone and had an active bank account. These people were thought to be the most likely candidates for the adoption of cell phones for financial transactions. Those interviewed were fairly diverse, ranging from an electrical engineering student to a spice company director. This diversity brought with it a range of ideas and varying perspectives regarding the adoption/non-adoption of cell phones for financial transactions. Interviews were conducted over a period of approximately four weeks and carried out at each informant’s preferred location.

Data Analysis Procedure

Data analysis began with the researchers listening to each interview after it had been conducted. Phrases and quotes were noted down by researchers and conceptual labels were assigned to them. Labels were for the most part drawn from existing theory on adoption and diffusion (e.g., the adoption studies mentioned previously, which in turn drew in some cases from Rogers, 1983). The concepts were entered into a spreadsheet laid out under each participant’s name, and colour coded. Concepts were then organised into higher order categories. Following on from this, the categories were expanded into their properties and dimensions, and relationships between categories analysed, by also drawing from the literature. The categories were linked and illustrated through a theoretical framework that visually represented the theory of adoption/non-adoption of cell phones for financial transactions.

RESULTS OF ANALYSIS

The results of the analysis are firstly reported in terms of six major categories that emerged, followed by a model depicting the relationships between categories. These relationships are then described in the form of a story line.
Emergent Categories

Cost

What emerged almost immediately during the interview analysis was the consistent concern over the cost involved with using the new mobile services. This was identified as being one of the major factors to be considered when deciding whether or not to adopt it. One interviewee noted: “...there must be a significant cost saving for people to make the effort to transition to new technologies”. Cost was often weighed up against the perceived benefits that the new service could offer. It was held that “[Banks and service providers] must make it more cost effective to do a transaction via your phone [rather] than using the Internet or going to an ATM, then it will work”.

Resistance to Change

Several interviewees referred to concepts that were deemed to belong to a higher order category labelled resistance to change. For example, one of the interviewees noted that “Some people will take to new technology no matter what, just to be at the cutting edge...while the middle group will use it after a period of pragmatic consideration. And a final percentage will not take to it at all”. This statement was deemed to represent the concept, time-to-adopt, an attribute of resistance to change. Many interviewees also expressed concerns over the rapid pace of technology change. For instance it was noted: “People are still getting used to banking over the Internet. Banking over your cell phone is a pretty far out idea”. This, together with other statements, gave rise to identification of the compatibility concept as defined by Rogers (1983), and so was labelled as such.

Exposure

Few participants were aware that facilities for performing financial transactions from cell phones were currently available. Those that were, had only heard about it via word of mouth from their friends or colleagues. It became apparent that marketing or promotion of the service and product was lacking. As noted by a participant: “it needs a lot of marketing and people education because there’s just not enough known about it.” Another concept that emerged under the exposure category was that of trialability. Several of the interview participants expressed a general interest and desire to be able to experiment with the new technology for a limited period at little or no cost in order to ascertain whether or not it would be suitable and beneficial for them to adopt. Another stated that he would “definitely be happy to use it, once [he had] seen others use it successfully.” This was also deemed to be a property of the exposure category, and in keeping with the literature, specifically the diffusion of innovations theory, was named observability (Rogers, 1983).

Perceived Relative Advantage

Concerning relative advantage, the general trend that emerged was that the benefits of the service offered would be one of convenience whereby it would be “easier than using an ATM or banking through the Internet” and would be “time saving.” Many of the participants gave almost contradictory views in that on the one hand they believed that the service would provide people with enormous benefits, but that they themselves would be hard pressed to justify the cost against the perceived added value that the service would bring. This is best highlighted by one interviewee who stated that the new service would “allow travelling people to keep in touch with their personal affairs, no matter where they are in the world”, yet he “would only use it personally if [he] was far away from home and there was no other way of performing the transaction.”

Perceived Ease-of-Use

Almost all of the interview participants seemed to agree that using the cell phone for performing any type of financial transaction would not pose any major difficulties. Many were confident that it could be designed such that it would be “simple, intuitive and easy to use.” There were however a few concerns over the limitations of the interface display and input mechanisms. Specifically, these were concerns over the relatively small keypad and screen sizes. One participant held that “a lot of business men struggle to read the fonts on a cell phone” and that “you can so often make a mistake - instead of R 1000 you press R 10 000.”

Perceived Risk

The idea of risk emerged in three distinct yet related concepts. These were physical security, information security and privacy. Physical security referred to the fact that with the new service, it would no longer be necessary to carry cash around and so it would add to one’s personal security. A concern emerged that although “[cell phone banking] is convenient, it could be more inconvenient if you lose the phone, because then you would have to replace everything”. Information security referred to the safety and security of the data as it travelled over the network. These were mainly expressed as concerns over the call being intercepted and decrypted. Many of the people interviewed were unaware of the underlying technology and as such were hesitant to assume that it was
secure. Privacy was identified as being primarily an apprehension over the “dissemination of sensitive data to third parties” and what “the party being transacted with does with the information.”

These six categories and their key properties are displayed in Table 1 below.

Table 1: Major Categories and their Properties

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>PROPERTIES</th>
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<tbody>
<tr>
<td>PERCEIVED RISK</td>
<td>Physical Security</td>
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<tr>
<td></td>
<td>Information security</td>
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<tr>
<td></td>
<td>Privacy</td>
</tr>
<tr>
<td>PERCEIVED EASE-OF-USE</td>
<td>Interface Complexity</td>
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<td></td>
<td>Usefulness</td>
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<td></td>
<td>Convenience</td>
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<td>Efficiency</td>
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<td>Reliability</td>
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<td></td>
<td>Relative Advantage</td>
</tr>
<tr>
<td>PERCEIVED RELATIVE ADVANTAGE</td>
<td>Call Cost</td>
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<tr>
<td></td>
<td>Transaction Cost</td>
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<td></td>
<td>Opportunity Cost</td>
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<td>COST</td>
<td>Awareness</td>
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<td>Marketing</td>
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<td>Trialability</td>
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<td>Observability</td>
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<td></td>
<td>Familiarity</td>
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<td>EXPOSURE</td>
<td>Style &amp; Fashion</td>
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<td></td>
<td>Compatibility</td>
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<td></td>
<td>Time to Adopt</td>
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<tr>
<td>RESISTANCE TO CHANGE</td>
<td></td>
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</tbody>
</table>

Relationships between Categories

The relationships between categories established through the research process are illustrated in Figure 1 below.

Figure 1: Adoption/Non-Adoption of Cell Phones for Financial Transactions
well as their resistance to change.

The decision to adopt (or not adopt) will have a subsequent influence upon the exposure of the individual to the service. In other words, should an individual choose to adopt the service, this will lead to further exposure. This exposure will give rise to a reformulation of perceptions, which could change the adoption decision. This feedback mechanism in the model therefore explains situations whereby an individual may decide to adopt the service, but then after more exposure may reformulate perceptions and decide not to adopt. It also explains the situation whereby an individual may choose not to adopt initially, but after further exposure reformulate their perceptions and decide to adopt. The implication is that adoption is a continuous process with an ongoing reformulation of perceptions taking place. Resistance to change may be reduced over time through greater exposure, leading to formulation of more positive perceptions.

Discussion and Implications

The theory derived from this analysis has been developed through applying the grounded theory methodology. A review of theory prior to, and during the grounded theory analysis nevertheless informed the process. The labelling and refining of emergent concepts and categories, as well as potential relationships were carried out in reference to this existing theory. Factors identified in the literature as being significant influences on adoption of cell phone for financial transactions are apparent in the above model. These include relative advantage/perceived usefulness (Brown et al., 2003; Carroll et al., 2003; Luarn and Lin, 2005; Matilla, 2003), perceived ease of use (Carroll et al., 2003; Luarn and Lin, 2005; Matilla, 2003), perceived risk (Brown et al., 2003; Luarn and Lin, 2005, Matilla, 2003), cost (Carroll et al., 2003; Luarn and Lin, 2005), exposure (Brown et al., 2003; Matilla, 2003), and resistance to change (Matilla, 2003). The modality of mobility concept defined by Sarker and Wells (2003) is also apparent by the manner in which relative advantage was described. A participant indicated that, for example the use of cell phones for financial transactions would be useful only in certain circumstances, such as when travelling far from home.

The way in which our theory describes how perceptions are formulated and reformulated depending on exposure is also similar to the use process described by Sarker and Wells (2003). Their use process for instance consists of an exploration and experimentation phase [exposure] followed by an assessment of experience [formulation of perception], which feeds back into exploration and experimentation. This overall use process leads also to adoption outcomes, such as continuity of use [adoption decision] and resource commitment.

In contrast to the Carroll et al. (2003) theory, our model depicts the process before level 1 evaluation, as there were no participants who had actually used cell phones for financial transactions. Level 1 evaluation occurs after initial usage and experimentation. Nevertheless, there were some similarities to the level 1 adoption and evaluation process.

The positioning of categories mirrors the diffusion of innovation stages as specified by Rogers (1983), i.e. an individual may pass through the following stages when adopting an innovation - knowledge, persuasion, decision, implementation, and confirmation. According to Clarke (1999), in the knowledge stage there is exposure to the innovation, and understanding of its functions. In the persuasion stage there is a forming of favourable attitudes [formulation of perceptions], followed by the adoption decision. The implementation and commitment phases are not apparent in the above theory, as none of the informants had yet actually used cell phones for financial transactions.

In summary, our theory validates both the variance theories of mobile commerce adoption (e.g., Brown et al., 2003), as well as the process theories (e.g., Sarker and Wells, 2003). It also validates the diffusion of innovations stages articulated by Rogers (1983, 2005). Its contribution to the body of knowledge is that it provides an explanation of how consumers decide whether to either adopt or not adopt mobile commerce applications in a natural setting, where no technology or service is given to experiment with initially. There is still, nevertheless, similarity to the adoption process where technology and services have been supplied. The difference may be that perceptions are less well formed in the former case.

The implications for practice are that in order to increase the use of cell phones for financial transactions amongst consumers, there ought to be greater exposure through, for example, more visible and aggressive marketing campaigns. The absence of these campaigns in South Africa may be because banks and other stakeholders are waiting for 3G services to more widely diffuse before launching any major drives (e-Business Handbook, 2004). Our theory suggests that increased exposure helps to overcome resistance to change, as well as to develop more accurate perceptions of relative advantage, ease of use, costs and risks. Positive perceptions of relative advantage
and ease of use increase the chance of adoption, whereas perceptions of high cost and high risk decrease this possibility.

LIMITATIONS AND FUTURE RESEARCH
The study participants had generally not had experience in actually using their cell phones for financial transactions. As such they expressed general opinions about what they thought and believed. Future research might then try to identify only those consumers who currently use or have used these services. Alternatively, as with some previous studies, participants may be provided with access to the services for a trial period, and their experiences assessed throughout the process of experimentation and evaluation.

CONCLUSION
Over the past decade, cell phone usage has grown exponentially in South Africa. However, despite the relevant services being readily available and accessible, cell phone utilisation for financial transactions has failed to be taken up by mainstream consumers. A qualitative study, employing the grounded theory approach was therefore conducted in order to understand the process by which individuals decide to adopt or not adopt cell phones for financial transactions. A literature review was undertaken not so much as to assimilate current thinking and paradigms, but more to provide a background context and scope to the research issues at hand, and to sensitise the researchers to the key concepts relating to the phenomenon of mobile commerce adoption. Data was then gathered through a series of semi-structured interviews and recorded for further analysis. From the analysis of the data categories, their constituent properties and the dimensions thereof were identified. Relationships between these categories were then determined in order to develop a descriptive and context-based theory. This model was briefly compared to the existing literature in order to provide some validation as well as identify possible areas for future research. The first two categories that emerged from the analysis, exposure and resistance to change, were found to influence the formulation of perceptions concerning relative advantage, perceived ease-of-use, perceived risk and cost. These four factors were directly related to the decision as to whether to adopt the services or not. This decision was then found to lead to further exposure, such exposure having an effect on resistance to change, and leading to re-formulation of key perceptions. The adoption process was therefore seen as being in constant flux, depending to a large extent on the level of exposure to the services.

REFERENCES


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