

# Issues Affecting the Adoption and Continual Usage of Internet Banking Services in Semi-Rural Areas of South Africa

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## ABSTRACT

*In modern society, Information communication technology (ICT) diffusion is very rapid. However, ICT infusion is very slow. Several issues contribute to ICT infusion. They range from social, economic, demographic and political reasons. Internet banking is one such ICT contribution that is facing limited acceptance in some parts of South African society. This research looks at issues affecting the adoption and continual usage of Internet banking in a South African semi rural area, Mafikeng region. Although Internet banking has been receiving a lot of interest worldwide, very little methodical study has been done to determine reasons why many people in semi rural areas like Mafikeng do not adopt and make use of Internet banking services. Technology Acceptance Model (TAM) was used to guide the enquiry process into factors affecting Internet banking infusion. Internet Security was found to be a major factor contributing to Internet banking adoption and continual usage in Mafikeng.*

**Keywords:** Internet Banking, Technology Acceptance Model, Internet Security, ICT diffusion, South Africa

## 1. INTRODUCTION

For banks to serve clients through the Internet can be very risk if security is not improved. The primary services provided through Internet banking are transferring money among one's own accounts, paying bills, checking account balances and sending and receiving confidential information between banks and their clients.

Information about financial institutions, their customers and financial transactions are considered very sensitive. Doing such business via a public network consequently introduces new challenges for information security. Internet banking system must solve issues of authentication, confidentiality, integrity and non-repudiation. The system must ensure that only authorized people can access an Internet banking account, the information viewed remains private and cannot be modified by third parties. Any transactions made should be traceable and verifiable. The behavior of people in a semi rural area of South Africa towards the adoption and usage of Internet banking will be the focus of this paper.

The rest of the paper is as follows: **Section Two** discusses the general Internet issues in South Africa. **Section Three** discusses the theoretical frameworks used to appraise the adoption of information systems in the society. **Section Four** looks at the research approach, **Section Five** discusses the results and **Section Six** concludes the discussion.

## 2. BACKGROUND TO INTERNET USE IN SOUTH AFRICA

South African Internet users have been increasing steadily since 2000 from 2.4 million to 3.6 million in 2005 (Internetworldstats, 2006). This is an average user increase of 50% and an average of 6.7% of users relative to the country's gross population. Table 1 shows the increase in the number of internet users from 2000 to 2005.

The Goldstuck report on "Internet Access in South Africa 2004", mentioned the introduction of high speed or broadband wireless by Sentech, and the good rand to dollar exchange rate as some of the factors that could contribute to increased internet access in South Africa. This is in addition to the introduction and licensing of a Second National Operator (SNO). The introduction of the SNO will remove Telkom monopoly and introduce competition in the fixed line industry. This may eventually lead to decrease in telecommunication costs which are rated highly as one of the factors hindering internet infusion in South Africa. In addition to broadband access from Sentech, introduction of ADSL and ISDN from Telkom will further increase internet speed and will positively contribute to reduction of internet costs.

### 2.1 Internet Banking Review

For customers, developments taking place in the banking world means cheaper, faster and convenient banking (Chan 2001). Nowadays, banks are installing automated teller machines (ATMs) in a bid to bring services to the people. Banking has been revolutionized (Standard Bank, 2004). Point of sale banking, where people are allowed to use debit and credit cards to pay for goods and services in addition to withdrawing money have also been introduced.

Advances in information technology (IT) have created cell phone banking and Internet banking as serving channels in the banking sector. Internet banking is

Table 1. Internet Users Growth Trends in South Africa, 2000-2005. (Source: Internetworldstats, 2006)

YEAR	Users	Population	% Pen.	Usage Source
2000	2,400,000	43,690,000	5.5 %	ITU
2001	2,750,000	44,409,700	6.2 %	IWS
2002	3,100,000	45,129,400	6.8 %	ITU
2003	3,283,000	45,919,200	7.1 %	Wide World Worx
2004	3,523,000	47,556,900	7.4 %	Wide World Worx
2005	3,600,000	48,861,805	7.4 %	Wide World Worx

“communication with the Bank and/or performance of Transactions through the Internet network” (ING Bank, n.d.). Some people refer to it as online banking. Generally, the two words are used interchangeably and defined as terms “used for performing transactions, payments etc. over the Internet through a bank, credit union or building society’s secure website.” (Wikipedia, n.d.).

Internet banking has changed the way banking is conducted areas such as, distribution, production, payment and trading (Llevwellyn, 1997). It also created new customer values, in content, infrastructure, and context (Methlie, 1998). Although the number of Internet users has increased significantly over the past decade, only a small number of those users have made actual purchases over the Internet. The failure of the Internet as a retail distribution channel has been attributed to the lack of customer trust in this electronic channel and web merchants (Stewart, 1999) as media of banking.

Customer trust can be related to customer loyalty and hence increased revenues for a firm such as a bank (Reichheld, 1993), High customer trust, low customer turnover and decreased costs can generate new business for a firm via word-of-mouth recommendations (Schlesinger and Heskett, 1991). Studies on factors that determine customer trust and loyalty in Internet banking are becoming extremely important.

### 2.1.1 Internet Banking in South Africa

According to World Wide Worx (2004), South Africa is one of the richest and economically important countries in Africa. Despite the country’s sound economic framework, the apartheid legacy has prohibited South Africa from achieving its full economic potential.

South Africa’s four main domestic banks offer Internet banking services. These are Standard bank, First National bank, ABSA bank and Nedbank. According to SA.Internet.com (2001), ABSA had predicted an Internet population of 3.2 million by the end of 2002. On the contrary, online banking only reached the one million mark in South Africa at the end of 2003. This implies ABSA’s prediction went off the mark. World Wide Worx (2004)’s report, “Online banking in South Africa”, the number of online bank accounts in South Africa grew by 28% in 2003.

However, about half of the country’s Internet users have signed up for Internet banking (Webchek, 2002). This has encouraged banks to launch many new online banking offerings. Despite all these positive trends, few questions however remain unanswered. Two of such important questions are:

- Is there a great opportunity for growth amongst semi- rural Internet banking users in South Africa?
- What are the reasons contributing to the slow uptake of Internet banking services in South Africa?

This research paper covers an area that has long been neglected by many researchers in this field. It looks at a section of the society which falls between the urban elite and the seriously disadvantaged rural population, the semi rural society. This section of society has a great potential in adding value to businesses and must be considered as the next generation market niche especially in the banking sector. By its nature, the banking industry has traditionally focused on the urban elite as their revenue base. Market saturation is now forcing many banks to formulate new business strategies that are powered with new information systems strategies such as Internet banking strategies. These strategies can easily be realizable due to the fact that technology costs are ever going down and customers are ever looking for pervasive services.

### 2.2 Issues facing Internet Banking Customers

Internationally, banking is an information sensitive industry (Hoppe, 2001). There are a number of issues hampering the acceptance of Internet-based banking. These include customer satisfaction with existing service channels, security concerns, and a perceived lack of utility in the Internet channel. For newcomers to the Internet, issues such as security and privacy concerns are still the greatest barriers to entry.

### 2.3 Trust in Internet Banking

Trust is defined as “a willingness to rely on an exchange partner in whom one has confidence” (Mukherjee et al., 2003). Customer trust is depended upon Internet banking reliability and integrity. Trust plays a vertical role in building long-term

exchanges between banks and customers. There exist many factors that contribute to Internet banking acceptance by users. Different models are used to study technology acceptance in organizations and society at large. The next section discusses some of these models.

## 3. FRAMEWORKS FOR EVALUATING IT ACCEPTANCE IN SOCIETY

Business-to-customer (B2C) commerce in the financial industry depends on the consumers accepting and recognizing online banks the same way they have accepted brick and mortar banks (Mattila, 2001). One of the objectives of this research is to investigate consumer adoption and usage of Internet banking. The research will help South African banks to understand the attitude of customers towards Internet banking. In order for banks to find out the attitudes of their customers towards Internet banking, indirect indicators such as verbal expression or overt behavior should be used to measure hypothetical constructs that show variables that are not directly observable.

### 3.1 Technology Acceptance Model

Technology Acceptance Model (TAM) proposed by Davis (1989) is derived from the Theory of Reasoned Action (Cho & Cheung, 2003). The goal of TAM is to provide a description of the determinants of technology acceptance that are competent of explaining user behavior across a broad variety of end-user technologies and user populations (Kamel & Hassan, 2003). TAM achieves this goal by recognizing a small number of basic variables suggested by other researchers dealing in the cognitive and sentimental determinants of computer acceptance (Chan, 2001).

TAM assumes that perceived usefulness (PU) and perceived ease of use (PEOU) are the primary significance for computer acceptance behavior. This model hypothesize that actual usage is determined by users’ behavioral intention to use, which is influenced by their attitude and belief of perceived usefulness (Cho & Cheung, 2003). Users attitude towards Internet banking is determined jointly by perceived usefulness and perceived ease of use.

- **Perceived Usefulness (PU)** is whereby a potential user believes that his job performance would improve when using a particular system (i.e. Internet banking). How will Internet banking improve the way users do their financial transactions?
- **Perceived Ease of Use (PEOU)** is whereby a potential user believes that using a particular system (i.e. Internet banking) would be hassle free. Issues such as system’s user interface design come to the fore.
- **External variables** of the system, such as documentation, and training are also considered here.

### 3.2 Development of Hypotheses

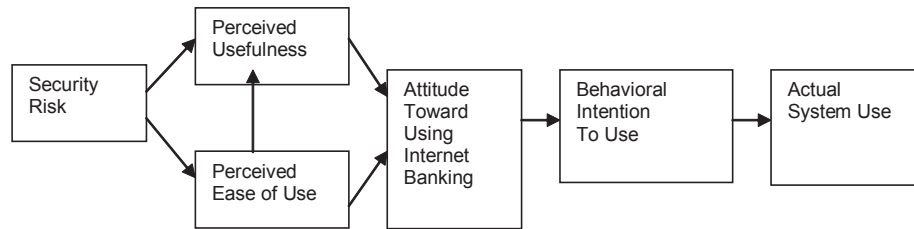
Hypotheses were developed based on the Technology Acceptance Model. According to Cho & Cheung (2003), perceived ease of use is a better predictor of attitude while perceived usefulness is a better predictor of intention of inexperienced users. The research considered the role of Internet banking security as an external variable affecting consumer adoption on Internet banking.

#### 3.2.1 Internet Banking Adoption Model

Figure 1 shows the TAM based Internet banking adoption model. Perceived ease of use (PEOU), perceived usefulness (PU), attitude, intention, and the actual use are directly extracted from the technology acceptance model (TAM).

- **PEOU:** In this research, PEOU means the ease of login to the bank site and perform transactions. PEOU is positively related to attitude towards Internet banking security.
- **Attitude:** The research defines attitude as a person’s positive or negative feeling about Internet banking. In TAM, attitude is directly related to intention. Internet banking security risk, PEOU, PU all influence attitude and they in turn affect the intention to use.
- **PU:** Perceived usefulness can be measured using security as a parameter. The perceived usefulness influences attitude towards using Internet banking. If Internet banking security is reliable and there exist Internet banking perceived usefulness, then people will have positive attitude towards using Internet banking.

Figure 1. TAM-based Internet banking adoption model



- **Security risk:** The effect of security risk on the adoption and continual usage of Internet banking was considered as an external variable. Security risk is the uncertainty users have on the fidelity of Internet transactions. This category includes issues pertaining to hackers, crackers, passwords, and the type of security protocols. Security risk may have negative impact on the PEOU and PU. If security risk on Internet banking web sites is reduced, users will be more willing to adopt and use the facility. The less the security risk, the higher PEOU, and PU.

3.2.2 Hypotheses Proposals

The following six hypotheses were proposed:

- H1: Peoples’ attitude towards Internet banking is directly related to Perceived ease of use (PEOU)
- H2: Perceived ease of use (PEOU) is directly related to perceived usefulness (PU) of Internet banking
- H3: Perceived usefulness is positively related to users’ attitude to use Internet banking
- H4: Users’ intention to use is dependent on users’ attitude towards Internet banking
- H5: Security risk is negatively related to Perceived ease of use of Internet banking
- H6: Security risk is negatively related to Perceived Usefulness of Internet banking.

4. RESEARCH APPROACH

This is a quantitative type of research. Quantitative research is based on the assumption that natural phenomena can be quantified in numeric terms. The development of metrics (numbers) that can be used to describe phenomena (objects and relationships) under study are the focus of this type of research (Cornford and Smithson, 1996). Because numbers (quantities) are the principal instruments to make a decision, this research becomes also a positivistic type of research.

Positivism is used to describe a philosophical position that can be discerned in research and can also involve crude and superficial data collection (Bryman, 2004). This type of research treats the subject of research as something capable of developing general theories of universal applicability (Cornford and Smithson, 1996). In some cases the theories need to be proposed and tested. The research will focus on a case of Mafikeng region. This case study exhibits particular characteristics that are not common to most of South African regions. It is a sample of participants from a semi rural background. The results that are found here may need to be supported with research from other representative areas of South Africa to make them more conclusive.

4.1 Research Design

A survey was conducted in the region of Mafikeng. The data gathering was done using a questionnaire. All the questions were of closed type. The intention was to collect information on people’s perception of Internet banking and Internet banking security. The questionnaire had three parts. Part I dealt with Internet access issues and use of Internet banking. Part II questions looked at respondent’s perception towards Internet banking. On a five point Rieckert scale, respondents were asked to indicate what they think about different aspects of Internet banking and security. Part III of the questionnaire included questions that gathered the demographic characteristics of the participants. Issues like age, gender and

employment status were asked. Data collection took place between November and December 2005. Hundred questionnaires were distributed, fifty four (54) were completed and returned, and forty six (46) were not returned. All the data collected was analyzed using SPSS 13.1 version for windows.

5. RESULTS AND ANALYSIS

Comparisons were made between people who are using and not using Internet banking. Occupation, gender, access to Internet and Internet banking knowledge were considered. Table 2 shows the profile of the respondents. Of the returned 54 questionnaires, nineteen(19) were users of Internet banking, thirty three (33) were not using Internet banking and there were two missing data. Of these 54, twenty six (26) were males and twenty eight (28) were females.

Table 3 shows the distribution of respondents according to places they access the Internet.

The purpose of this question was to know which place is most used for Internet access. Of 54 observations, 9.3% access Internet from school, 70.4% access Internet from the work place, only 1.9% access it from home and 18.5% were missing data. This shows that from the sample chosen, very few people can pay Internet access at home.

Table 4 shows statistics of people who know about Internet banking. The purpose of this question was to give the researcher a guide of whether people have knowledge about Internet banking.

About 81.5% (44) of participants have knowledge of Internet banking and 16.7% (9) have never heard about Internet banking before. We have 1.9% (1) missing data. Table 5 shows results of people who are using Internet banking. These results will be used to judge Perceived Ease of Use and Perceived Usefulness of Internet banking.

Table 2. Respondent’s profiles

<b>Gender</b>	Male	48.1%
	Female	51.9%
<b>Occupation</b>	Employed	81.5%
	Unemployed	18.5%
<b>Age</b>	17-21	7.4%
	22-30	29.6%
	31-40	24.1%
	41-50	25.9%
	51-60	11.1%
	61 and above	1.9%
<b>Experience in using Internet banking</b>	Yes	35.2%
	No	61.1%
	Missing data	3.7%

Table 3. Place of Internet access

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	School	5	9.3	11.4	11.4
	Work	38	70.4	86.4	97.7
	Home	1	1.9	2.3	100.0
	Total	44	81.5	100.0	
Missing	System	10	18.5		
Total		54	100.0		

Table 4. Knowledge of Internet banking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	44	81.5	83.0	83.0
	No	9	16.7	17.0	100.0
	Total	53	98.1	100.0	
Missing	System	1	1.9		
Total		54	100.0		

Table 5. Internet banking users

**Do you have experience using Internet Banking?**

					Cumulative
Valid	Yes	19	35.2	36.5	36.5
	No	33	61.1	63.5	100.0
	Total	52	96.3	100.0	
Missing	System	2	3.7		
Total		54	100.0		

Table 6. Security perception

**Advances in Internet security technology provide for safer Internet Banking.**

					Cumulative
Valid	Disagree	2	10.5	11.1	11.1
	Neither	9	47.4	50.0	61.1
	Agree	6	31.6	33.3	94.4
	Strongly Agree	1	5.3	5.6	100.0
	Total	18	94.7	100.0	
Missing	System	1	5.3		
Total		19	100.0		

About 35.2% (19) of respondents have experience using Internet banking. This implies that out of 54, 61.1% (33) have no experience of Internet banking. There were two (2) missing data. Table 6 shows the Internet banking user's perception of Internet banking security. The Internet banking users are the ones who can give the Perceived Ease of Use and Perceived Usefulness from their experience in using Internet banking. Perceived Ease of Use is a better predictor of attitude and Perceived Usefulness is a better predictor of intention of inexperienced users (Cho & Cheung, 2003).

The respondents gave their answers using a five point Rieckert scale. As discussed in section 4.1, the range was from disagree (scale 1) up to strongly agree (scale 5).

The responses answered the research questions. The questions test our proposed model, where security was used as an external variable. The research questions

concerns the most important elements of Perceived Usefulness (PU) and Perceived ease of Use (PEOU) in Internet banking. When respondents asked to provide their perception about security in Internet banking, Perceived Usefulness was considered the most important element of the PU construct.

Respondents were asked to indicate whether they think advances in Internet security technology provide for safer Internet banking. About 10.5% of the 19 who use the service disagree that advances in Internet security technology provide for safer Internet banking, 47.4% observations did not give their perceptions, 31.6% observations agree that advances in Internet security technology provide for safer Internet banking while only 5.3% observations strongly agree. We had 5.3% (1) missing data.

Table 7 indicates the distribution of responses with respect to the user friendliness of Internet banking. This question also was used in our proposed model, where

Table 7. User friendliness of Internet banking

**Internet Banking is easy-to-use.**

					Cumulative
Valid	Neither	2	10.5	10.5	10.5
	Agree	11	57.9	57.9	68.4
	Strongly Agree	6	31.6	31.6	100.0
	Total	19	100.0	100.0	

Table 8. Advice other to use Internet banking

**I will not advise others about to use Internet Banking.**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	15.8	15.8	15.8
	Disagree	4	21.1	21.1	36.8
	Neither	4	21.1	21.1	57.9
	Agree	7	36.8	36.8	94.7
	Strongly Agree	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

security is also an external variable in Technology Acceptance Model (TAM). This research question also concerns an important element of Perceived Usefulness (PU) and Perceived ease of Use (PEOU) in Internet banking. In respondents' perception about ease of Internet banking, Perceived Ease of Use was considered the most important element of the PEOU construct.

About 10.5% (2) observations of 19 strongly disagree that Internet banking is easy-to-use, and 57.9% (11) agree that Internet banking is easy-to-use while 31.6% (6) observations strongly agree.

The focus of the question above was on the direct and indirect effects of PEOU and PU on the intention to choose Internet banking. Attitude construct has a larger direct effect on intention than PEOU and PU. The answer to the question above is that attitude mainly influences intention and behavior directly, but also indirectly through PEOU and PU.

About 15.8% (3) observations of 19 strongly disagree that they will not advise other to use Internet banking, 21.1% (4) observations disagree, 21.1% (4) did not provide their feeling, 36.8% (7) observations agree that they will not advise others to use Internet banking, 5.3% (1) observations strongly agree.

**5.1 Hypotheses Results**

Using the analyses made on section 5, Table 2 through to Table 7, the following deductions can be made about the proposed hypotheses.

H1: Perceived ease of Use (PEOU) is directly related to peoples' attitude towards Internet banking security.

The results of this hypothesis show that the majority of responses confirmed that attitude towards Internet banking adoption is directly related to Perceived Ease of Use and Perceived Usefulness. Attitude is also indirectly affected by security risks in Internet banking.

H2: Perceived ease of use (PEOU) is directly related to perceived usefulness (PU) of Internet banking.

Perceived ease of Use is directly related to Perceived Usefulness. This hypothesis was tested by the question "is Internet banking ease to use?". This hypothesis

has been proven true as the responses were positive about the ease of Internet banking.

H3: Perceived usefulness is positively related to users' attitude to use Internet banking.

The result of the above hypothesis is true because the responses show that if the Perceived Usefulness is positive the user's attitude will also be positive.

H4: Users' attitude has a positive relation to the users' intention towards the adoption of Internet banking.

The result of the above hypothesis is also true because if the response of attitude towards Internet banking is positive, the intention to use will also be positive.

H5: Security risk is negatively related to Perceived Ease of Use of Internet banking

The hypothesis above explains that if the security risk is high in Internet banking, the possibility that user's see it to be Perceived Ease of Use is negative.

H6: Security risk is negatively related to Perceived Usefulness of Internet banking

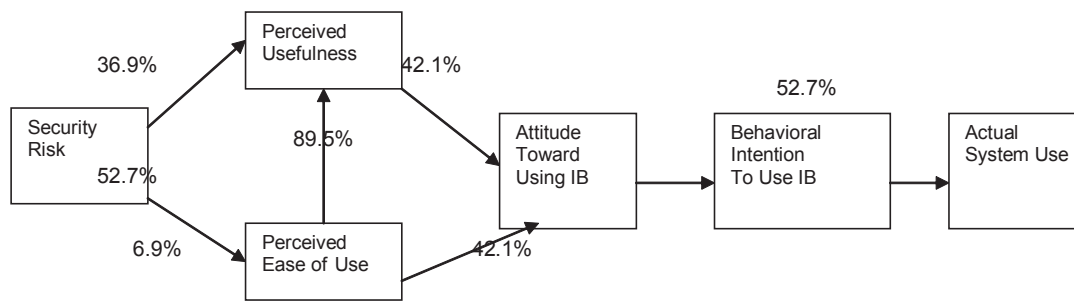
The hypothesis has been proved that it is true that security risk is negatively related to Perceived Usefulness.

Figure 2 shows the percentage distributions of the results obtained that justify the six hypotheses that were developed above.

**6. DISCUSSIONS AND CONCLUSIONS**

TAM as an appraisal technique for technology acceptance in communities can be applied effectively if other variables are kept constant. By focusing on the security parameter in Internet banking (IB), and ignoring other factors, the research has

Figure 2. Results for TAM-based Internet banking model



managed to show that Internet banking acceptance is directly related to both PU and PEOU but inversely related to the security issue. In other words, security as portrayed herein, is a major factor that reduces the uptake and continual use of Internet banking in Mafikeng.

The study has however shown that apart from security, in semi rural areas like Mafikeng, the following factors play a very important role in the acceptance and usage of Internet banking.

- Economic status of the society. Mafikeng is generally a poor society and prospective Internet banking users have no access to the Internet. Many of those using Internet access it from work places as indicated in Table 2.
- The people have no knowledge of the security systems in place in Internet banking. This has been indicated in the research by the fact that many respondents did not answer the security question, opting to abstain, Table 6.
- Implicitly, costs such as telkom costs, bandwidth and speed may also affect the uptake of a technology such as Internet banking. The research bases this argument on the fact that, if at all, a user has to use an Internet café to access the facility; the costs can be prohibitively very high. All these are a combination of Internet speed, bandwidth and telkom costs.
- The literacy level of a society play a major role in this type of research. Usually technologies such as Internet are associated with the educated, learned elite of the society. This factor was not properly followed in this research but considering that Mafikeng is a semi rural area, many people did not know what to answer on the questionnaire because they are semi literate. Table 2 statistics supports this fact.

The biggest limitation of the research is the fact that the number of respondents was very small. In studies like this, the sample could have been increased to about a thousand (1000) participants. This was not possible because of the financial and time constraints. Also, since this is a case study, the results may not be accepted at face value to be a general representation of all South African semi rural areas. The research intends to spread the investigation throughout South African towns so as to reach a general conclusion.

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[www.irma-international.org/chapter/hybrid-genetic-metaheuristic-for-two-dimensional-constrained-guillotinable-cutting-problems/112326](http://www.irma-international.org/chapter/hybrid-genetic-metaheuristic-for-two-dimensional-constrained-guillotinable-cutting-problems/112326)