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## Mobile Opportunities, Mobile Problems: Assessing Mobile Commerce Implementation Issues in Malawi


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### Abstract

The increased usage of mobile phones and the rapid developments in mobile communication technologies present a surge for m-commerce. While m-commerce has been implemented in many countries in both the developed and developing world, it remains an unexploited area in some African countries, including Malawi. This paper investigates the problems that Malawi could face in the implementation of m-commerce and the stakeholders to drive m-commerce implementation in the country. The research has established that banks, mobile phone operators and the central bank, among other institutions, are the key stakeholders to play a leading role in the implementation of m-commerce in Malawi. The paper has further identified a number of possible m-commerce applications in the country including m-banking, m-shopping and m-health.

However, the implementation of these applications will face technical, business and policy problems. These have been discussed and analyzed. The results of the research are expected to help in directing the focus of researchers, policymakers, technical implementers, service providers and other stakeholders, as Malawi joins the race for mobile payment systems.

Keywords: **e-commerce; m-commerce; electronic payment systems; Malawi; Africa**



## INTRODUCTION

Advances in mobile communication technologies and the proliferation of mobile phones and other mobile devices such as personal digital assistants and smartphones have created many opportunities for m-commerce, defined as the use of mobile devices and wireless networks to perform commercial transactions (Ayo, et al., 2007; Hu, et al., 2008) or simply the use of wireless hand-held devices to buy or sell goods and services (UNCTAD, 2002). While the traditional e-commerce offers "anytime" access to services, m-commerce enables one to perform business transactions "anytime and anywhere".

Malawi, just like most developing countries in Africa, has not yet implemented full-fledged m-commerce. Albeit developments in the country's payment systems such as the introduction of electronic payments using smart cards (Malswitch, 2008), Malawi still remains a predominantly cash-based society (Ngalande, 2003). While m-commerce would bring numerous opportunities to the country, such offerings do not come without business and technical implications. This paper, therefore, investigates the issues associated with the implementation of m-commerce in Malawi. The findings of the study present a reference point for researchers, policymakers, technical implementers, service providers and other stakeholders, as Malawi joins the race for mobile payment systems.

The paper is organized as follows: the first section gives an introduction to the study and presents a general overview of m-commerce. The second section reviews m-commerce features and current applications. To set the case for Malawi, the section introduces the country with reference to payment systems and current m-commerce trends. Subsequently, a gap in the existing literature on m-commerce, in terms of country-specific implementation issues, is identified. In the third section, the approach to undertaking the research is highlighted. A discussion of the research results is presented in the fourth section and finally, the fifth section draws conclusions of the research.

## M-COMMERCE TECHNOLOGY

### M-Commerce Features and Applications

There is a linkage between m-commerce and e-commerce. This relationship exists mainly because both involve electronic transactions that are conducted over computer-mediated networks via telecommunication networks. Furthermore, m-commerce exhibits all the different types of e-commerce, depending on the buyer and the seller involved, namely Business To Business (B2B), Business To Consumer (B2C), Consumer To Business (C2B) and Consumer To Consumer (C2C) (Bhasin, 2005). Although m-commerce delivers e-commerce over mobile devices, there are some features that are unique to m-commerce transactions or applications. Tiwari, et al. (2006) and UNCTAD (2002) identify a number of these unique features namely ubiquity, immediacy, instant

connectivity, localization, data portability, pro-active functionality and simple authentication procedure.

M-commerce is currently applied to a number of business domains and new areas continue being identified. Ayo, et al. (2007) and Tiwari, et al. (2006) classify m-commerce applications into 8 broad categories namely m-banking, m-entertainment, mobile information services, m-marketing, m-shopping, m-ticketing, m-health and telematics services.

## Welcome to Malawi

Rated as one of the least developed countries in the world (UNCTAD, 2006), Malawi is a low-income country whose development process is structurally disadvantaged. The country is characterized by a weak human resource, economic vulnerability and low income. The country has an inadequate telecommunication infrastructure with only 8 fixed telephone lines for every 1000 people as of 2003 (UNCTAD, 2006). Nonetheless, communications infrastructure in other parts of the country is efficient and can be used as a reliable platform on which to conduct businesses. This is supplemented by the existence of mobile phone network coverage in most parts of the country even in the remote rural areas. A number of banks exist in Malawi including First Merchant Bank, INDEbank, Malawi Savings Bank, National Bank of Malawi, NBS Bank, Nedbank, Opportunity International Bank of Malawi, Standard Bank and the newly established Ecobank and FDH Bank. Products and services offered differ from bank to bank and include account management (deposits, withdrawals, funds transfers), loans, foreign exchange, stock brokerage, financing towards insurance premiums and the acquisition of asserts. The regulation of these banks and other financial institutions is within the mandate of the country's central bank, the Reserve Bank of Malawi (RBM). RBM also advances the implementation of payment systems and clearing houses in Malawi inline with the Reserve Bank of Malawi 1964 Act of Parliament which was amended in 1989 (RBM, 2003). There are two mobile phone operators in Malawi, Zain and TNM, and plans are underway to license a third and a fourth operator. These operators offer a wide range of services to their customers including Short Message Service (SMS), international roaming, direct recharging and transfer of airtime from one account to another. Both operators also offer Wireless Application Protocol (WAP) services enabling subscribers to surf the internet using their mobile phones.

Until the end of the 20$^{th}$ century, Malawi was an entirely cash-based society (Ngalande, 2002). Business transactions such as paying for goods and services involved exchange of cash and sometimes issuing of cheques. In terms of settlement, inter-bank money transfers were done manually, initiated by a bank sending a fax to RBM, instructing it to debit the bank's account and credit a beneficiary bank's account. To clear cheques, banks met at RBM to exchange cheques and determine the net obligations, which would then be effected in RBM's general ledger by the end of the day at 17 hours (RBM, 2008). Electronic payments emerged in Malawi with the establishment of Malawi Switch Center (Malswitch) by RBM in 1999 to facilitate the implementation of a clear, secure and guaranteed electronic payment infrastructure (Malswitch, 2008). Malswitch provides a national network infrastructure which links all the major banks in Malawi. Malswitch acts a platform for electronic payment systems such as the Real Time Gross Settlement (RTGS) system for electronic settlement, the Electronic Cheque Clearing House (ECCH)

for electronic cheque clearing, the electronic bidding system through which banks and financial institutions nationally can electronically place their bids for treasury and RBM bills; and the Credit Ceiling Authority system that automates the process of funding arrangements for government departments and ministries. Smart cards are also available in Malawi. Smart cardholders can use their smart cards as an electronic wallet to pay for goods and services, transfer funds from one smart card to another, manage recurring payments such as standing instructions, among other services. In the recent past, the country has witnessed the introduction of the electronic voucher system, which allows mobile and fixed-line phone subscribers to buy prepaid airtime for their phones from either an Auto Teller Machine (ATM) or a Point of Sale (POS) terminal at merchants' shops (Malswitch, 2007; Malswitch Today, 2008; NBM, 2008). Similar systems on offer have facilities to pay for water and electricity bills (NBM, 2008) and television subscription bills (NBS Bank, 2008) at the ATM.

M-commerce has not yet been implemented in Malawi. There are, however, traits of mobile information services but even these are still very young and underdeveloped. The race for such services started by the Malawi Commodity Exchange (MACE) and the Initiative for Development and Equity in African Agriculture (IDEAA) Malawi, in partnership with TNM. IDEAA and MACE have introduced a mobile phone notification service, which allows farmers, traders, exporters and importers to receive price bulletins and information on offers to buy and sell agricultural produce via SMS (IDEAA Malawi, 2004; RHVP, 2007). Another development in mobile information services is an SMS service by the country's electricity provider, enabling customers to receive up-to-date post-paid electricity bills via SMS. Much recent developments have been prepaid airtime top up services by Zain to transfer prepaid units from a merchant's bulk mobile phone account to a subscriber's account (Daily Times, 24th April 2008; Celtel, 2008). All these services available in Malawi do not necessarily involve financial transactions or mobile payments but simply communication of business-related information over mobile phones. UNCTAD (2002) terms this "mobile business", a limited form of m-commerce.

## Assessing M-Commerce Implementation Problems

Although some traits of m-commerce exist in Malawi, the country just like most developing countries in Africa, has not yet fully implemented m-commerce. The increased number of opportunities and possible applications in m-commerce would bring with it both technical and managerial issues. These issues have been investigated by a number of authors. One identified issue in m-commerce is the lack of rapid growth. Hu, et al. (2008) have observed that this could be due to the lack of what are termed 'killer applications', that is, applications that transform the way people live, work and conduct business. In pursuit of such killer applications, Hu, et al. (2008) identify m-payments and m-banking, as applications which when fully adopted will bring about major technological, economic, and social growth in m-commerce. Tarasewich, et al. (2002) have also identified a number of problems related to m-commerce. These problems range from mobile client challenges to communications infrastructure challenges to other technological challenges such as management of viruses, security of data transmitted over wireless networks and control of mobile device location data. However, these issues are neither country-specific nor focussed on a specific group of stakeholders in m-commerce. Most importantly they do not address m-commerce implementation.

Academic literature on m-commerce in the context of Malawi is young. The business case for m-commerce in Malawi has already been justified elsewhere (Wandawanda, 2005). Generally, there is consumer demand for m-commerce among major stakeholders such as mobile phone operators, banks, private businesses and the general public, particularly young people. Albeit this established demand, no known research has been conducted to investigate the technical or business implications of launching m-commerce in Malawi. In the absence of the empirical research, researchers and implementers may use m-commerce literature from other developing and developed countries to recognize potential problem areas in the implementation of m-commerce in Malawi. However, much of this literature is centred on analyses of current applications, prospects of new applications and trends in user adoption (see for example Khalifa & Cheng, 2002; Sarker & Wells, 2003; Jarvenpaa, et al., 2003; Carlsson, et al., 2005; Harris, et al., 2005). Existing research on m-commerce does not, therefore, adequately address implementation issues in Malawi. By recognizing this knowledge gap, this paper proceeds in the direction of investigating the issues and problems that would be encountered in the implementation of m-commerce in Malawi.

## RESEARCH METHODOLOGY

The main objective of the research is to identify the major problems that would be encountered in the implementation of m-commerce in Malawi. The research also identifies the key m-commerce stakeholders and possible business functions where m-commerce can feasibly be applied in Malawi. The unit of analysis are organizations that benefit from payment systems or are likely to be part of the payment systems' policymaking processes in the country.

Using a combination of purposive, stratified and simple random sampling, a representative research sample was selected from employees of the central bank, major banks, financial institutions, mobile phone operators, communications regulatory authorities, other private companies and institutions involved in the lobbying of policy changes and implementation. A questionnaire, employing both closed and open-ended questions, was used as the primary data collection tool in addition to a literature search. Questions asked ranged from which organizations ought to be driving the implementation of m-commerce in Malawi to the possible sectors of the economy where m-commerce may be applied and the likely problems to be encountered in m-commerce implementation in the country. A total of 70 questionnaires were sent out and 58 were returned representing a response rate of 83%.

## RESULTS

This paper adopted descriptive statistics as a method for analysing the research data and the completed questionnaires were processed using Statistical Package for the Social Sciences (SPSS).

### a) Respondent's Details

| | | Frequency | Percent |
|---|---|---|---|
| Valid | Banking | 18 | 31.0 |
| | Central bank | 10 | 17.2 |

| | | | |
|---|---|---|---|
| | Financial services | 8 | 13.8 |
| | Government | 2 | 3.4 |
| | Mobile phone operator | 4 | 6.9 |
| | Other | 16 | 27.6 |
| | Total | 58 | 100.0 |

**Table 1: Respondents' Organization**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | Business management | 8 | 13.8 |
| | Policy making | 2 | 3.4 |
| | Technical | 30 | 51.7 |
| | Other | 18 | 31.0 |
| | Total | 58 | 100.0 |

**Table 2: Respondents' Nature of Work**

As Table 1 shows, 31.0% of the respondents are from banks, 17.2% are from Malawi's central bank, 13.8% work in financial institutions, 3.4% are government employees, 6.9% are from mobile phone operators and the rest (27.6%) are from other organizations such as regulatory authorities, business advocacy bodies and marketing firms. The nature of work for these respondents (refer to Table 2) is business management (13.8%), policy making (3.4%), technical (51.7%) and other types of work such as senior management, technical management, sales, commercial and business development (31.0%). The respondents hold a variety of job positions ranging from technical positions such as Heads of IT, Mobile Banking and Technical Services, IT Managers, Software Architects and Network Support Engineers to business positions such as Sales Managers, Heads of Operations and Banking and Payment Systems Analysts.

**b) M-Commerce Drivers in Malawi**

| | N | Percent | Percent of Cases |
|---|---|---|---|
| Banks | 44 | 33.8% | 75.9% |
| Government | 18 | 13.8% | 31.0% |
| Mobile phone operators | 36 | 27.7% | 62.1% |
| Reserve Bank | 20 | 15.4% | 34.5% |
| Other | 12 | 9.2% | 20.7% |
| Total | 130 | 100.0% | 224.1% |

**Table 3: M-Commerce Drivers in Malawi**

Banks (75.9%) and mobile phone operators (62.1%) should take a leading role in spearheading the implementation of m-commerce in Malawi. However, the central bank

(34.5%), the government (31.0%) and other institutions (20.7%) could also play a role in m-commerce implementation in the country. These other institutions include Malswitch, stockbrokers, registered merchants and other service providers currently offering solutions on the internet.

**c) Business Sectors for Possible M-Commerce Applications**

| | N | Percent | Percent of Cases |
|---|---|---|---|
| Agriculture | 28 | 9.6% | 48.3% |
| Banking | 42 | 14.4% | 72.4% |
| Entertainment | 22 | 7.5% | 37.9% |
| Financial information services | 30 | 10.3% | 51.7% |
| Health | 22 | 7.5% | 37.9% |
| Insurance | 12 | 4.1% | 20.7% |
| Manufacturing | 4 | 1.4% | 6.9% |
| Marketing and advertising | 28 | 9.6% | 48.3% |
| News | 26 | 8.9% | 44.8% |
| Shopping | 34 | 11.6% | 58.6% |
| Tourism | 16 | 5.5% | 27.6% |
| Vehicle tracking and theft protection | 22 | 7.5% | 37.9% |
| Other | 6 | 2.1% | 10.3% |
| Total | 292 | 100.0% | 503.4% |

**Table 4: Business Sectors for Possible M-Commerce Applications**

A number of business domains and sectors of the Malawi economy have been identified as being suitable for m-commerce applications in the country (refer to Table 4). These include Banking (72.4%), shopping (58.6%), financial information services (51.7%), agriculture, marketing and advertising (48.3%), news (44.8%), health, entertainment and vehicle tracking (37.9%), tourism (27.6%), insurance (20.7%) and manufacturing (6.9%). It has also been established that other sectors (10.3%) such as stock broking, lottery and charity donations could benefit from m-commerce applications in Malawi.

**d) Problem Occurrence During M-Commerce Implementation**

| | | Frequency | Percent |
|---|---|---|---|
| Valid | Yes | 34 | 58.6 |
| | No | 24 | 41.4 |
| | Total | 58 | 100.0 |

**Table 5: Problem Occurrence During M-Commerce Implementation**

The majority (58.6%) of the respondents believe that problems will be faced in the implementation of m-commerce in Malawi.

**e) M-Commerce Implementation Problems**

A number of m-commerce implementation-related issues and problems in Malawi have

been identified. These can be broadly classified into 3 categories namely technical, business and policy problems.

**Technical Problems**
Malawi lacks both the telecommunication infrastructure and the human resource with m-commerce technical expertise to successfully launch m-commerce. Some areas of the country do not have mobile network coverage and supporting facilities such as road network and electricity. The country has no optic fibre network running across the country and as a result network service providers use E1 wireless links and leased lines to channel traffic. The signals are not always clear and the calls are often cut due to interruption. Also, an SMS can sometimes take over 8 hours to be received. This poses a serious challenge for m-commerce solutions. What will happen if a connection is cut during a transaction? What is the implication if the transmission of authentication information is delayed?

Additionally, it would be extremely difficult to unambiguously identify mobile phone owners, a necessarily step in m-commerce transactions, because Malawi does not have a formal addressing system. As such, SIM authentication methods employed in m-commerce applications may not work in Malawi.

Another technical drawback is the limitation of mobile handsets. Versatile m-commerce solutions deploy Java for interactive GUI. However, most mobile phones owned by subscribers in Malawi are not Java-enabled, and this may limit the range of m-commerce applications that may be feasibly implemented.

**Business Problems**
Setting up the necessary telecommunication infrastructure on which m-commerce should be based will incur huge capital investments. Service providers may not be ready for such a costly undertaking. Also, m-commerce will likely be faced with low levels of user adoption. The new technology is going to raise security concerns. How secure is it to make a payment using a mobile handset when the gadget may easily get lost or stolen and therefore abused? Furthermore, illiteracy levels in Malawi are high, especially among the rural communities. Usage of m-commerce solutions by these people is likely to be problematic with erroneous or unintended transactions being common.

In addition, Malawi is a largely cash-based society. The benefits of cash are obvious and include no transaction costs, privacy and immediacy. Why would a consumer pay for a product or service using a mobile device, possibly at a transaction fee when cash is without cost? Why would users prefer m-commerce solutions when they present a privacy risk as they leave a trace of one's habits and lifestyle? What is the justification for m-commerce when payment by cash is immediate with no need for any processing?

**Policy Problems**
No legal framework and policy for regulating mobile payment systems currently exists in Malawi. Consequently, there are fears amongst key stakeholders that any m-commerce solution implemented in the near future will suddenly meet obstacles from the central bank once a regulatory policy is set up which restricts services that will have already been implemented. As m-commerce is a new phenomenon in Malawi, the country also lacks the technical expertise with which to develop regulatory policies.

## CONCLUSION

Although some e-commerce applications like internet banking exist in Malawi, full-fledged m-commerce is not yet available. The key stakeholders to drive the implementation of m-commerce in Malawi are banks and mobile phone operators. However, the central bank, the government and other institutions could also play a leading role in spearheading m-commerce implementation. M-commerce can be applied to a number of business domains in Malawi including banking, shopping, financial information services, agriculture, marketing, news, health, tourism and insurance. From these identified business areas, the range of m-commerce applications that can benefit Malawi are m-banking, m-shopping, mobile information services, m-marketing and m-health.

Inasmuch as the identified m-commerce applications are feasible in Malawi, their implementation would face a number of technical, business and policy challenges. From the technical point, mobile handset limitations, authentication problems and lack of telecommunication infrastructure will likely affect m-commerce applications. The other challenges to the implementation of m-commerce in Malawi are business-related and include huge capital investments, low user adoption levels, low literacy levels and reliance on cash as the only medium of exchange. The third obstacle to m-commerce implementation in Malawi lies in regulatory policies. Malawi currently has neither the legal framework for regulating mobile payment systems nor the technical expertise to develop one. Successful implementation of m-commerce in Malawi will require researchers, policymakers, technical implementers, service providers and other stakeholders to focus their efforts in these emerging issues.

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