

**POTENTIAL GROWTH OPPORTUNITIES FOR
SMS BASED UTILITY PAYMENTS AND BANKING
SERVICES IN SRI LANKAN CONTEXT**

 University of Moratuwa, Sri Lanka.
MASTER OF BUSINESS ADMINISTRATION
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IN
INFORMATION TECHNOLOGY

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December 2007

POTENTIAL GROWTH OPPORTUNITIES FOR SMS BASED UTILITY PAYMENTS AND BANKING SERVICES IN SRI LANKAN CONTEXT

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The Dissertation was submitted to the Department of Computer Science & Engineering of the University of Moratuwa in partial fulfillment of the requirement for the Degree of Master of Business Administration.

Department of Computer Science & Engineering

University of Moratuwa

December 2007

DECLARATION

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ABSTRACT

Mobile phone has started to touch the hearts of millions of Sri Lankans while Internet is still not accessible for many of them. Therefore if people can save money and time by conveniently carrying out banking and utility payments transactions through the mobile phone from where they are, it should obviously hit the society with lot of socio-economic benefits.

But the reality is that the strength of the SMS based payments has not been exploited to its full potential in Sri Lanka though it is experimented by many banks and mobile operators in the country. The main objective of this research was to investigate the influential factors that have led these services to be unpopular among Sri Lankans. A model, which can be used to promote these services in the country, was produced at the end of the research.

Global research findings on mobile and SMS based banking and payments, identified through the literature were discussed. A qualitative study was carried out to identify the influential factors pertaining to mobile and banking industry. User perspectives were identified through a questionnaire based survey conducted with a selected sample of mobile subscribers banking with four leading banks in Sri Lanka.

Data gathered from the consumer survey were statistically analyzed through linear regression analysis and simple correlation analysis. It was concluded that there is a significant relationship between the SMS based payment services usage and the influential factors such as awareness, security confidence, service reliability and the SMS usage intensity of the mobile subscribers. However, there was no significant linear relationship between services usage and easy usability of the services. It was also concluded that SMS based banking and payments services offered by the mobile operators and banks in Sri Lanka, are not aligned with the business strategies of the respective organisations.

ACKNOWLEDGEMENT

The success of this research project can be attributed to many individuals. All of them have supported me in different ways at different stages of the project. I would like to express my gratitude to each of them for all the support, advices and encouragement extended to me during the project.

Also there are few individuals, who deserve a special word of thank for the highly important contributions made to help this research project a success. First and foremost, I wish to express my sincere gratitude to my supervisor Dr. Chathura De Silva, Senior Lecturer, Department of Computer Science and Engineering, University of Moratuwa, for his advices, guidance and support extended to me during the entire research study.

I would extend my heartfelt gratitude to Mr. Saman Perera, GM - Information Systems, Mobitel (Pvt.) Ltd and all my co-workers for the encouragement, guidance and helping me in various ways through out the research project.



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I wish to thank Mrs. Vishaka Nanayakkara, Senior Lecturer and Head of Department of Computer Science and Engineering, University of Moratuwa, and the staff of the Department for all the support extended to us during the research period.

I would also like to thank Dr. Kennedy Gunawardena, Senior Lecturer, University of Sri Jayawardenapura for his assistance and guidance on research design and data analysis.

I would extend my sincere gratitude to all individuals including industry specialists, who participated in the pilot study, qualitative study and the research survey for spending their valuable time on my research.

Last but not least, I would be really grateful to my wife Niru and little daughter Ransilu for their patient, understanding and support in making this endeavor a success.

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ABBREVIATIONS

ARPU	– Average Revenue Per User
ATM	– Automatic Teller Machine
BOISL	– Board of Investment Sri Lanka
BTS	– Base Transceiver Station
CBSL	– Central Bank of Sri Lanka
CDMA	– Code Division Multiple Access
GDP	– Gross Domestic Products
GSM	– Global System for Mobile Communications
HNB	– Hatton National Bank
HSBC	– Hongkong and Shanghai Banking Corporation
ISP	– Internet Service Provider
ITU	– International Telecom Union
IVR	– Interactive Voice Response
LAN	– Local are Network
LCB	– Licensed Commercial Banks
MSC	– Mobile Switching Center
NDB	– National Development Bank
NFC	– Near Field Communication
NTB	– Nations Trust Bank
OTA	– Over the Air
PDA	– Personal Digital Assistant
PIN	– Personal Identification Number
SIM	– Subscriber Identification Module
SMS	– Short Messaging Service
SMSC	– Short Message Service Center
SWIFT	– Society for Worldwide Inter-bank Financial Telecommunication
TRCSL	– Telecommunication Regulatory Commission of Sri Lanka
VPN	– Virtual Private Network
WAN	– Wide Area Network
WAP	– Wireless Application Protocol

1. INTRODUCTION

1.1 Overview

Customers continue to access retail banks by walking into their local branch and talking with members of staff. And they use traditional ATMs to access a relatively simple range of banking services. However, automated methods of access are on the increase, and the Internet and Mobile phone have started to play a significant role in the process.

Electronic transactions were first experienced in Sri Lanka around 2 decades ago with the introduction of Bank Automatic Teller Machines (ATM) to the country. Today ATM card has added so much of convenience to the Banking consumer making all types of banking services available 24 hours through an auto generated Personal Identification Number (PIN). So the ATM card has become so much popular today as it has eliminated numerous hassles faced by the customer while physically visiting the bank counters even for a simple cash withdrawal.

'e-Channelling is another successful electronic payment solution, which has made the life easier for all Sri Lankans, who make channeling appointments with specialist consultants in private hospitals. This service has eliminated the hassle of physically visiting hospitals and waiting in long queues for making such appointments.

Both these solutions in overall are ground breaking innovations and have added certain economic benefits to the country while addressing much needed requirements of the society.

Sri Lanka's mobile phone industry has been growing at a rapid space over the last few years. The number of mobile phone users has been increased to 5.4 million as at end of 2006 with a mammoth 59% growth compared to the previous year [1].

SMS has become very popular mode of communication in Sri Lanka over the recent years mainly because of the affordable cost and availability. According to the financial statements of Dialog Telekom for the financial year 2006 [2], the peer-to-

peer SMS revenue represents the largest component of non-voice revenue and accounting for 6 per cent of total revenue in year 2006. It gives an indication on how close the SMS is to the ordinary user's life style.

By the end of year 2006, Sri Lanka's mobile phone industry has become totally GSM with the migration of all analogue subscribers to GSM technology [3]. All Mobile operators are now providing SMS services free of subscriptions. This has made the SMS facility available to all mobile phone subscribers in the country as almost all GSM phones in the market are SMS enabled.

These set of information suggest that the SMS based utility payments and banking services solution should hit the Sri Lankan community as a ground breaking alternative to the Internet Payment and Internet Banking due to its lower cost and wider availability.

There has been some research on the electronic payments and Internet banking in the Sri Lankan context. However possibilities of exploiting SMS based utility payments and banking services to create a socio-economic impact in the country has not been investigated before.

1.2 Sri Lankan Banking Sector

The banking sector is one of the most dynamic and energetic sectors of the economy, with developments taking place during the fast few years in every aspects of the industry for example at institution level, instrument level, range of services and the geographic coverage.

Types of financial institutions available in Sri Lanka are; Commercial Banks, Development financial institutions, Merchant/ Investment banks, Finance companies, Leasing Companies, Mortgage banks, Venture Capital Companies, Savings Bank and Pension funds according to the BOISL web site [4].

The Central Bank of Sri Lanka, CBSL, is the governing institution in the financial system of Sri Lanka. There are 26 Licensed Commercial Banks (LCBs) in operation in the country. Some of these are locally incorporated and the others are branches of

foreign banks. Two of the LCBs are state owned and still dominate the Licensed Commercial Banks in Sri Lanka.

BOISL web site [4] further says that rapid technological advancement including an automated check clearing house that clears checks from most part of the country within three days, ATMs, credit cards, electronic funds transfer facilities and several financial derivatives are evidence to this. Several banks have introduced tele-banking and electronic business banking and many have extended banking hours with some services being made available 24 hours a day through automation. The banking system is now linked closely to the worldwide networks via SWIFT and credit card gateways. However the researcher has found out that the mobile banking or SMS banking is relatively new concept to the country

Commercial Banking Assets and Deposits Distribution -

It was worthwhile to investigate the leading commercial banks market share and the position with respect to other banks before banks are selected to conduct this research. The Table 1.1 reveals total assets, advances & deposits of top commercial banks operated in Sri Lanka as at Sep 2006. [5]

BANK	Total Assets (Rs Billion)	Advances (Rs Billion)	Deposits (Rs Billion)
Bank of Ceylon	325.6	199.0	235.7
People's Bank	306.0	221.7	240.5
Commercial Bank	210.2	140.6	147.5
HNB	187.2	129.1	141.1
Seylan Bank	132.6	98.9	96.9
Sampath Bank	100.2	71.9	76.2
NTB	33.8	24.5	21.2
DFCC Vardana Bank	8.7	7.0	5.9
NDB Bank	57.7	41.4	17.0
Pan Asia Bank	11.4	8.3	8.1
Union Bank	8.5	4.6	7.3
HSBC	107.5	70.1	63.5
Standard Chartered	65.7	39.8	43.9
Total	1,555.2	1,056.9	1,104.7

Table 1.1: Assets, Advances & Deposits of Leading Commercial Banks as at Sep 2006
Source: [5]

According to Table 1.1, the assets and deposits distribution among Sri Lanka's licensed commercial banks has still been dominated by the 2 state banks, Peoples Bank and Bank of Ceylon.

Bank of Ceylon heads all other commercial banks on total assets followed by Peoples Bank, Commercial Bank, HNB and Seylan Bank. However the 6th position is taken by HSBC, the multi national bank with a relatively smaller branch network in Sri Lanka, ahead of Sampath Bank, which operates branch network of more than 100 branches in Sri Lanka.

In terms of total advances and deposit distribution Peoples Bank leads all other commercial banks. Bank of Ceylon, Commercial Bank, HNB and Seylan Bank have obtained the next respective positions in order. Then Sampath Banks easily heads HSBC and in 6th position mainly due to their widely distributed branch network.

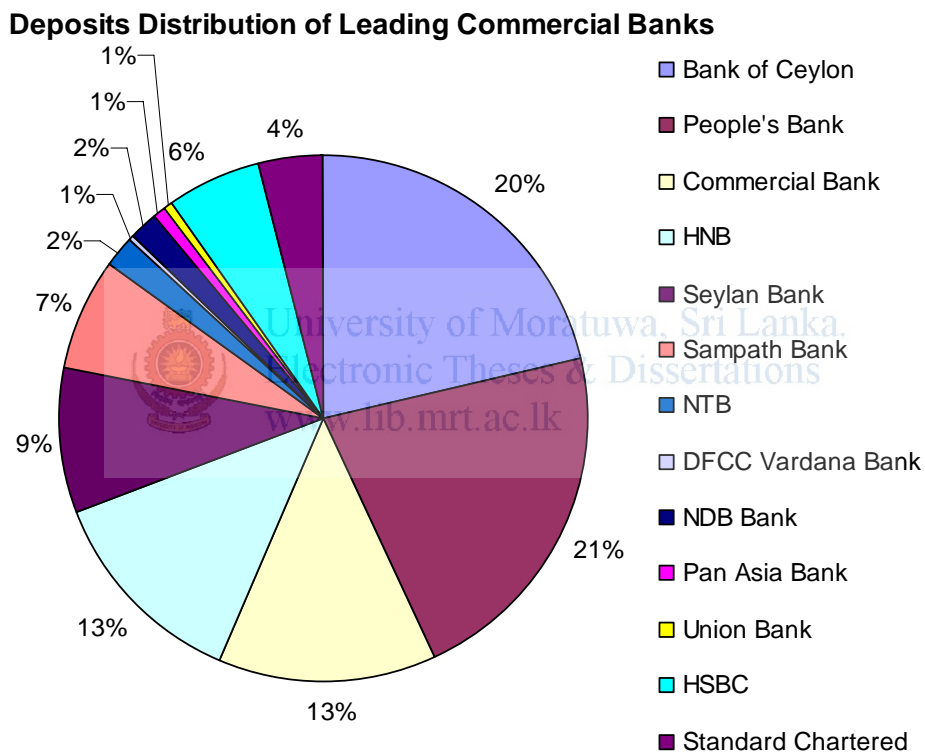


Figure 1.1: Deposits Distribution of Leading Commercial Banks as at Sep 2006
Source: [5]

Figure 1.1 clearly identifies the top 6 LCB's based on the deposits distribution, which are Peoples Bank, Bank of Ceylon, Commercial Bank, HNB, Seylan Bank and Sampath Bank in order. These six (6) LCBs represent 78% of LCB sector in Sri Lanka [6].

1.3 Sri Lankan Mobile Telecom Sector

According to telecomasia.net, the number of cellular phone users in Sri Lanka grew to 5.4 million in 2006 from 3.4 million a year earlier, as operators slashed tariffs by up to 40%. Currently there are four (4) players in the Sri Lankan mobile market and India's largest private phone company, Bharti Airtel, is lined up to be the fifth mobile phone player in the country [1]. The market is dominated by the leader Dialog Telekom, a subsidiary of Telecom Malaysia with a share of over 50% [7] followed by Mobitel, Sri Lanka Telecom's mobile arm, Tigo, a Millicom International company and Hutchison Sri Lanka all of whom have registered over 1 million subscribers according to latest TRCSL statistics. Both postpaid as well as prepaid mobile services are offered to the Sri Lankan consumers by these operators.

The growth experienced by Sri Lanka's mobile telecom sector will be further discussed in Section 2.1.3.

1.4 Research Problem

Most of Licensed Commercial Banks (LCBs) have launched SMS based utility payments or banking services. As stated in Section 1.3, Bank of Ceylon, Peoples Bank, Commercial Bank, Hatton National Bank, Seylan Bank and Sampath Bank represent 78% of LCB sector in Sri Lanka [6]. Also there are 6 Million mobile phone subscribers in the country as at end of 2007 March [1]. However there are less than 40,000 mobile subscribers registered for the services with all these 6 banks as at March 2007 with most of them are only receiving SMS transaction alerts according to the bank sources. These facts indicate that still the SMS based utility payments and banking services are not so popular in the country.

1.5 Research Topic

The topic of the research was titled 'Potential growth opportunities for SMS based utility payments and banking services in Sri Lankan context'.

1.6 Research Objectives

- 1) The main objective behind the research was to evaluate the critical success factors of the SMS based utility payments and banking services in Sri Lanka and develop a model, which can be used to promote the service to create a considerable socio-economic impact in the country.
- 2) It was expected to identify the reasons that have slowed down the development of SMS based transactions in the country and how these factors can be eliminated to reach the expected success level and address a desired requirement of the society.
- 3) During the research it was expected to evaluate the effect of influential factors to the development of SMS based utility payments and banking services in Sri Lanka. The similar factors identified by the global researchers were first to be evaluated. Then the effect of these factors as well as any local factors to be evaluated in three (3) different perspectives, bank, mobile operator and user.
- 4) The research is also aimed at providing recommendations for both mobile telecom as well as banking industry on successful implementation of these services.
- 5) Finally to develop a model, which can be used to promote SMS based services as a successful alternative to the Internet Banking and Tele-Banking. Less Internet penetration (Section 2.1.1) and the higher voice call chargers (Section 2.2.4) are the main barriers for the later services to be under developed.

1.7 Importance of the Research

The results produced as the output of this research would be useful for the management of the operators and the banks in their strategic decision making and business planning.

- (i) Operators can make use of these results and conclusions to stream line the SMS based mobile transactions services to their subscribers by enhancing revenue and growth opportunities for the company.

- (ii) Banks can enhance the possibilities of value addition to their customer base through effective use of these results, which would in turn improve their growth opportunities through higher customer satisfaction.

1.8 Research Scope

Out top 6 LCB's based on the advances and deposits distribution, which are identified in Section 1.2, Two (2) state banks are still in a primary state with respect to the SMS based utility payments and banking services. All other banks, Commercial Bank, Hatton National Bank, Seylan Bank and Sampath Bank offer SMS based utility payments or banking services to its customers. Therefore this research is restricted to SMS based services offered by these four (4) banks with any of the mobile operator in Sri Lanka. SMS based services offered by fixed line operators too were excluded from the research as the number of such services is insignificant.

This research was targeted only towards postpaid mobile users even though the SMS based utility payment and banking services are available for both types of subscribers in Sri Lanka. The main reason being the postpaid subscribers always want to be connected and avoid unnecessary service interruptions due to delayed payments where as for prepaid users, the uninterrupted service is not an essential requirement.

This research was conducted with a qualitative analysis as well as quantitative analysis. The qualitative analysis was performed to evaluate the status of SMS based utility payment and banking services in 4 selected banks as well as all 4 mobile operators considering the entire country. However the quantitative analysis, which was used to evaluate user perspectives, was restricted to a limited sample of mobile users that can be achieved within the limited time frame and the resources for this research. The main intention of the quantitative analysis is to identify user perceptions, benefits, problems of the ordinary user with regard to the SMS based utility payment and banking services. Therefore the sample will be selected from outside the western province where infrastructure development and technical know how of the people are relatively less in comparison to the western province.

2. LITERATURE REVIEW

2.1 Overview

Banking industry has now come across another medium through which, it can reach customers. The customers, who are always on the move, may be looking for the comfort of self servicing. So these financial service requirements can now be made possible with the faster growing mobile phone networks.

Technological hurdles faced by the people in underdeveloped remote rural areas can also be reduced using already well expanded mobile telephone coverage. This would also be served as another value added service to the Banking customer.

Mobile banking and payment services can soon attract customers who are very much techno savvy and already adopted to the mobile products such as SMS based applications.

Finally the Banking industry too still hoping that consumers will be able to save time and money by getting used to this new mode of servicing

2.1.1 Email & Internet Growth in Sri Lanka

For the last few years, the growth in Information and Communication Technologies in Sri Lanka has been very encouraging. At present, the number of websites that cater to the Sri Lankan diaspora as well as to the Sri Lankan public is on the rise with a higher focused towards Sri Lankan content either in Sinhalese, Tamil or English. E-mail and Internet were first used in Sri Lanka in late eighties making the country being one of the first countries in Asia to use Internet. However the latest TRCSL statistics [8] it shows that the number of registered Internet users is 150,000 as at March 2007 and it confirms that Internet Penetration has not gone beyond 1%. This will keep the potential growth opportunities for Internet Banking at very minimal level. Affordability of a personal computer, the relatively higher usage charges and lack of communication infrastructure developments are the major factors behind the slow growth rate.

Email & Internet Growth 1996 - 2007 March

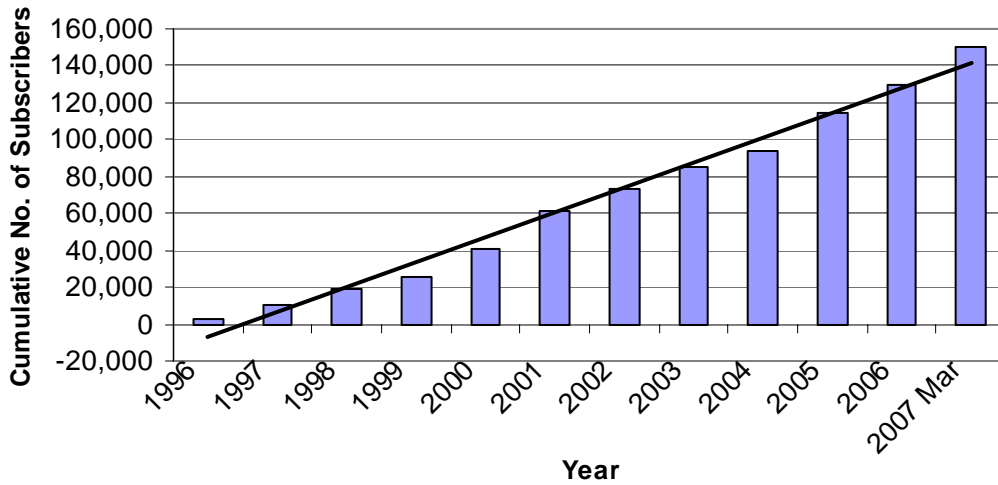


Figure 2.1: Email & Internet Growth 1996-2007
Source: [8]

However Figure 2.1 indicates that the number of Email and Internet subscribers has been growing at a similar rate for the past 10 years.

2.1.2 Fixed-line Telephone Distribution in Sri Lanka

According to the TRCSL latest statistics [8] total number of fixed line telephone in the country as at March 2007 is 2,086,774. Table 2.1 shows how these subscribers are distributed through out 9 provinces of the country.

Province	Subscriber Base	Province	Subscriber Base
Western	1,028,613	Sabaragamuwa	144,461
Central	209,291	Uva	111,627
Southern	216,684	North	26,190
North Central	100,816	East	81,243
North West	167,849	Total	2,086,774

Table 2.1 : Provincial Fixed-line Telephone Distribution
Source: [8]

Fixed line telephone market in the country is also shared by four (4) players. The sector is dominated by Sri Lanka Telecom while Suntel, Lankabel and recent addition Dialog CDMA also compete each other in the market. Most of the recent growth in the fixed line telephone sector can be attributed to the CDMA wireless technology introduction in year 2005.

Provincial Distribution of Fixed Phones as at March 2007

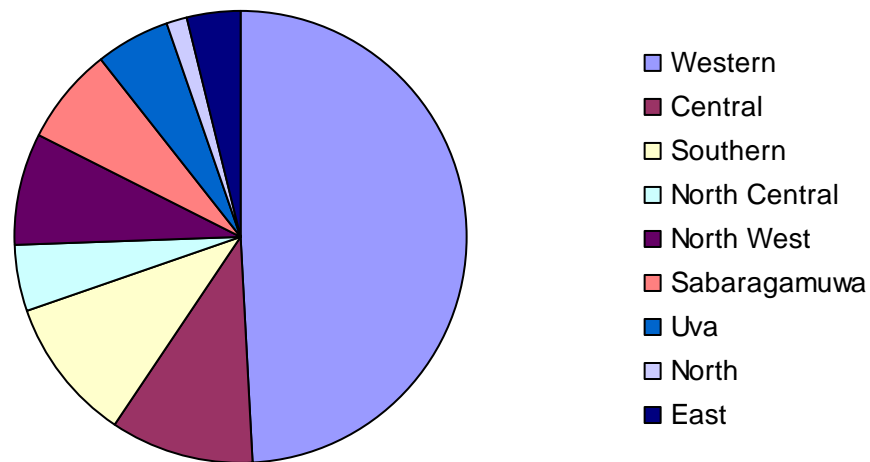


Figure 2.2: Provincial Fixed-line Telephone Distribution
Source: [8]

Figure 2.2 clearly indicates that half of the total fixed line telephones in the country are registered in western province. This is a very strong indication that country's overall communication infrastructure development is still not balanced between the urban and rural areas of the country.

2.1.3 Sri Lanka Mobile Industry Growth

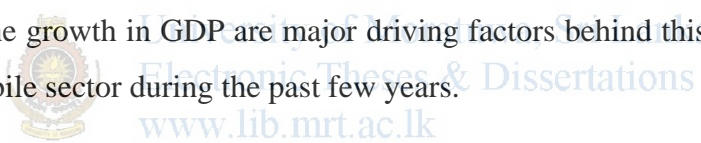
The mobile sector in Sri Lanka was growing at an annual rate of more than 50% coming into 2007. Even though the mobile penetration still relatively high compared with some other Asian markets such as India and Bangladesh at around 27% by end-2006 [1], still the strong growth is more than likely to continue. The market has undoubtedly benefited from the liberalization of the market in nineties as well as the competition. As described in Section 1.3 currently there are four operators battling for a relatively small market share in the country while fifth (5th) mobile operators too is due to start services in late 2007.

The Table 2.2 and Figure 2.3 illustrate how the growth of the Sri Lankan mobile market has been taken place from year 1991 since the liberalization of telecom market.

Year	Mobile Subscribers	Year	Mobile Subscribers
1992	2,644	2000	430,202
1993	14,687	2001	667,662
1994	29,182	2002	931,403
1995	51,316	2003	1,393,403
1996	71,029	2004	2,211,158
1997	114,888	2005	3,361,775
1998	174,202	2006	5,412,496
1999	256,655	2007 Mar	5,958,685

Table 2.2 : Mobile Subscribers Growth 1992-2007 Mar
Source: [8]

This Figure 2.3 clearly illustrates the exponential growth experienced by Sri Lankan mobile telecom industry since the liberalization of the market. According to Central Bank Annual Report 2005 [9], reduction in mobile tariff, shorter payback in investment, higher availability and accessibility due to increase in competition, reduction in handset prices, enhanced benefits through VAS and increase affordability through the growth in GDP are major driving factors behind this unbelievable growth in the mobile sector during the past few years.



Mobile Industry Growth 1992-2007 March

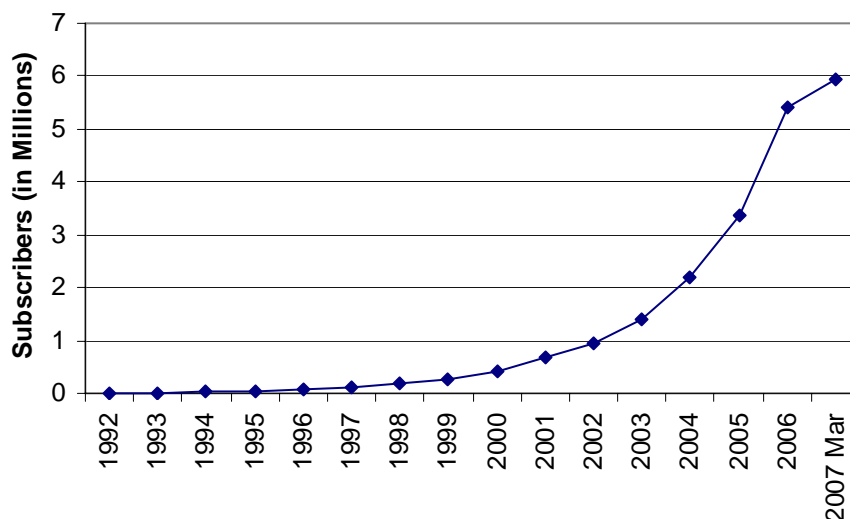


Figure 2.3: Mobile Subscribers Growth 1992-2007 March
Source: [8]

According to latest TRCSL statistics [8] total number of mobile subscribers has reached 5,958,685 as at March 2007.

TRCSL [10] further says that out of the total mobile subscribers in the country 89% are in the prepaid segment. It also says that the clear majority of new users buy prepaid cards [1].

Prepaid Postpaid Composition in Sri Lanka

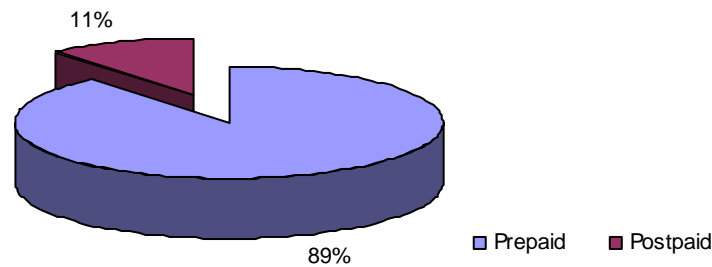


Figure 2.4: Prepaid Postpaid Composition in Sri Lanka
Source: [10]

Figure 2.4 indicates that the majority of Sri Lanka's mobile telephone subscribers are in the prepaid segment. Dialog Telekom, which owns more than 50% of the Sri Lankan mobile market [7] confirms these statistics in their Annual Report 2006[11]. It [11] further says that Average Revenue Per User (ARPU) lies around Rs 400 per month where as ARPU for the paid base is around Rs 1600. Prepaid subscribers are generally used to utilize the mobile phone as and when it is necessary where as postpaid subscribers would prefer to be online continuously without being interrupted. Therefore this research was targeted only towards postpaid mobile users even though the SMS based utility payment and banking services are available for both types of subscribers in Sri Lanka.

2.1.4 Mobile Subscriber Growth in Regional Countries

Let's look at how the mobile subscriber's growth has taken place in regional countries during the past few years. Table 2.3 shows the growth of the mobile sector of four (4) south Asian countries India, Pakistan, Bangladesh and Sri Lanka. It indicates the subscribers in millions since year 2004 to 2006 and the mobile penetration in year 2006 for all 4 countries.

Year	India	Pakistan	Bangladesh	Sri Lanka
2004 (Mn)	55.1	7.9	4.0	2.2
2005 (Mn)	85.1	15.5	10.4	3.3
2006 (Mn)	149.5	48.2	22.0	5.4
2006 Penetration (%)	13	31	14	27

Table 2.3: Mobile Subscriber Growth in Regional Countries 2004-2006

Source: [12]

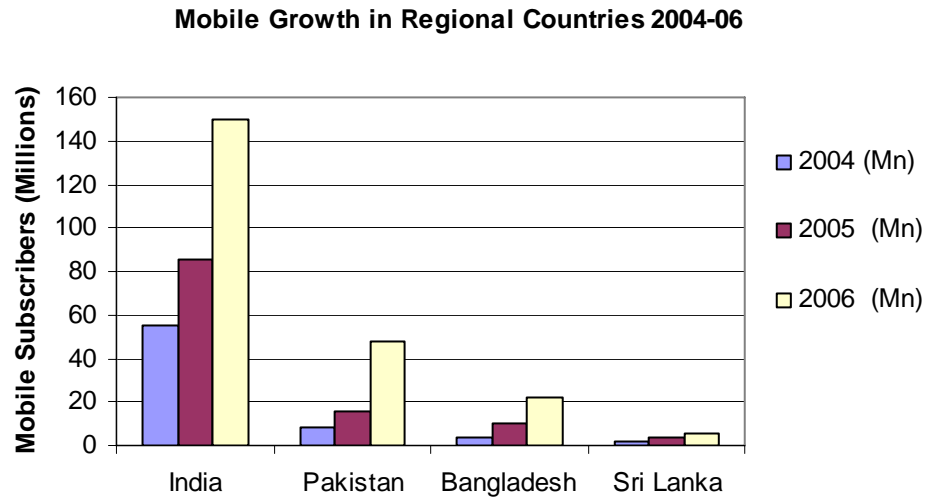


Figure 2.5: Recent Mobile Subscriber Growth in Regional Countries 2004-2006

Source: [12]

Figure 2.5 above indicates that the other main South Asian markets such as India, Pakistan and Bangladesh too have experienced an exponential growth and Sri Lanka's growth terms of number of subscribers is not that significant compare to these countries. It clearly illustrates the size of the Sri Lankan market compare to the other neighboring countries.

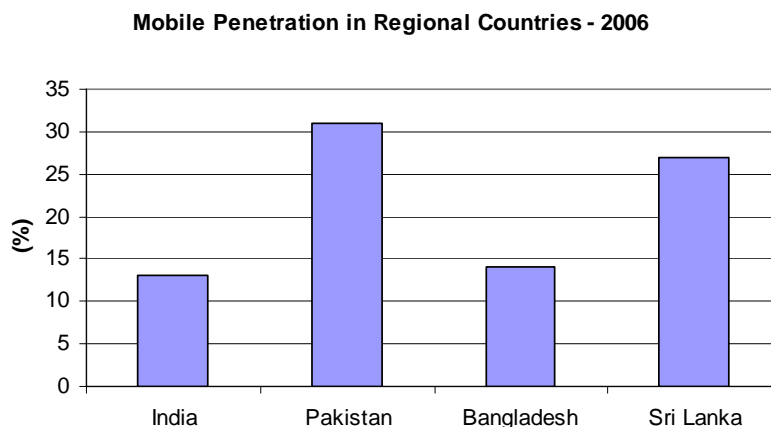


Figure 2.6: Mobile Penetration of Regional Countries 2006

Source: [12]

The mobile penetration, the number of mobile phones per a 100 of the population, is compared in Figure 2.6 for the same four countries. It indicates that Sri Lanka is well ahead of India and Bangladesh and very close to Pakistan. Therefore it implies that Sri Lankan community is ahead some countries like India and Bangladesh in technology adaptation.

2.2 Mobile Banking and Payment Transactions

2.2.1 Mobile Payment Business Model

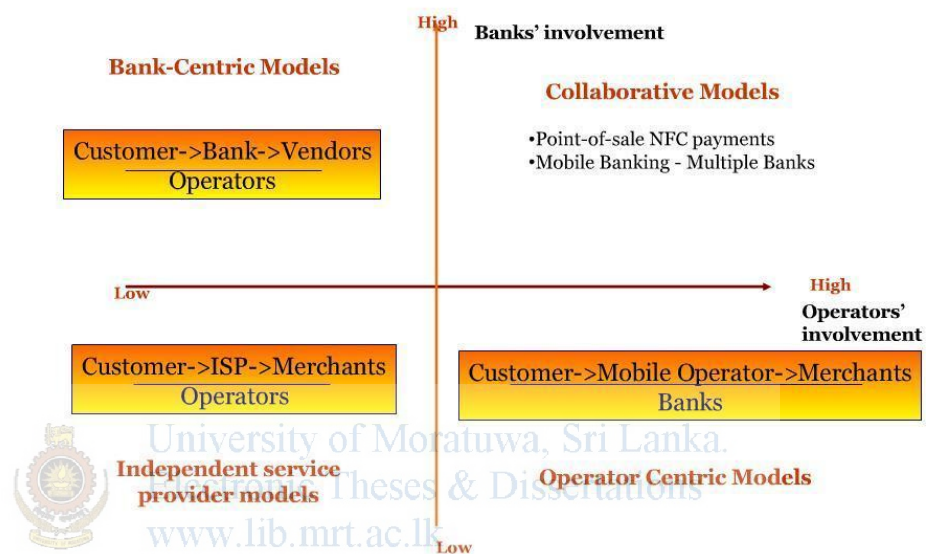


Figure 2.7: Mobile Payment Business Model
Source: [13]

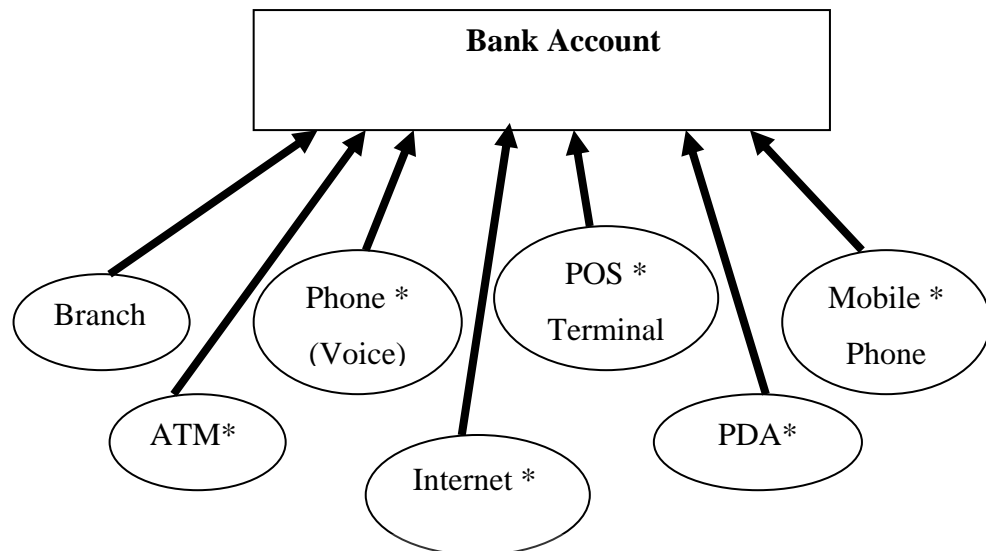
Concept of Mobile Payment is not a new idea in mobile communication industry but to be successful, all involved companies must have to find solutions to alter consumer spending habits.

Mobile Banking solution will enable users to transfer money from account to account, pay bills, manage and monitor account for spending limits, credit fraud, etc. According to [13] its success depends on the ease-of-use and robustness of the platform and the capability to aggregate accounts from multiple financial institution or multiple banks.

In Figure 2.7, [13] has categorised Mobile Payment solution in to 4 models. 1. 'Bank-Centric Models' with higher Bank's involvement, 2. 'Collaborative Models' with multiple Banks, Point-of-sale NFC payments and higher operator involvement, 3.

‘Independent Service Operator Models’ with low Bank’s and Operator involvement but an ISP involvement and finally 4. ‘Operator Centric Models’ with low bank’s involvement but higher operator and Merchants involvement.

2.2.2 Mobile Phone as a Banking access device



* Electronic Modes where PIN or SMART Card Required

Figure 2.8: Different mode for accessing the Bank Account

Source: [14]

As far as technical devices are concerned, there are various options for implementing a collaborative model banking solution based on a smart card or a PIN as shown in Figure 2.8 [14]. Almost all these options have been implemented in Sri Lanka. The latest being the PDA device tried out by The Finance Company very recently. The POS Terminal solution, easy-Pay, implemented by NDB and Dialog recently will be discussed later in Section 2.6.2. According to [14] Consumers would benefit from these opportunities due to more convenient access possibilities. Since consumers trust banks most they would also welcome the fact that banks continue to be the main payment service providers in all these banking solutions.

2.2.3 Advantages of Mobile Banking Over other Technologies

Rensburg in his article [15] describes 4 advantages of mobile banking facility over the Internet banking solution.

1. The banking alert on account transactions and credit card transactions that grew to be a popular feature in many countries including Sri Lanka cannot be effectively implemented in an Internet banking paradigm. Simply it is just not possible to send SMS confirmations to Internet users.
2. If a specially built SIM card is utilized much more advanced security implementations are possible with mobile banking which, are not possible with Internet banking.
3. Almost all mobile operators in Sri Lanka have increased their network coverage to a satisfactory level. The immediacy of mobile phones or the anywhere any time concept allows for new types of solutions. Some of these solutions can be implemented by integrating with existing electronic banking applications. For example a bank can allow their customers to change the ATM PIN over the phone after an ATM transaction, can allow customers to block a credit card of his own over the phone, etc.
4. SMS based mobile banking application deploys message-based implementations instead of the session-based implementations used in Internet banking applications which is more vulnerable to security threats [15]

2.2.4 SMS Based Transactions

In general there are 4 common technologies that can be used for Mobile Phone Banking transactions or Utility Payments [16]. These are (i) IVR (Interactive Voice Response), (ii) WAP (Wireless Access Protocol) - WAP enabled mobile phone required, (iii) Standalone Mobile Application Clients such as J2ME and J2EE – (Java enabled mobile phone required) and (iv) SMS (Short Messaging Service).

Mobile transactions based on technologies (i), (ii) and (iii) have some major limitations compare to (iv) the SMS based transactions in the Sri Lankan context. IVR is more expensive as it involves making a voice call, which is generally more expensive than sending an SMS or making data transfer using above (ii) or (iii). This is one of the major reasons for which, the Tele-Banking Services has not been so popular in Sri Lanka even though the service has been launched by many banks some years back.

Technologies (ii) and (iii), WAP and Standalone Applications need either WAP or Java enabled phones, which are relatively expensive and can not be afforded by the majority of the average users in Sri Lanka.

2.2.5 Mobile Banking Transactions that can be offered through SMS

Globally most of the Bank's mobile phone based services are supporting some or all of the following functionalities, which can be offered through SMS [16]:

These services includes Account Balance Enquiry, Account Statement Enquiries, Cheque Status Enquiry, Fund Transfer between Accounts, Credit/Debit Alerts, Minimum Balance Alerts, Transaction Alerts, Recent Transaction History Requests, Information Requests like Interest Rates/Exchange Rate and Utility Bill Payment

2.3 Global status of SMS Based Banking and Payments Solutions

According to [17], French bank Societe Generale had around 290,000 mobile banking customers regularly using SMS within its mobile banking service in 2002, yet fewer than 700 customers used the WAP service, which represented just 0.2% of its mobile banking customer base. In the UK, First Direct had 160,000 users for its SMS alerting service, yet just 4000 active WAP customers representing just 2.5% of its mobile banking customer base.

Further it [17] says, UK bank Natwest launched its mobile banking service in October 2000, but closed it down the following year due to lackluster consumer interest. Natwest's service did not incorporate SMS in anyway, which made the service unavailable to about 90% of those mobile subscribers without a WAP handset. The bank has stated this as a key factor in the failure of the service to meet its expectations.

This confirms that even in tech savvy, high income markets, SMS is the most popular technology used for Mobile Banking and Payments compared to WAP or other mode of communications.

South Korea and Japan are the two leading examples from Asia where mobile banking and payments have experienced an overwhelming success [18].

2.3.1 Bangladesh Example

Bank Asia Limited of Bangladesh has launched a SMS banking product named "Thumbpay" for Aktel mobile subscribers. Services available through "Thumbpay" are a) Account balance inquiry, b) Pre-Paid refill or Post-Paid bill to own number/ third party and c) Funds transfer. Subscribers of Grameen and Citycell mobile networks also have the option of balance inquiries through SMS [19].

2.3.2 China Example

Industrial and Commercial Bank of China, ICBC, one of the largest banks in China offers 24 hours Mobile Banking through SMS for subscribers of both China Mobile and China Unicom, two main mobile telecom providers in China. Main services offered through this Mobile Banking are enquiry services and transfer services.

Customer can go to ICBC business offices expanded all over the country to register Mobile Banking (Short Message) Service if they have savings account or settlement account opened in ICBC and mobile subscription from either China Mobile or China Unicom [20].

2.3.3 South Africa Example

A company named "WIZZIT", which is a division of the South African Bank of Athens, offers a transaction banking account accessible via mobile phone. It has launched its services in December 2004 and introduces itself as a "virtual bank" and has no branches of its own.

Customers can use their mobile phone to make person-to-person payments, transfer money, purchase prepaid electricity, and buy airtime for a prepaid mobile phone subscription [21].

2.4 Sri Lankan Environment

2.4.1 Mobile Telecom Sector Suitability

Numerous difficulties such as long queues, parking issues, etc faced by the customers when physically visiting banks, ATM machines and other utility bill payment centers have made room for Internet Banking, Tele-Banking and Mobile Banking services to grow rapidly in the country in coming years. SMS base mobile transactions would be

the best alternative in Sri Lanka due to various reasons and some of which, has been listed below. Sri Lanka's mobile penetration is rapidly increasing [8] and the country may be amongst the top of mobile phone penetration per capita in the South Asian region, in comparison to some other countries in Asia [12] [22]. The SMS facility is available to all mobile phone subscribers in the country as almost all GSM phones in the market are SMS enabled. SMS is a cost effective mode of communication and could easily be afforded by any Sri Lankan mobile subscriber.

Sri Lanka has a low internet penetration of less than 1% as described in Section 2.1.1. The country has only around 828,000 credit cards were in issue up to May 2007 [23] leaving the penetration to little over 4.0%.

2.4.2 Sri Lankan Banking Sector Availability

According to [6], Sri Lankan banking sector is dominated by Licensed Commercial Banks (LCBs) with a share of about 82.5 per cent of assets as at end of year 2006. Even though a large number of licensed commercial banks exist in the country, the stability of the LCB sector is primarily dependent on the six largest LCBs, consisting of the two state banks and the four largest domestic private commercial banks. The 6 banks are Bank of Ceylon, Peoples Bank, Commercial Bank, Hatton National Bank, Seylan Bank and Sampath Bank. These six banks represent 78 per cent of the LCB sector assets and 65 per cent of the entire banking sector assets [6].

2.5 SMS Based Banking and Payments Solutions in Sri Lanka

2.5.1 Sampath Bank Tigo (Celltel) SMS Banking

Tigo's Cell Banking SMSTM service enables customers of Tigo and Sampath Bank to conduct their day-to-day consumer banking from their mobile phones, anywhere, anytime. This was the first SMS based banking and payment solution launched in Sri Lanka. Users can send SMS messages containing transaction codes corresponding to the banking services they need. Users can request balance information and statements, transfer funds between accounts within Sampath Bank as well as to other banks, receive alerts from the bank and request help from the bank's support system [24].

2.5.2 Mobitel and Sampath's Banking, Bill Payment and SMS Reload

Mobitel has introduced range of facilities to its subscribers banking with Sampath Bank. Customers would be able to receive micro statements on SMS requests. These requests would be replied with the current account balance, last five transactions on account by account basis, mini statements with details such as date, time, place and amount of the transaction and so on [25].

According to the Mobitel's web site [26] this feature provides prepaid reload and bill payment facilities to Mobitel customers who hold current or savings accounts with Sampath Bank. An added convenience provided by this facility is that it can be accessed via a user friendly Over the Air (OTA) menu. The menu is built into the Mobitel SIM by default and customers are not required to go through the hassles of remembering short codes.

2.5.3 Com e-Load from Commercial Bank

Commercial banks SMS based mobile bill pay and re-load facility, which is branded as "Com e-Load" is the most publicized product in this are in the country prior to NDBs easy Pay is launched in this August. According to Mr Pradeep Banduwansa, Manager, e-Banking Division, Commercial Bank [27], this unique facility is available to both Postpaid and prepaid customers of Mobitel and Prepaid customers of Dialog.

Pre-paid customers can reload their Mobitel Pre-paid account by any value between Rs. 100 to Rs. 999 while for Post-paid customers the bill settlement amount is unlimited. The re -loaded amount will be instantly debited from their accounts at Commercial Bank [28].

Mobitel subscribers are provided an added convenience of using this facility is that it can be accessed via a user friendly Over The Air (OTA) menu which is built into the customer's mobile SIM, which eliminates the hassle of remembering short codes [27].

2.5.4 HNB Mobitel SMS Banking, E Reload and Bill Pay

HNB and Mobitel jointly launched a SMS Banking, Prepaid Reload and Postpaid bill payment solution through SMS for HNB Savings or Current account holders. Through this HNB and Mobitel customers are able to inquire the account balance, transfer funds, pay credit card bills, reload pre-paid Mobitel accounts and pay postpaid

Mobitel bill through a SMS based facility, which can be accessed via Mobitel's user friendly OTA menu [29].

2.5.5 HNB Tigo E-Reload and Bill Pay

HNB and Tigo entered into an agreement in late August 2007 to provide SMS Reload and Banking services to HNB accountholders who are on the Tigo Network. Both Post-paid and Pre-paid Tigo users who maintain or open new accounts with HNB will benefit from this service, which offers an array of facilities.

A unique feature is the simplicity in reloading a Tigo pre-paid connection or paying a post-paid bill with a short message sent to a dedicated short code, 258. Another first is the plan to offer this reload service especially to the Tigo Retailer network, which will improve efficiency and convenience to the Retailers who are having accounts at HNB.

All HNB SMS Banking related short messages can be sent to the short code 'HNB' (462) from a Tigo connection. Some of the key features include: Balance inquiries and Fund Transfer between HNB accounts, HNB Credit Card status inquiries and settling credit card bill by debiting an HNB current or savings account [30].

2.6 Latest Mobile Payment Solutions in Sri Lanka

2.6.1 Hutch's Mobile-to-Mobile Payment Service

Through a feature named "Me2U", which was launched in July 2007, Family and friends can top-up each other's mobile accounts, employers can top-up their employees' mobile accounts & Parents can top-up their children's mobile accounts". Since this facility is made available through a simple SMS feature it is possible for anyone to re-charge at anytime, at any place and for any amount. It also allows Parents to control and monitor children's mobile phone usages and employers could control their employees' mobile accounts. So this becomes an easy and convenient control mechanism as well. What's more, it would cost the same value of an SMS for each transaction and the receiver has no incoming charge for receiving funds. A customer's per transaction value can vary from as low as Rs.1 to the highest value of Rs.500/- per day [31].

2.6.2 NDB's EZ Pay Solution

Dialog Telekom together with NDB Bank, another private sector commercial banks in the country, unveiled eZ Pay, a mCommerce (Mobile Commerce) initiative, a service that allows consumers to purchase goods, pay bills, transfer money and perform banking transactions via their mobile phones [32].

The Dialog-NDB mobile commerce network will empower consumers with the ability to carry out a variety of electronic transactions using their mobile phone from anywhere within Dialog GSM's network coverage.

The technology also facilitates the transformation of merchants and retailers of varying size and scale in to electronic payment acceptance points and mini-banking points.

The facilitation of electronic transactions at the smallest of retail stores across the country is expected to create and nurture an all new wave of grass-root banking.

This technology enables special software on the SIM card to transform a standard mobile phone into an electronic wallet. In order to acquire this service Dialog subscriber need to change the existing SIM card to new software enabled SIM. The consumer can perform a mobile transaction through a simple SMS. The Point of Sale device too is capable of capturing and validating mobile and banking transactions performed by retailers and merchants.

2.6.3 Sampath Bank's 'Mobile Cash'

Sampath Bank, which introduced ATMs to Sri Lanka in the 1980s, now provides platform-independent mobile cash transfer solution for the first time in Sri Lanka. This facility, which was launched in late August 2007, will let customers send money to any person with a mobile phone or a CDMA phone.

Almost all mobile cash facilities that have been introduced in Sri Lanka were limited to a single mobile service provider but Sampath Bank's this service is available to all GSM and CDMA subscribers in all networks. Account holders have the freedom to remit money through their mobile phone to a CDMA phone or another mobile phone

in a different mobile network. According to the bank this is the unique feature of this facility.

The system also lets customers pay for products provided the merchant is equipped with a Point of Sale (PoS) machine, through which money can be received by the remitter. This service is initially restricted to purchases at all Singer outlets island wide [33].

2.6.4 Mobitel's Peer to Peer Balance Transfer

Mobitel launched a new service under the brand "SMART Share" for its SMART pre-paid subscribers with the new concept of peer to peer gifting in late September 2007. It gives SMART customers the freedom to share pre-paid balance with their friends while the feature is offered through USSD service.

It is a hassle free way where balance transfers can be done any time of the day from anywhere among friends and family. If any one of your SMART friends runs out of pre-paid balance you can send a simple command to transfer a portion of the balance to your friend's phone.

This service is different from SMART Reload done through a retailer where the subscriber account is topped up. Customers can send any amount ranging from Rs. 10 to Rs. 2,000, with the persons sharing account balance receiving SMS's confirming the amounts sent and received. The sender will be charged a nominal amount of Rs.2 (plus government taxes and levies) for this service [34].

2.7 Influencing Factors for Mobile Payment Success

No.	Factors	Related Factors
1	Cost	Transaction fees
2	Ease of use	Flexibility, unobtrusiveness
3	Security	Reliability, Privacy, Anonymity, Trustworthiness, Regulatory framework, Regulation, Consumer protection
4	Technical feasibility	Integration effort, Interoperability, Scalability, Remote access
5	Independence	
6	Universality	Critical mass, Transferability, divisibility, Standardization
7	User support	

Table 2.4: Factors for Influencing the Success of Mobile Payments

Source: Modified from [35]

Heijden in his conference paper [35] has listed a set of factors that would influence the success of mobile payment and banking solution. He has referred to the various previous researches done on the subject by different authors at different times. Table 2.4 has been extracted from his paper as the researcher is determined to evaluate the importance of these factors in the Sri Lankan context.

In an another research carried out at Helsinki Business School [36], Mallat has identified certain adoption determinant for mobile payments, contributing factors for each of these determinants and the proposed effect (positive or negative) on adoption for each of the contributing factors.

No.	Adoption determinant	Contributing factors	Proposed Effect on Adoption
1	Relative advantage	a) Time and place independent purchases b) Queue avoidance c) Enhanced payment instrument availability d) Complement to cash	+ + + +
2	Compatibility	a) High with digital content and services b) High with small value purchases at POS c) Low with large value purchases	+ + -
3	Complexity	a) Complex SMS formats, codes, service numbers b) Management of separate accounts burdensome c) Complex registration procedures	- - -
4	Costs	a) Premium pricing & high transaction costs	-
5	Network Extension	a) Lack of wide merchant adoption b) Proprietary devices / services	- -
6	Trust	a) In merchants b) In telecom operators c) In financial institutions	+ + +
7	Perceived Security Risk	a) Unauthorized use b) Transaction errors c) Lack of transaction record and documentation d) Vague transactions e) Concerns on device and network reliability f) Concerns on privacy	- - - - - -

Table 2.5: Factors Affecting Consumer Adoption of Mobile Payments
Source: [36]

The Table 2.5 has been extracted from this research paper [36] and it describes the contributing factors for almost all the influential factors identified in Table 2.4 as well. Let's take each and every influential factor and discuss its importance with regard to the SMS based utility payment and banking services in the Sri Lankan context.

2.7.1 Cost Advantage

People are used to physical cash exchanges for goods and services due to its clear advantages such as simplicity, speed and it is free from additional charges. For example certain section of the Sri Lankan public still prefer to go to the hospital if they can and do the channeling appointment directly even though the 'eChanneling' service is available to them either through Internet or mobile phones. This would be

simple as well as additional cost of 'eChanneling' service charge plus Internet and mobile call charges would not be applied.

Because of this, most mobile payment systems around the world provide the service free to consumers, and continue to do so because switching back to cash is very easy for all consumers. Even in Sri Lanka certain mobile operators would not charge for the SMS when SMS Prepaid reload or SMS bill payment is performed.

Heijden [35] further says that one could argue that mobile payment systems compete with cash for the consumer's favor while the consumer places value on mobile payment solution by taking into account the value offered by the service . Therefore both cost and ease of use are typically evaluated in their relationship to other alternatives for a banking and payment methods such as traditional cash payment, Internet Banking, Tele-banking, etc.

2.7.2 Ease of Use

Heijden's study on mobile payment [35] has revealed that in particular the calling of a long phone number, 10 digits most of the time, either by either consumer or merchant to initiate the transaction was too time-consuming and too error-prone. However he suggests that alternatives to overcome these usability problems were coming in and available on the market now.

In Sri Lanka as well, the Mobile operator Mobitel offers SMS based payment and banking services through the user friendly Over the Air (OTA) menu, which is built into the Mobitel SIM card by default. All SMS based services can be accessed via this menu and customers are not required to go through the hassles of remembering SMS short codes [27].

2.7.3 Information Security Concerns

Information Security is a broader concept and one of the most important aspects as far as any information related application is concerned. When a financial transaction is performed through a wireless media security should be considered at top priority without any doubt. A.E Pascual in his article "Wireless Security" [37] talks about

Information Security in the context of wireless communication. He describes 5 main objectives of Information Security.

Confidentiality - Unauthorized persons, processes, or devices will not have any access to the information being stored and transmitted.

Authentication - Verification and validation of the identity of the intended user or device

Integrity - Ensuring the accuracy and the consistency of the content or the information

Availability - Reliability and the timely availability of the data and information services for authorized users.

Non-Repudiation - Assurance that neither the sender nor the receiver can later deny having processed information

According to Heijden's findings [35] both merchants and consumers are having security concerns mainly because of the perceived risk related to the transaction performed.



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However he says most of the involved parties on the belief that security confidence can be enhanced by taking appropriate security measures, which would positively affect the perceived risk.

2.7.4 Infrastructure Availability

G. Roy describes the Infrastructure requirement for mobile payment and banking solutions in a joint m-payment feasibility study report [38]. According to her, there are a wide variety of networks and devices, which can be used to support m-commerce and mobile payments in particular. Here we only will focus towards the infrastructure requirement for SMS based mobile payment and m-commerce solutions.

GSM Technology –

A mobile infrastructure is mainly made up of equipment vendors, software developers and mobile device manufacturers. The Global System for Mobile Communications or GSM is the only technology currently used by all mobile networks in Sri Lanka [2].

In addition to voice services, it defines a number of data services that can be used for data transmission between mobile phones with SMS being the most commonly used service in Sri Lankan context as described in Section 2.2.4.

SMS Technology –

The point-to-point SMS Service is a messaging service introduced by the GSM system to deliver short text messages. The service was later enhanced and used for various data applications such as over the air configuration, data downloading etc. The SMS provides a mechanism for transmitting short messages to and from mobile handsets. The service can deliver up to 140 octets of data in a message. The service makes use of a short message service center or SMSC, which acts as a store-and-forward system for short messages. The mobile network provides the path for the transport of short messages between the SMSC's and wireless handsets. On the security point of view, there are no additional security provided to the message transmission in addition to the protection provided by the GSM air interface between MSC and BTS. That means if the data need to be secured it should be provided at the application level. [38]

Similarly the banking sector should have the systems capable of interacting with external systems to provide online data communication. Also common standard protocols must be used by both Operators and Banks for smooth application integration.

Interoperability -

According to the Wireless access Protocol White Paper [39] Interoperability refers to the software and devices work across all wireless network technologies. It has to be made sure that the content and applications must scale across a wide range of wireless bearer networks and device types. In other words mobile operators must feel secure that their investments will yield benefits in the future.

This cannot be achieved until equipment and software offered by different suppliers can be made to work together. Operator should be able to choose equipment and software from multiple vendors, selecting each piece of the solution that is appropriate for the operator's particular needs.

2.7.5 Technological Feasibility and User Support

Heijden [35] has found out that ‘Technology Feasibility’ and ‘User Support’ have not been regarded as critical factors. He suggests 2 reasons for that 1) Technology feasibility and User support can be considered hygiene factors, and 2) Both these issues were largely under Merchants and Consumers own control.

Hygiene factors are factors related to mobile payment and banking that can cause dissatisfaction if missing but do not necessarily increase consumer and merchant acceptance. That means these are features of a mobile payment system that just have to be there. However, when they are present, they will not by themselves contribute to consumer and merchant acceptance.

Secondly both technology feasibility and user support are largely under merchants and consumers control. Its merchant and consumers responsibility to get rid of any irregular devices and acquiring compatible units while both parties are also responsible for the user support.

2.7.6 Awareness

Consumer awareness is one of the critical factors with regard to the SMS based payment and banking solutions in the Sri Lankan context. Globally most of the operators and banks have highly publicised the features and facilities offered to the consumers through different communication channels. During the industry observation this researcher has found out that except for few banks most of the banks and celcos (cellular companies) in the country have not put a lot of effort to increase the consumer awareness on the SMS based services offered by them.

2.7.7 Universality

Universality refers to the acceptance of the solution to all the involved parties such as consumers, celcos, banks, etc. According to Heijden’s findings [35] transaction cost and the ease of use for the consumer will play a major role with regard to the consumer acceptance. He further says bank acceptance and celco acceptance were important too but many executives including those working for banks and celcos agreed that this would not be a great problem if consumer acceptance can be achieved

3. METHODOLOGY

3.1 Introduction

This Chapter first describes how the concepts, variables and indicators were identified and mapped into questions of the pilot questionnaire. Then the formation of three separate questionnaires to carry out qualitative and quantitative analysis will be discussed next.

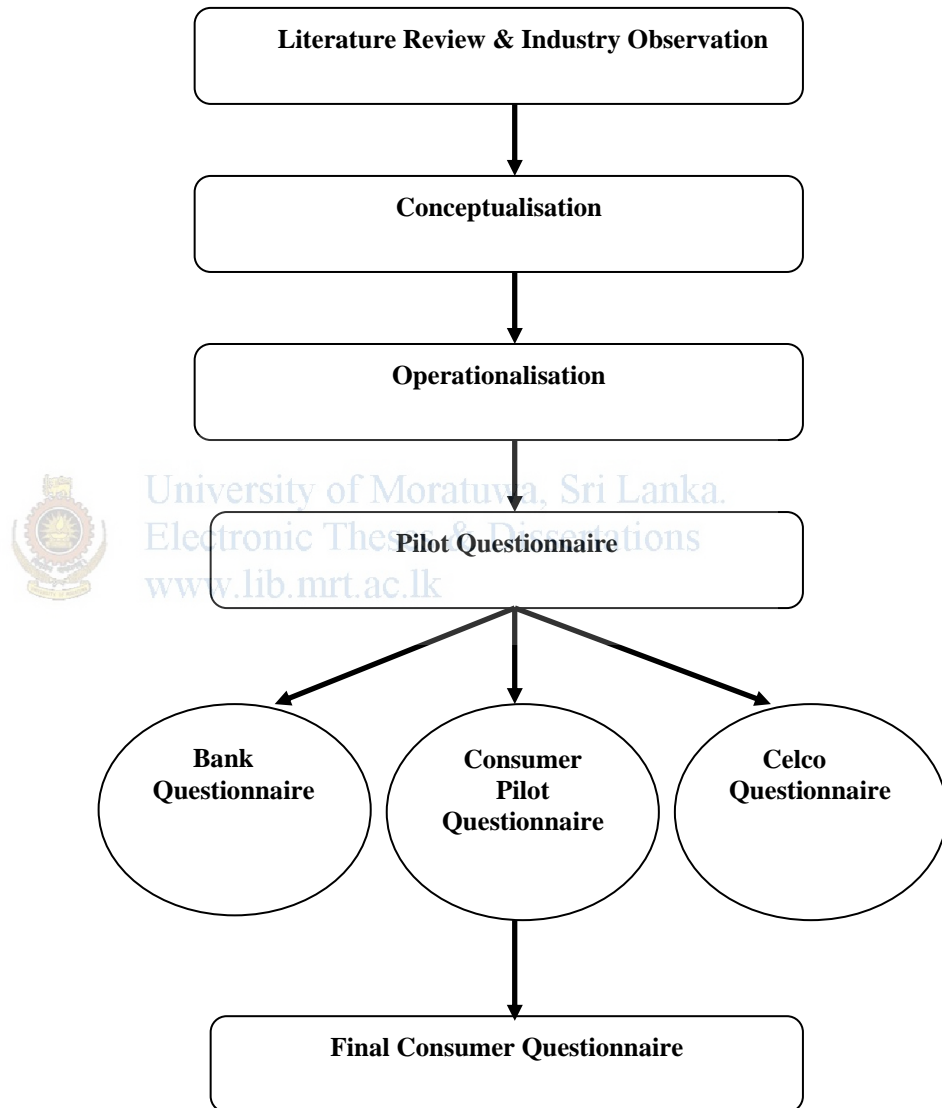


Figure 3.1: Questionnaire Generation

Generation of the theoretical framework, the sample selection and data collection for the quantitative analysis will also be described later in the Chapter. Finally, the limitations of the methodology and the study will be discussed.

3.2 Pilot Study

Few Banking professionals, who were directly involved in implementing SMS based payment and banking solution and few professionals from Mobile telecom operators who were also directly involved in these solution implementations were also interviewed during the industry observation. The researcher's own industry experience was also mattered most.

The final consumer questionnaire should be designed to get both qualitative as well as quantitative information from typical Sri Lankan post-paid mobile subscribers who possess a current or savings bank account in 4 selected banks. Information gathered on user perceptions, benefits gained and problems faced on SMS based banking and utility payment services during the pilot study.

Pilot Questionnaire was divided into 3 different sections I (User), II (Celco or Cellular Company) and III (Bank). Section I was distributed by selecting few friends and associates on behalf of the general consumers. Section II and III were distributed among few friends, not necessarily the IT professionals, who are working for cellular companies and banks respectively. Several iterations were made by enhancing the questionnaire and distributing it again and again to different set of respondents.

3.3 Conceptualisation

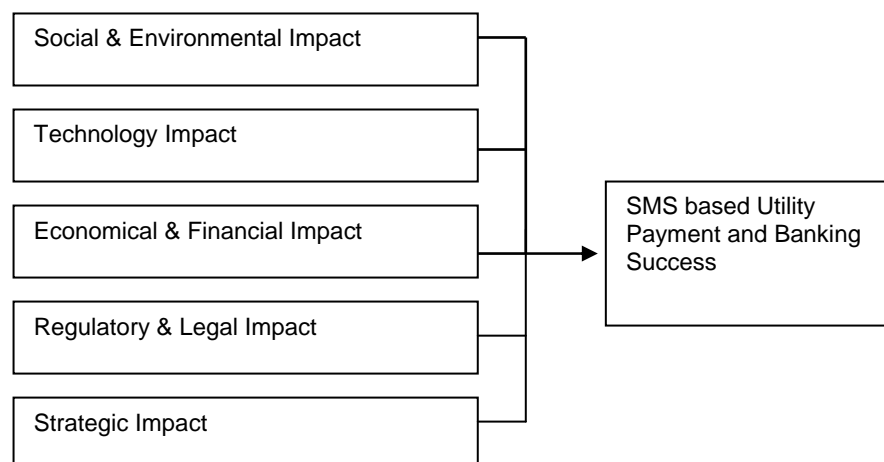


Figure 3.2: Dependency of Concepts

Based on the input gathered during the literature review and industry observation five (5) concepts that have an impact on the growth of the SMS based utility payment and banking services were identified. Figure 3.2 indicates the dependency of each of these concepts to success of SMS based utility payment and banking services in Sri Lanka.

3.3.1 Social & Environmental Impact

Variables	Indicators
Awareness	Level of awareness on SMS based payment services provided by cellular companies
	Level of awareness on SMS based services provided by banks
	Level of awareness on handset suitability
	Level of awareness on free SMS subscriptions
	Celco's level of commitment to create awareness
	Bank's level of commitment to create awareness
Psychological Readiness	Psychological barriers for SMS based payment services offered by cellular companies
	Psychological barriers for SMS based services offered by banks
Exposure to SMS base Services	Level of exposure to SMS Based services
Environmental Influence	Level of positive influence from consumers close associates
	Any common negative influences for consumers?
	Level of cooperation received by celcos from bank
	Level of cooperation received by banks from celcos

Table 3.1: Variables and Indicators for Social & Environmental Impact

Social & Environmental Impact can be identified through variables such as awareness, psychological readiness, exposure to SMS based services and environmental influence. Indicators for each of these variables are listed in Table 3.1.

3.3.2 Technology Impact

Technology Impact can be identified through variables such as mobile service availability, intensity of SMS usage, easy to use interface requirements, reliability of SMS based services, confidence on security and intensity of technical involvement. Indicators for each of these variables are identified in Table 3.2.

Variables	Indicators
Mobile Service Availability	Level of satisfaction on mobile reception availability
Intensity of SMS Usage	Level of peer to peer SMS usage
	Level of peer to application SMS usage
Easy to use Interface Requirements	Level of concerns on native language availability
	Level of satisfaction on user friendliness
Reliability of the SMS base Services	Level of confidence on mobile service provider for SMS delivery and response time
	Level of confidence on bank on service availability for electronic and mobile based services
Confidence on Security	Level of any strongly held beliefs against security
	Level of consumer confidence on Information Security
	Mobile industry confidence on providing secured medium
	Banks concerns on exposing information to celcos
Intensity of Technical Involvement	Number of similar products launched by banks
	No of similar products launched by cellular companies

Table 3.2: Variables and Indicators for Technology Impact

3.3.3 Economical & Financial Impact

Economic and Financial Impact can be identified through variables such as transaction cost, cost advantage and intensity of investments.

Variables	Indicators
Transaction Cost	Level of concerns on transaction cost
Cost Advantage	Level of consumer confidence on cost advantage
Intensity of Investments	Current investments made by mobile companies
	Current investments made by banks

Table 3.3: Variables and Indicators for Economical & Financial Impact

Indicators for each of these variables are listed in Table 3.3.

3.3.4 Regulatory & Legal Impact

Regulatory and Legal Impact can be identified through variables such as regulatory constraints and organizational policy constraints. Indicators for each of these variables are shown in Table 3.4.

Variables	Indicators
Regulatory Constraints	Availability of regulatory issues in the mobile industry
	Availability of regulatory issues in the banking industry
Organisational Policy Constraints	Availability of organisational policy issues within celcos
	Availability of organisational policy issues within banks

Table 3.4: Variables and Indicators for Regulatory and Legal Impact

3.3.5 Strategic Impact

Strategic Impact can be identified through variables decisive factors, customer service offered and organizational prospects. Indicators for each of these variables are listed in Table 3.5.

Variables	Indicators
Decisive Factors	Most influential factor for current users to choose
Customer service offered	Level of consumer satisfaction on mobile service provider's customer service
	Level of consumer satisfaction on bank's customer service
Organisational prospects	Level of revenue enhancement opportunities for celco's
	Level of consumer value addition opportunities for banks

Table 3.5: Variables and Indicators for Strategic Impact

3.4 Operationlisation

Questions were designed in such a way that it measures the identified variables and indicators in different scales as described in Table 3.6. Questions were categorised in to three (3) questionnaires, Qus. User, Qus. Celco and Qus. Bank as illustrated in Section 3.2.

Table 3.6: Operatinalisation

Concept	Variable	Indicators	Measures	Scale	Question
Social & Environmental	Awareness	Level of awareness on SMS based payment services provided by cellular companies	Very High, High, Average, Low, Very Low	Scale	Qus. User - 3
		Level of awareness on SMS based services registration and mobile number registration	Very High, High, Average, Low, Very Low	Scale	Qus. User – 4
		Level of awareness on handset suitability	Yes, No	Nominal	Qus. User – 13a)
		Level of awareness on free SMS subscriptions	Yes, No	Nominal	Qus. User – 13b)
		Celco's level of commitment to create awareness	Yes, No	Nominal	Qus. Celco – 4
		Bank's level of commitment to create awareness	Yes, No	Nominal	Qus. Bank – 5
	Psychological Readiness	Psychological barriers for SMS based payment services offered by cellular companies	Yes, No	Nominal	Qus. User – 6
		Psychological barriers for SMS based services offered by banks	Yes, No	Nominal	Qus. User – 7
	Social Influence	Level of exposure to SMS Based services	Very High, High, Average, Low, Very Low	Scale	Qus. User -8
		Level of positive influence from consumers close associates	Very High, High, Average, Low, Very Low	Scale	Qus. User – 9
		Any common negative influences for consumers?	Registration process is complex , Mobile is not registered to your name , Security risk is higher , Cost can be higher , Any Other	Nominal	Qus. User – 5
		Level of cooperation received by celcos from bank	Yes, No	Nominal	Qus. Celco – 5
		Level of cooperation received by banks from celcos	Yes, No	Nominal	Qus. Bank – 3

Concept	Variable	Indicators	Measures	Scale	Question
Technology	Mobile Service Availability	Level of satisfaction on mobile reception availability	Very High, High, Average, Low, Very Low	Scale	Qus. User – 16
	Intensity of SMS Usage	Level of peer to peer SMS usage	Above 50, 26-50, 11-25, 1-10, Never	Scale	Qus. User – 11
		Level of peer to application SMS usage	Above 50, 26-50, 11-25, 1-10, Never	Scale	Qus. User – 12
	Easy to use Interface Requirement	Level of concerns on native language availability	Not Concerned at all , Not Concerned, Neutral, Concerned , Highly Concerned	Scale	Qus. User – 14
		Level of satisfaction on user friendliness	Very High, High, Average, Low, Very Low	Scale	Qus. User – 15
	Reliability of the SMS base Services	Level of confidence on mobile service provider for SMS delivery and response time	Very High, High, Average, Low, Very Low	Scale	Qus. User – 17
		Level of confidence on bank on service availability for electronic and mobile based services	Very High, High, Average, Low, Very Low	Scale	Qus. User – 18
	Confidence on Security	Level of any strongly held beliefs against security	Yes, No	Nominal	Qus. User – 10
		Level of consumer confidence on Information Security	Very High, High, Average, Low, Very Low	Scale	Qus. User – 19
		Mobile industry confidence on providing secured medium	Yes, No	Scale	Qus. Celco - 2
		Banks concerns on exposing information to celcos	Very High, High, Average, Low, Very Low	Scale	Qus. Bank - 2
	Intensity of Technical Involvement	Number of similar products launched by banks	None , 1 to 3, 3 to 5 ,6 to 9 ,10 or above	scale	Qus. Bank - 1
		No of similar products launched by cellular companies	None , 1 to 3, 3 to 5 ,6 to 9 ,10 or above	scale	Qus. Celco - 1

Concept	Variable	Indicators	Measures	Scale	Question
Economical & Financial	Transaction Cost	Level of concerns on transaction cost	Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree	scale	Qus. User - 20
	Cost Advantage	Level of consumer confidence on cost advantage	Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree	scale	Qus. User - 21
	Intensity of Investments	Current investments made by mobile companies	Very High, High, Average, Low, Very Low	scale	Qus. Celco - 3
		Current investments made by banks	Very High, High, Average, Low, Very Low	scale	Qus. Bank - 4
Regulatory & Legal	Regulatory Constraints	Availability of regulatory issues in the mobile industry	Yes, No	Nominal	Qus. Celco - 6
		Availability of regulatory issues in the banking industry	Yes, No	Nominal	Qus. Bank - 6
	Organisational Policy Constraints	Availability of organisational policy issues within celcos	Yes, No	Nominal	Qus. Celco - 7
		Availability of organisational policy issues within banks	Yes, No	Nominal	Qus. Bank - 7
Strategic	Decisive Factors	Most influential factor for current users to choose	High Availability, More Convenience, Time Saving, Minimal Cost, Any Other	scale	Qus. User - 2
	Customer service offered	Level of consumer satisfaction on mobile service provider's customer service	Highly Satisfied, Satisfied, Neutral, Dissatisfied, Highly Dissatisfied	scale	Qus. User - 22
		Level of consumer satisfaction on bank's customer service	Highly Satisfied, Satisfied, Neutral, Dissatisfied, Highly Dissatisfied	scale	Qus. User - 23
	Organisational prospects	Availability of organisational policy issues within celcos	Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree	scale	Qus. Celco - 8
		Availability of organisational policy issues within banks	Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree	scale	Qus. Bank - 8

Table 3.6: Operatinalisation

3.5 Final Questionnaire

This Questionnaire was aimed at conducting a survey among Sri Lankan banking and mobile phone consumers by capturing data for a quantitative statistical analysis. Based on the input gathered at the Pilot Study, consumer questionnaire was developed, which was targeted to capture information from postpaid mobile subscribers, who used to bank with any of the 4 licensed commercial banks selected in Section 1.8. This questionnaire was translated to Sinhala language based on the pilot study input. Sinhala and English versions of the questionnaire are listed in Annexure I and II respectively.

3.6 Qualitative Study

3.6.1 Mobile Operators Perspectives

Separate section of the questionnaire (II – Qus. Celco) was designed to gather information from mobile operators prior to consumer questionnaire was finalised. This questionnaire is used just as a guideline to capture information from the mobile sector. Information gathered on existing SMS-based banking and utility payment applications, barriers to implement and maintain such applications and barriers to implement new services. The technical capabilities, Security concerns and financial commitments of the organizations were further investigated. Information gathered through interviews with the area specialist in the mobile industry was also used for this qualitative analysis. Mobile industry findings with respect to the entire country will be discussed in details in Section 5.2.

3.6.2 Banking Perspectives

Separate sections of the questionnaire (III – Qus. Bank) was designed to gather information from the banking sector with more emphasise to the 4 selected banks, similar to Qus. Celco. The process of information gathering is exactly similar to the one, which was used for mobile operators described in Section 3.6.1. Findings relevant to the banking industry with respect to the entire country will be discussed in details in Section 5.1.

3.7 Theoretical Framework

3.7.1 Conceptual Model

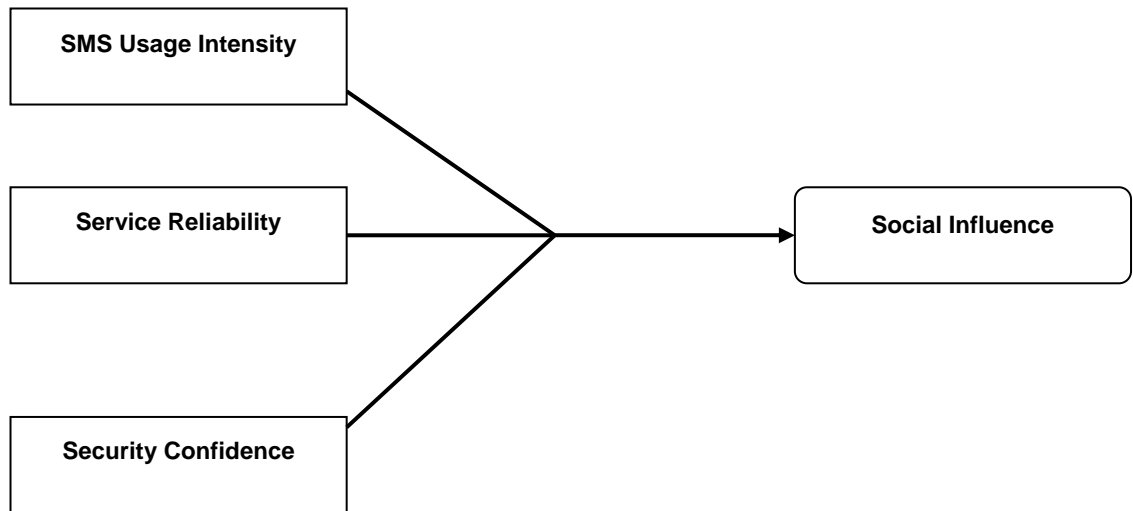


Figure 3.3: Conceptual Model on Social Influence

Here it would be investigated whether the confidence built on security aspects, service reliability and the higher SMS usage intensity would build the level of social of influence towards SMS based utility payment and banking transactions.

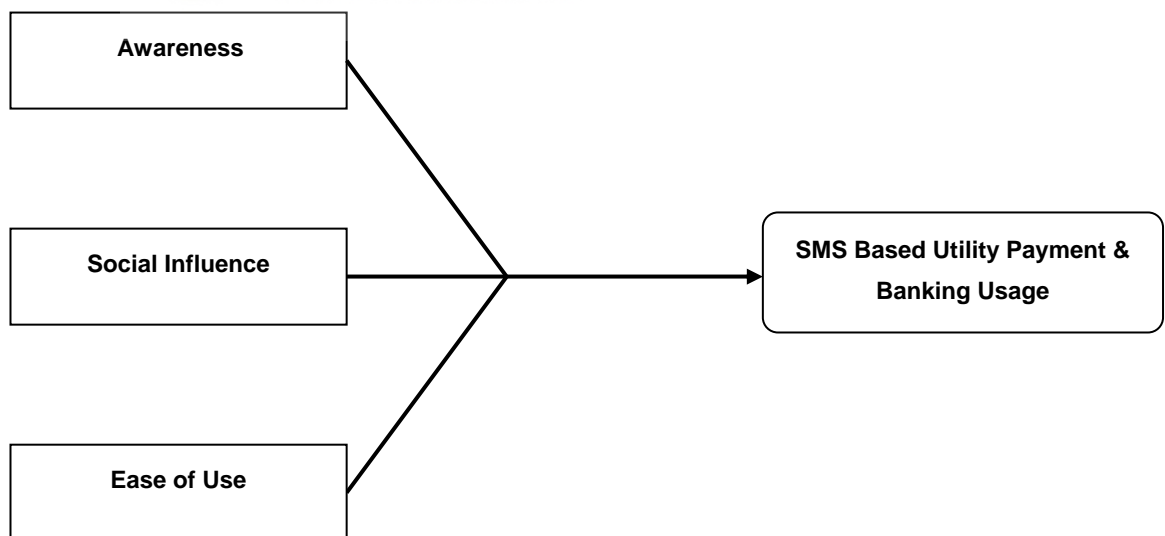


Figure 3.4 : Conceptual Model on Service Usage

Then the researcher would investigate whether the higher awareness, increased social influence along with easy usability would enable the development of SMS based monetary transactions in the Sri Lankan context.

3.7.2 Hypothesis Development

Based on this conceptual model following hypothesis were developed and would be tested at the analysis stage in Section 4.7.

- 1) Service Reliability, Confidence on Security and Higher SMS Usage Intensity would build the Positive Social Influence towards SMS based monetary transactions
- 2) Awareness, Positive Social Influence and Easy Usability would enhance the level of SMS based utility payments and banking transactions usage in Sri Lanka

3.8 Sample Selection

Target Population of the survey was all postpaid mobile subscribers in the country as described in Section 1.8. Total postpaid mobile subscriber in the country as at 2nd Quarter 2007 is 715,000 according to the TRCSL statistics.

Final sample has to be larger as much as possible in comparison to the sample population to have more accurate results. Therefore several ceiling were applied to choose a reasonable sample population from the above target population.

First ceiling was applied to select the postpaid mobile subscribers, who has the SMS based payment and banking services available from all 4 banks selected under the research scope, Section 1.8. Four banks are Commercial Bank, Hatton National Bank, Seylan Bank and Sampath Bank. As at June 2007 Mobitel is the only mobile service provider, who has launched SMS based banking or postpaid bill payment solutions with all these 4 banks. Also even as of now only Mobitel provides the user friendly OTA SIM menu for SMS based services to its subscribers, which is not offered by any other operator. According to the company sources [41] Mobitel's postpaid active subscriber base as at June 2007 is 201,519.

The second ceiling would be applied to select the individual mobile subscribers by excluding corporate customers from the above base because in normal practice corporate bills would be paid by the employer not by the subscriber him/her self.

According to the same source Mobitel's active individual postpaid subscriber base is 131,875 as at end June 2007 [41].

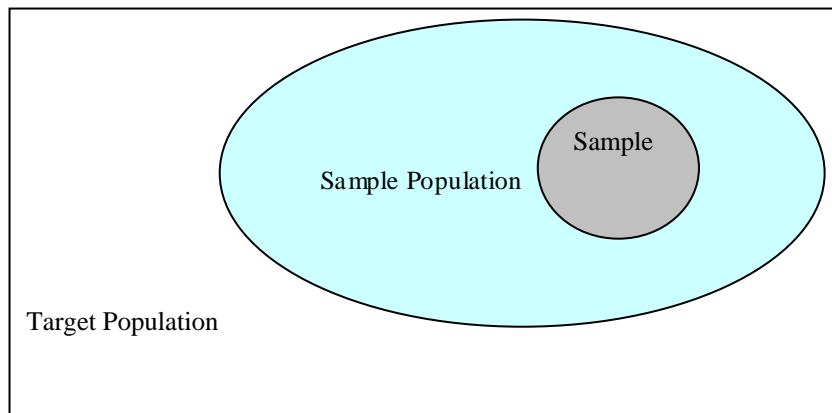


Figure 3.5: Target Population, Sample Population & Actual Sample

The above 131,875 mobile subscribers distributed all over the country and all of them has the opportunity to pay their monthly mobile bill through SMS or subscribe for SMS banking services since April 2007, if they have a current or savings account from any of the above 4 licensed commercial banks. All the banks have an interconnected branch network expanded island wide with over 100 branches each.

The third ceiling would be applied to select a subset of these subscribers, whose billing address located within Ratnapura district. Ratnapura was selected by the researcher based on 2 factors, (a) it represents a sample population that can be surveyed during the limited time frame and resources available for this survey and (b) the availability of the access to intermediate contacts to support more accurate and efficient data collection. Mobitel [41] says out of the above active individual postpaid subscriber base, 4,981 subscribers are residing in the Ratnapura district.

Finally the fourth ceiling is applied to reduce the sample population to mobile subscribers who are interacting with 4 selected banks. Since this research is intended to investigate payment option for banking and mobile subscribers, the sample population was chosen by selecting the number of mobile subscribers, who have done their last 3 bill payments to above 4 selected licensed commercial banks through any banking mode. According to Mobitel [41] this number would be 901 out of the above base of 4,981 subscribers.

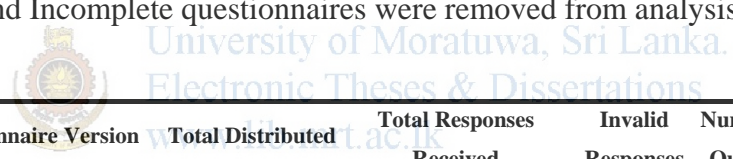
Actual sample was selected by covering all 4 banks with proportionate numbers.

3.9 Data Collection

Sample of mobile subscribers selected in Section 3.8 were surveyed and the raw data were collected via the systematically designed questionnaire. Both Sinhala and English versions of the questionnaires were distributed to the actual sample. Two sets of questionnaires were physically distributed through close relatives and friends in the Ratnapura district. Another set of respondents was first contacted over the phone and briefed about the survey and then the questionnaire was sent by either by email (softcopy) or normal mail (hard copy) depending on the email availability. Each hard copy, which was sent by normal mail, was coupled with a stamped envelope for the respondent to reply. Then each respondent was reminded and assisted over the phone to fill the questionnaire.

Each answered questionnaire was assessed in several ways for validity and completeness of the data. Validity was checked mainly to verify if the response is from correct selected respondent and for the integrity and the consistency of the data.

Invalid and Incomplete questionnaires were removed from analysis.



Questionnaire Version	Total Distributed	Total Responses Received	Invalid Responses	Number of Valid Questionnaires
English – Soft Copy	50	34	1	33
English – Hard Copy	30	9	2	7
Sinhala - Hard Copy	320	176	12	164
Total	400	219	15	204

Table 3.7: Questionnaire distribution and response summary

The summary shown in Table 3.7 indicates the statistics related to the questionnaire distribution and response status.

3.10 Limitations of the Study

There were some limitations with regard to the proceedings of this study.

1. Restriction of the quantitative analysis to a sample selected outside the western province is a restriction of this research. Technical know how and the infrastructure development in the selected geographic area, Ratnapura district, is less in comparison to the western province. However with the available time frame and resource the best

possible sample was selected as the main objective was to investigate the user perspectives with regard to the ordinary Sri Lankan user. It should also be noted that the services of all four mobile operators and all four selected banks will be available to the Ratnapura district at the maximum level.

2. It was very difficult to gather information from both banking and telecom sectors due to their highly competitive nature of business.

3. Question interpretation to the ordinary users was not that easy as it took several pilot questionnaire iterations to finalise some questions in the final questionnaire.

4. It was realized during the pilot study that if the questionnaire can be translated to Sinhala language, it would be more effective especially when the sample has been selected from Ratnapura district.

5. Accurate information related to certain demographic information of the users such as monthly income was not easily available and so that it had to be excluded from the final questionnaire.

6. The limitations natural to questionnaire based researches may affect this research as well. Some of the limitations that might have an impact on are ambiguity of questions, limiting user responses to categorical answers rather than descriptive, and reliability of the answers received from mobile users in the selected sample.

7. Unavailability of comprehensive literature on SMS based payment and banking services in the Sri Lankan is another disadvantage.

4. SURVEY DATA ANALYSIS

4.1 Introduction

All the answers to subject related questions were coded by assigning generally the higher ranks such as 1 for positive responses and lower rank such as 5 for negative responses. The respondents were instructed to select the most appropriate single answer according to their preference.

Let's take the Q18 of the questionnaire for an example.

Q18. Reliability in terms of the security of the information being transmitted between the bank and your mobile phone when a SMS based transactions is taken place.

i. Very High *ii. High* *iii. Average* *iv. Low* *v. Very Low*

From the above answering options if the reliability is 'Very High' Rating 1 was assigned where as if the reliability is 'Very Low' Rating 5 was assigned. Likert Scale ratings of 1 to 5 were given as follows.

Very High	-	Rating 1
High	-	Rating 2
Average	-	Rating 3
Low	-	Rating 4
Very Low	-	Rating 5

Like wise all favorable responses were given a higher rank while negative responses were given a lower rank

The responses to the demographics questions were also coded using numeric values. For an example Sex was coded with values 1 or 2 by assigning 1 for Male's and 2 for Female's while the Province residing in were given values from 1 to 8. All the valid responses were then entered into a Microsoft Excel spreadsheet by using these numeric values to get the data prepared for the statistical analyze. These data in the Excel spreadsheet was then exported to a SPSS file as SPSS was chosen as the data analysis tool for the analysis.

4.2 Primary Results

4.2.1 Descriptive Statistics of Responses

	N	Minimum	Maximum	Mean	Std. Deviation
Gender	204	1	2	1.31	.465
Age Group	204	1	5	3.24	1.014
Highest Education	204	1	5	3.30	.955
Main Bank	204	1	4	2.29	1.137
Frequent Mode of Banking	204	1	3	1.68	.509
Level of Familiarity	204	1	5	3.64	1.107
Level of Usage	204	1	5	3.89	1.065
Reason to Select	204	1	5	3.87	1.615
Awareness of the Services	204	1	5	2.95	1.186
Awareness of the other Services	204	1	5	3.18	1.145
Reason not to Select	203	1	5	4.77	.745
Prepaid Re-load Importance	203	1	2	1.11	.312
SMS Banking Importance	203	1	2	1.09	.285
Level of mobile service familiarity	202	1	5	2.92	.913
Level of Influence	202	1	5	3.19	1.145
Over cautious ness on Risk	204	1	2	1.33	.481
Peer to Peer SMS Usage	202	1	5	2.47	1.155
Peer to Application SMS Usage	202	1	5	3.37	1.068
SMS Technology Awareness	203	1	2	1.04	.206
SMS Free Subscription Awareness	203	1	2	1.21	.406
Level of Native Language Req.	204	1	5	2.09	1.053
Level of User Friendliness	204	1	5	2.46	.832
Network Coverage Satisfaction	203	1	5	2.41	.842
Speed of Service Satisfaction	204	1	5	2.70	.874
Level of Reliability	203	1	5	2.87	.854
Level of Risk Cautious	203	1	5	3.37	1.079
Cost Benefit Importance	202	1	5	2.19	.969
Save Cost or Not	202	1	5	2.68	.792
Telecom Customer Service	204	1	5	2.17	.803
Bank Customer Service	203	1	4	2.10	.777

Table 4.1: Descriptive Statistics of responses for all the questions

A summary of valid responses received for all the questions including demographic information are listed in Table 4.1.

It shows the number of responses received for each question, minimum value, maximum value, mean and the standard deviation.

4.2.1 Descriptive Statistics of Variables

Descriptive statistics of all the important variables used for the analysis are shown in Table 4.2 along with the skewness.

Variable	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
SMS Intensity	202	1.00	5.00	2.9183	.91124	.036	.171
Service Reliability	204	1.00	5.00	2.7745	.74154	-.234	.170
Security Confidence	203	1.00	5.00	3.3695	1.07926	-.302	.171
Social Influence	202	1.00	5.00	3.0545	.89887	-.040	.171
Ease of Use	204	1.00	4.50	2.2745	.75797	.300	.170
Awareness	204	1.00	5.00	3.0662	1.13792	-.124	.170
Usage	204	1.00	5.00	3.7647	1.06259	-.770	.170

Table 4.2: Descriptive Statistics of Variables

4.3 Reliability Analysis

Cronbach's alpha is a model that gives the internal inconsistency, which can be written as a function of the number of test items and the average inter-correlation among the items. The following equation, Eqn. 1 shows the formula for the standardised Cronbach's alpha:

$$\alpha = \frac{N \cdot \bar{r}}{1 + (N - 1) \cdot \bar{r}} \text{----- (Eqn. 1)}$$

Here N is equal to the number of items and r-bar is the average inter-item correlation among the items.

According to this formula it is evident that as long as number of items increased, Cronbach's alpha would be increased. And also if the average inter-item correlation is low, alpha will be low where as the average inter-item correlation increases, Cronbach's alpha increases. If Cronbach's alpha value is high then the reliability of the questionnaire is considered to be high.

Cronbach's Alpha	N of Items
.815	30

Table 4.3: Cronbach's Alpha

With this survey questionnaire, Cronbach's alpha returns a value of 0.815 with 30 items that is only with the responses for the questions. It gives 81.5% assurance on the reliability of the questionnaire with higher inter-item correlation.

4.4 Descriptive Statistics

4.4.1 Gender Distribution

		Frequency	Percent
Valid	Male	140	68.6
	Female	64	31.4
	Total	204	100.0

Table 4.4: Respondents Gender Category Details

Respondents Gender Category



Figure 4.1: Respondents Gender Category

According to the Table 4.4 and Figure 4.1, 69% of the survey respondents were Male's. It is important note this composition when judgment and conclusions are made.

4.4.2 Age Distribution

		Frequency	Percent
Valid	20 or less	4	2.0
	21-30	53	26.0
	31-40	59	28.9
	41-50	67	32.8
	Over 50	21	10.3
Total		204	100.0

Table 4.5: Respondents Age Category Details

Age Group Distribution

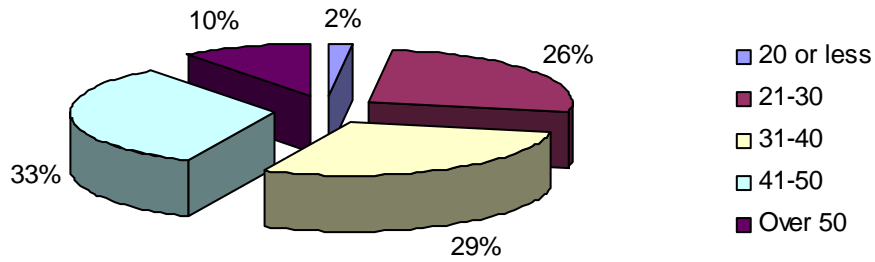


Figure 4.2: Respondents Age Category

‘Age Group’ of the respondents is distributed as shown in the Table 4.5 and Figure 4.2. The relation between the age group and different influential factors will be analysed later in this Chapter under the correlation analysis, Section 4.6.

4.4.3 Education Level Distribution

		Frequency	Percent
Valid	Below GCE O/L	3	1.5
	GCE O/L	29	14.2
	GCE A/L	108	52.9
	Dip.or High. Dip.	31	15.2
	Degree or above	33	16.2
	Total	204	100.0

Table 4.6: Respondents Highest Education Level Details

Education Level Distribution

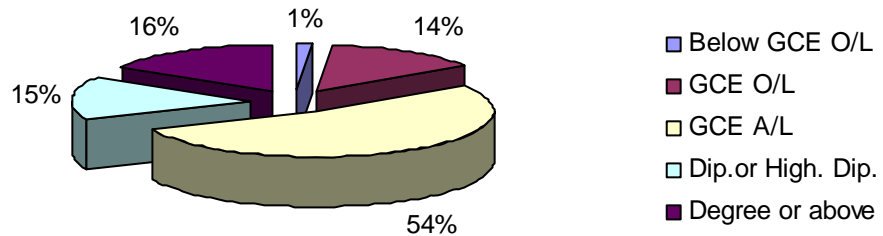


Figure 4.3: Respondents Education Level Category

'Highest Education' of the respondents is distributed as shown in the Table 4.6 and Figure 4.3. The relation between the highest education and different influential factors will be analyzed later in this Chapter under the correlation analysis, Section 4.6.

4.4.4 Distribution of Respondents among 4 selected Banks

		Frequency	Percent
Valid	Commercial	66	32.4
	HNB	56	27.5
	Seylan	38	18.6
	Sampath	44	21.6
	Total	204	100.0

Table 4.7: Respondents based on the Bank

Bank wise Respondents

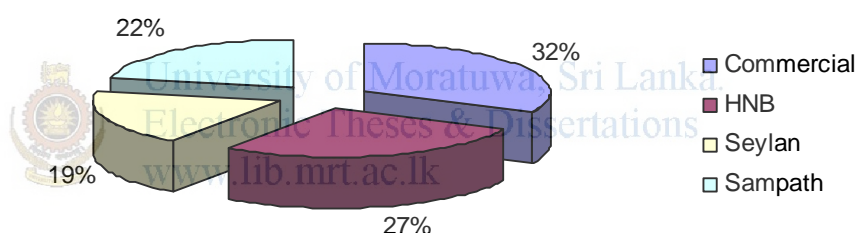


Figure 4.4: Bank wise Respondents

Bank based composition of the number of respondents participated in this survey is illustrated in Figure 4.4. How the important influential factors are varied among the consumers of these 4 banks will be discussed in details in Section 4.5.

4.5 Secondary Data Analysis

The secondary results are derived from the raw data tabulated further in this section. The aim was to further analyze the primary data into making more useful and comparative data. The factor scores were calculated for each respondent by using the sum of the relevant questions.

Variable= sum of marks of relevant questions

Ex. Intensity of SMS Usage = Q11+Q12

$$\begin{aligned} \text{Mean} &= \Sigma x/N \\ \text{Variance} &= \Sigma(x-X)^2/(N-1) \\ \text{Standard Deviation} &= \sqrt{\Sigma(x-X)^2/(N-1)} \end{aligned}$$

Here it will explore how the mean and standard deviation of each and every important variable is varied considering the entire sample and also considering 4 selected banks separately.

4.5.1 SMS Usage Intensity

Table 4.8 illustrates how the overall SMS usage intensity among the general sample as well as the consumers of 4 different banks is varied.

	Sample	Commercial	HNB	Seylan	Sampath
Mean	2.9183	2.8923	2.6705	3.4054	2.8214
Std Deviation	0.9112	0.8362	0.8690	0.8065	0.9928

Table 4.8: SMS Usage Intensity among Bank Consumers

Figure 4.5 illustrates that the HNB consumers are heavily used to SMS in comparison to other banks while the Seylan Bank consumers are least used to it. Sampath Bank consumers have shown the highest standard deviation for that.

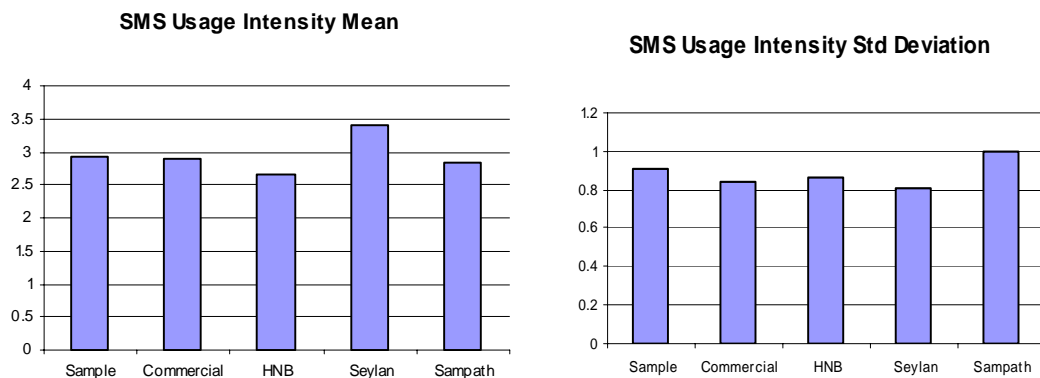


Figure 4.5: SMS Usage Intensity Mean & Std. Deviation

4.5.2 Service Reliability

Table 4.9 illustrates how the service reliability of the mobile and electronic banking services among the general sample as well as the consumers of 4 different banks is varied.

	Sample	Commercial	HNB	Seylan	Sampath
Mean	2.7745	2.6818	2.8125	2.9474	2.7159
Std Deviation	.7415	.6886	0.7234	.7780	.8026

Table 4.9: Service Reliability among Bank Consumers

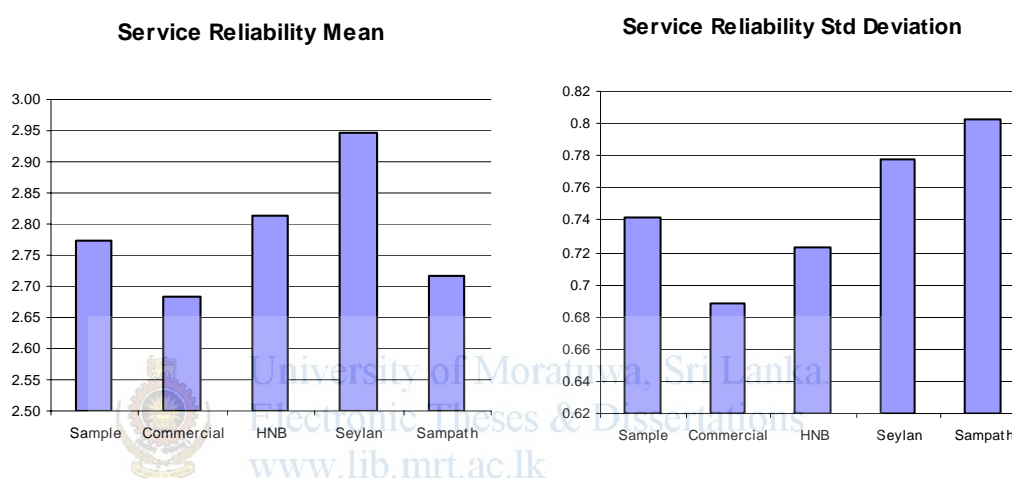


Figure 4.6: Service Reliability Mean & Std. Deviation

Figure 4.6 indicates that Service Reliability is higher among Commercial and Sampath bank consumers in comparison to the Seylan and HNB consumers. The reliability is worst among Seylan Bank consumers. Sampath Bank again shows the highest standard deviation.

4.5.3 Security Confidence

The Table 4.10 illustrates how the overall security confidence in general within the sample as well as among the consumers of 4 different banks is varied.

	Sample	Commercial	HNB	Seylan	Sampath
Mean	3.3695	3.1212	3.6182	3.6316	3.2045
Std Deviation	1.0793	0.9847	0.9905	1.0761	1.2310

Table 4.10: Security Confidence among Bank Consumers

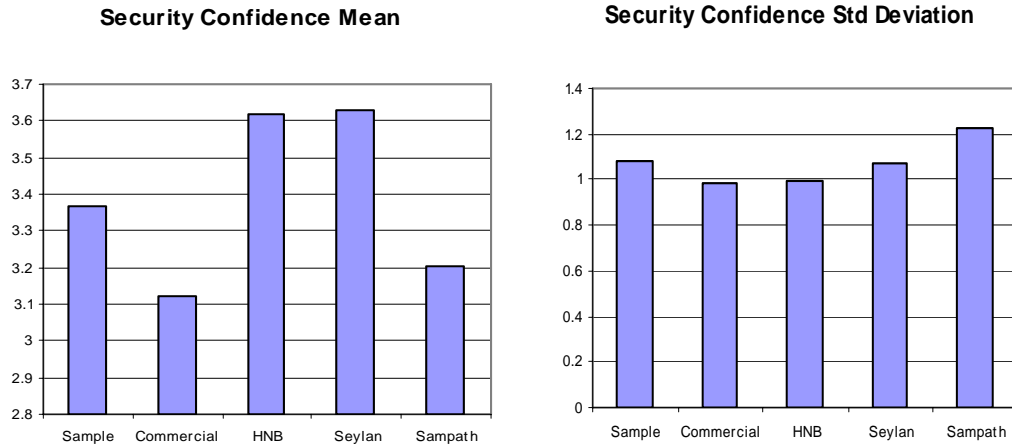


Figure 4.7: Security Confidence Mean & Std. Deviation

These results indicate that Security Confidence is higher among Commercial and Sampath bank consumers in comparison to the Seylan and HNB consumers. Sampath Bank shows the highest standard deviation for the security confidence as well.

4.5.4 Social Influence

The Table 4.11 illustrates how the social influence is varied in general within the sample as well as among the consumers of 4 different banks.

	Sample	Commercial	HNB	Seylan	Sampath
Mean	3.0545	2.9308	3.1727	3.3026	2.8750
Std Deviation	.8989	.8609	.8510	0.9045	0.9652

Table 4.11: Social Influence among Bank Consumers

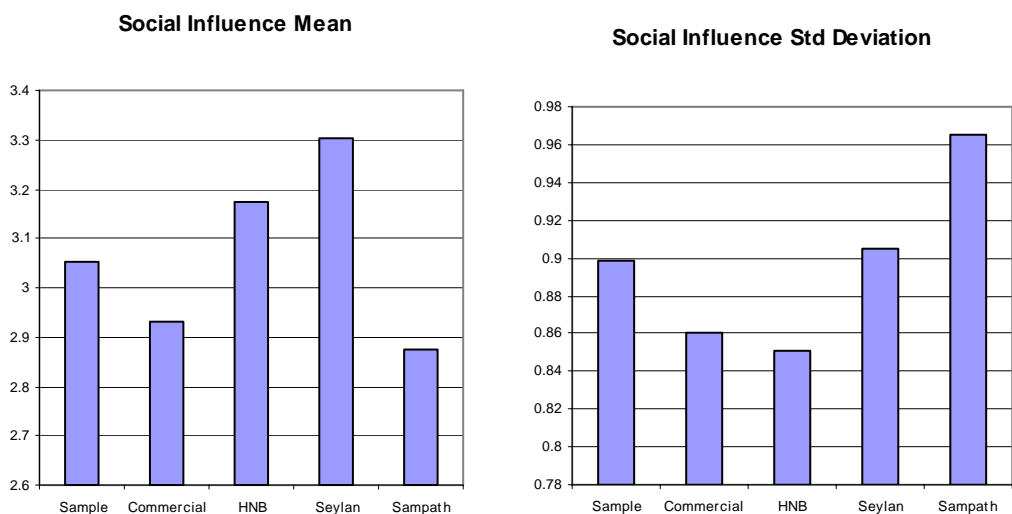


Figure 4.8: Social Influence Mean & Std. Deviation

According to Figure 4.8 Sampath Bank consumers have shown the highest social influence towards SMS based utility payment and banking services in comparison to other banks. However the highest standard deviation was also shown by the Sampath Bank consumers.

4.5.5 Ease of Use

The Table 4.12 illustrates how the ease of use within general sample as well as among the consumers of 4 different banks is varied.

	Sample	Commercial	HNB	Seylan	Sampath
Mean	2.2745	2.2045	2.3839	2.4342	2.1023
Std Deviation	0.7580	0.7015	.7804	0.7813	0.7669

Table 4.12: Ease of Use among Bank Consumers

Figure 4.9 indicates that Sampath Bank consumers have shown the highest usability of the services in comparison to the consumers of other banks. Worst usability was shown by the Seylan Bank consumers. Both Seylan and HNB have shown the highest standard deviation for the ease of use.

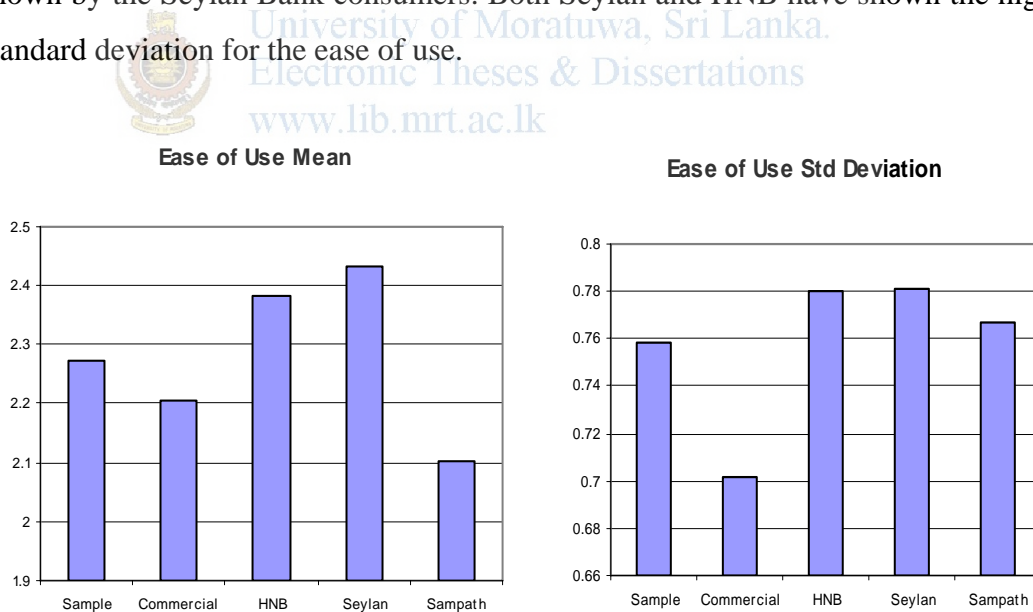


Figure 4.9: Ease of Use Mean & Std. Deviation

4.5.6 Awareness

The Table 4.13 illustrates how the awareness is varied in general within sample as well as among the consumers of 4 different banks.

	Sample	Commercial	HNB	Seylan	Sampath
Mean	3.0662	2.8788	3.1964	3.2368	3.0341
Std Deviation	1.1379	1.1995	1.0731	1.0510	1.1881

Table 4.13: Awareness among Bank Consumers

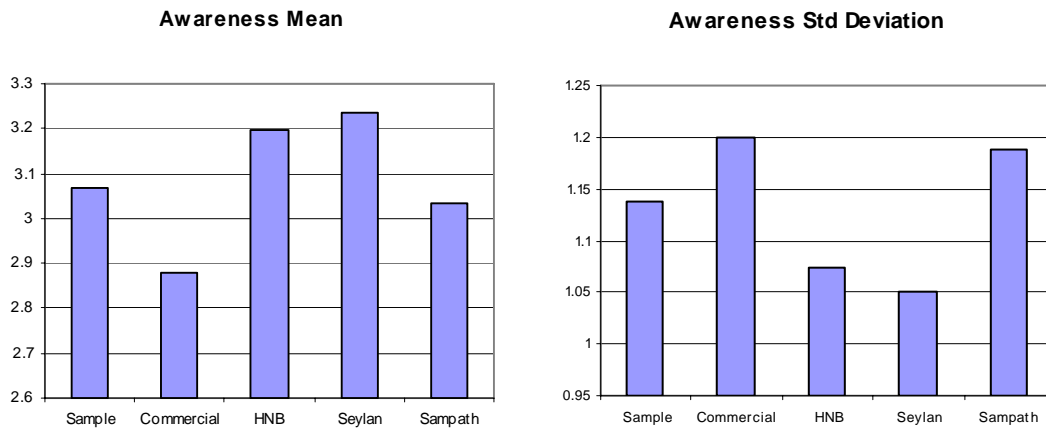


Figure 4.10: Awareness Mean & Std. Deviation

The results indicate that Commercial Bank consumers have shown the highest awareness on SMS based payment services among 4 bank's consumers. However the highest standard deviation was also shown by the Commercial Bank on consumer awareness.

4.5.7 SMS based payments and banking usage

The Table 4.14 illustrates how the usage within sample as well as among the 4 different banks is varied.

	Sample	Commercial	HNB	Seylan	Sampath
Mean	3.7647	3.5227	3.9196	4.0395	3.6932
Std Deviation	1.0626	1.1814	.8354	.8806	1.2115

Table 4.14: Service usage among Bank Consumers

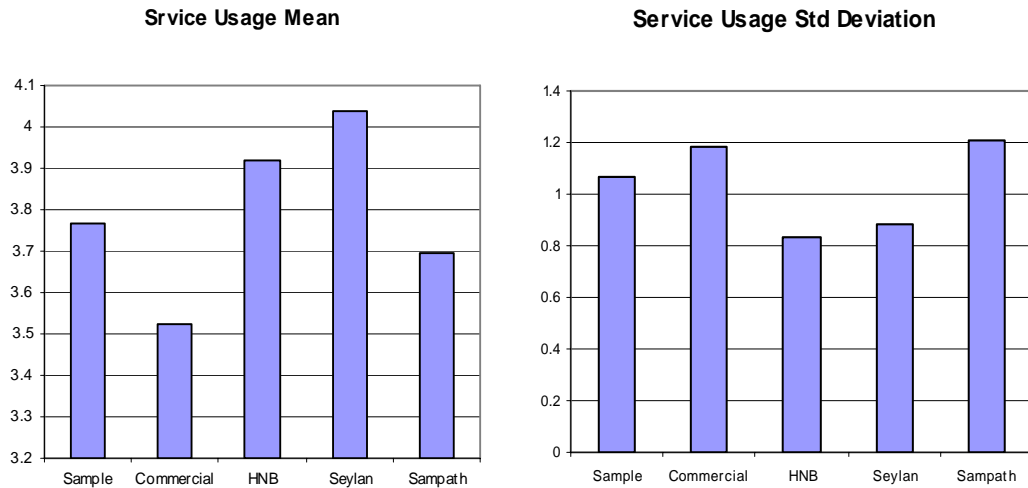


Figure 4.11: Service Usage Mean & Std. Deviation

Figure 4.11 indicates that service usage is very much higher among Commercial Bank consumers in comparison to the consumers of all other 3 banks. Highest standard deviation of the usage is shown by the consumers of Commercial and Sampath Banks.

4.6 Correlations

To determine the factors that are most influential to the SMS based utility payments and banking services, correlation analysis and regression analysis techniques were used. This section would investigate correlation among all important variables. The next section, Section 4.7 would describe the regression analysis and how it was used to test the hypothesis.

The Pearson correlation coefficient is calculated for each combination since all variables are measured using five-point interval scale in the questionnaire. The linear relationship between each pair of variables including ‘Age Group’ and ‘Education’ was investigated using correlation analysis, which provides a correlation coefficient that indicates the strength and direction of linear relationship. Significant (Sig) indicates the significant of the relationship. The correlations significant at .01 level are marked with ** while .05 level of relationships are marked with *.

4.6.1 Correlation Matrix on Social Influence

		Age Group	Highest Education	SMS Intensity	Service Reliability	Security Confidence	Social Influence
Age Group	Pearson Correlation	1	.109	.153(*)	.002	-.060	-.040
	Sig. (2-tailed)		.121	.029	.976	.392	.577
	N	204	204	202	204	203	202
Highest Education	Pearson Correlation	.109	1	.094	-.038	-.010	.021
	Sig. (2-tailed)	.121		.184	.586	.882	.764
	N	204	204	202	204	203	202
SMS Intensity	Pearson Correlation	.153(*)	.094	1	.147(*)	.153(*)	.323(**)
	Sig. (2-tailed)	.029	.184		.037	.030	.000
	N	202	202	202	202	201	200
Service Reliability	Pearson Correlation	.002	-.038	.147(*)	1	.574(**)	.562(**)
	Sig. (2-tailed)	.976	.586	.037		.000	.000
	N	204	204	202	204	203	202
Security Confidence	Pearson Correlation	-.060	-.010	.153(*)	.574(**)	1	.635(**)
	Sig. (2-tailed)	.392	.882	.030	.000		.000
	N	203	203	201	203	203	201
Social Influence	Pearson Correlation	-.040	.021	.323(**)	.562(**)	.635(**)	1
	Sig. (2-tailed)	.577	.764	.000	.000	.000	
	N	202	202	200	202	201	202

* Correlation is significant at the 0.05 level (2-tailed).

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

Table 4.15: Correlation Matrix on Social Influence

From the Table 4.15 it is evident that there is a significant positive linear relationship between social influence and security confidence on SMS based transactions ($r=.635$). The positive linear relationship between social influence and service reliability is significant too ($r=0.562$). The positive linear relationship between social influence and ease of use is also significant. ($r=0.323$).

It should also be noted that the positive linear relationship between security confidence and service reliability on SMS based payment transactions is significant ($r=0.574$).

4.6.2 Correlation Matrix on Service Usage

		Age Group	Highest Education	Social Influence	Ease of Use	Awareness	Usage
Age Group	Pearson Correlation	1	.109	-.040	-.046	-.024	-.056
	Sig. (2-tailed)		.121	.577	.514	.731	.428
	N	204	204	202	204	204	204
Highest Education	Pearson Correlation	.109	1	.021	.109	.095	.088
	Sig. (2-tailed)	.121		.764	.122	.178	.212
	N	204	204	202	204	204	204
Social Influence	Pearson Correlation	-.040	.021	1	.284(**)	.296(**)	.498(**)
	Sig. (2-tailed)	.577	.764		.000	.000	.000
	N	202	202	202	202	202	202
Ease of Use	Pearson Correlation	-.046	.109	.284(**)	1	.450(**)	.432(**)
	Sig. (2-tailed)	.514	.122	.000		.000	.000
	N	204	204	202	204	204	204
Awareness	Pearson Correlation	-.024	.095	.296(**)	.450(**)	1	.721(**)
	Sig. (2-tailed)	.731	.178	.000	.000		.000
	N	204	204	202	204	204	204
Usage	Pearson Correlation	-.056	.088	.498(**)	.432(**)	.721(**)	1
	Sig. (2-tailed)	.428	.212	.000	.000	.000	
	N	204	204	202	204	204	204

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

Table 4.16: Correlation Matrix on Service Usage

From the Table 4.16 it is evident that there is a significant positive linear relationship between awareness and SMS based payment services usage ($r=.721$). The positive linear relationship between service usage and social influence for SMS based payment transactions is significant ($r=0.498$) too. The positive linear relationship between service usage and ease of use is also significant ($r=0.432$).

It should also be noted that the positive linear relationship between easy usability and awareness on SMS based payment transactions is significant too ($r=0.450$).

4.7 Regression Analysis and Hypothesis Testing

'Forward Selection' stepwise variable selection procedure was used for regression analysis. The first variable considered for entry into the equation is the one with the largest positive correlation with the dependent variable. If the first variable is entered,

the independent variable not in the equation that has the largest partial correlation is considered next. The method terminates when no more variables are eligible for inclusion.

4.7.1 Model Building on Social Influence

Here the dependent variable is Social Influence. The independent variables Security Confidence, Service Reliability and SMS Intensity were sequentially entered into the model in Forward selection stepwise method.

Variables Entered/Removed (a)

Model	Variables Entered	Variables Removed
1	Security Confidence	
2	Service Reliability	
3	SMS Intensity	

a Dependent Variable: Social Influence

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.635(a)	.403	.400	.69775
2	.688(b)	.474	.468	.65658
3	.718(c)	.515	.508	.63179

a Predictors: (Constant), Security Confidence

b Predictors: (Constant), Security Confidence, Service Reliability

c Predictors: (Constant), Security Confidence, Service Reliability, SMS Intensity

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.682	1	64.682	132.855	.000(a)
	Residual	95.911	197	.487		
	Total	160.593	198			
2	Regression	76.098	2	38.049	88.262	.000(b)
	Residual	84.495	196	.431		
	Total	160.593	198			
3	Regression	82.756	3	27.585	69.108	.000(c)
	Residual	77.837	195	.399		
	Total	160.593	198			

a Predictors: (Constant), Security Confidence

b Predictors: (Constant), Security Confidence, Service Reliability

c Predictors: (Constant), Security Confidence, Service Reliability, SMS Intensity

d Dependent Variable: Social Influence

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.274	.161		7.895	.000
	Security Confidence	.525	.046	.635	11.526	.000
2	(Constant)	.687	.190		3.620	.000
	Security Confidence	.369	.053	.446	7.029	.000
3	Service Reliability	.401	.078	.327	5.146	.000
	(Constant)	.221	.215		1.028	.305
	Security Confidence	.352	.051	.426	6.949	.000
	Service Reliability	.375	.075	.306	4.994	.000
	SMS Intensity	.204	.050	.207	4.084	.000

a Dependent Variable: Social Influence

Excluded Variables(c)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	Service Reliability	.327(a)	5.146	.000	.345	.667
	SMS Intensity	.228(a)	4.257	.000	.291	.976
2	SMS Intensity	.207(b)	4.084	.000	.281	.969

a Predictors in the Model: (Constant), Security Confidence

b Predictors in the Model: (Constant), Security Confidence, Service Reliability

c Dependent Variable: Social Influence

Figure 4.12: Regression Analysis on Social Influence

Hypothesis: The hypothesis can be stated in the null and alternate as follows.

H_{A1}: There is a significant relationship between Security Confidence, Service Reliability and SMS Usage Intensity on Social Influence towards SMS based monetary transactions.

H_{O1}: There is a no significant relationship between Security Confidence, Service Reliability and SMS Usage Intensity on Social Influence towards SMS based monetary transactions.

This hypothesis was tested by constructing following linear model:

$$SI = \text{Intercept} + \beta_1 * SC + \beta_2 * SR + \beta_3 * SI + \varepsilon \quad \text{----- (Eqn. 2)}$$

Where: SI = Social Influence, SC = Security Confidence,
 SR = Service Reliability, SI= SMS Usage Intensity

To test this hypothesis, multiple regression analysis was done as explained before. The results of regressing three variables against Social Influence are shown in above tables in Figure 4.12. The ‘Variables Entered/Removed (a)’ table in the Figure 4.12 has listed the three independent variables (Security Confidence, Service Reliability and SMS Usage Intensity) entered in to the regression model. That means all three independent variables have been considered for the analysis.

In the ‘Model Summary’ table, **R** (.718) is the correlation of the three independent variables with the dependent variable Social Influence, after all the inter-correlations among the three independent variables were taken in to account.

In the ‘Model Summary’ table, the **R Square** (.515) is the explained variance. The ‘ANOVA (d)’ table shows that the F value of 69.11 is significant at the 0.000 levels. This indicated that 51.5% of the variance in Social Influence has been significantly explained by the three independent variables. Thus this hypothesis is substantiated for all three independent variables Security Confidence, Service Reliability and SMS Usage Intensity.

Therefore the linear model constructed in Eqn.2 above is accepted as it is.

4.7.2 Model Building on Service Usage

Here the dependent variable is Service Usage. The independent variables Awareness, Social Influence and Ease of Use were sequentially entered into the model in Forward selection stepwise method.

Variables Entered/Removed (a)

Model	Variables Entered	Variables Removed
1	Awareness	
2	Social Influence	

a Dependent Variable: Usage

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.720(a)	.519	.516	.74171
2	.779(b)	.607	.603	.67159

a Predictors: (Constant), Awareness

b Predictors: (Constant), Awareness, Social Influence

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	118.577	1	118.577	215.541	.000(a)
	Residual	110.028	200	.550		
	Total	228.605	201			
2	Regression	138.849	2	69.425	153.924	.000(b)
	Residual	89.756	199	.451		
	Total	228.605	201			

a Predictors: (Constant), Awareness

b Predictors: (Constant), Awareness, Social Influence

c Dependent Variable: Usage

coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
		1	(Constant)	1.700		
	Awareness	.673	.046	.720	14.681	.000
2	(Constant)	.834	.187		4.455	.000
	Awareness	.587	.043	.628	13.502	.000
	Social Influence	.370	.055	.312	6.704	.000

a Dependent Variable: Usage

Excluded Variables(c)

Model	Beta In	t	Sig.	Partial Correlation	Model	Collinearity Statistics
						Tolerance
1	Social Influence	.312(a)	6.704	.000	.429	.912
	Ease of Use	.135(a)	2.486	.014	.174	.800
2	Ease of Use	.078(b)	1.552	.122	.110	.775

a Predictors in the Model: (Constant), Awareness

b Predictors in the Model: (Constant), Awareness, Social Influence

c Dependent Variable: Usage

Figure 4.13. Regression Analysis on Service Usage

Hypothesis: The hypothesis can be stated in the null and alternate as follows.

H_{A2}: There is a significant relationship between Awareness, Social Influence and Ease of Use on the Usage of the SMS based utility payment and banking Services in Sri Lanka.

H_{O2}: There is a no significant relationship between Awareness, Social Influence and Ease of Use on the Usage of the SMS bases utility payment and banking Services in Sri Lanka.

This hypothesis was tested by constructing following linear model:

$$SU = \text{Intercept} + \beta_1 * AW + \beta_2 * SI + \beta_3 * EU + \varepsilon \quad \text{----- (Eqn. 3)}$$

Where: SU= Service Usage, AW= Awareness

SI = Social Influence, EU= Ease of Use

To test this hypothesis, multiple regression analysis was done as explained before. The results of regressing three variables against Service Usage are shown in above tables in Figure 4.13. In the 'Model Summary' table, Ease of Use variable has been excluded. Only the independent variables Awareness and Social Influence have been considered for the analysis.

In the 'Model Summary' table, **R** (.779) is the correlation of the two independent variables, Awareness and Social Influence with the dependent variable Social Influence, after all the inter-correlations among the two independent variables were taken in to account.

In the 'Model Summary' table, the **R Square** (.607) is the explained variance. The 'ANOVA (d)' table shows that the F value of 153.92 is significant at the 0.000 levels. This indicated that 60.7% of the variance in Service Usage has been significantly explained by the two independent variables. Thus this hypothesis is substantiated only for independent variables Awareness and Social Influence.

Therefore the linear model constructed in Eqn.3 above is accepted by excluding Ease of Use variable as shown below.

$$SU = \text{Intercept} + \beta_1 * AW + \beta_2 * SI + \varepsilon \quad \text{----- (Eqn. 4)}$$

Where: SU= Service Usage, AW= Awareness

SI = Social Influence



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5. DISCUSSION AND FINDINGS

Research findings are emerged when results derived through the data analysis were logically arranged. The most important findings of the quantitative analysis were discovered as a result of validating the test hypotheses. These results can be considered as the key outcome of this entries research. Though most of the results confirmed the initial predictions a few exceptions were also emerged. The findings are discussed in details during this Chapter and recommendations will be made on the basis of these findings.

5.1 Bank Specific Results

Most of the SMS based services are implemented through mutual relationship between bank and operators. In general researcher has found out that the Sri Lankan banking industry does not face any regulatory barriers with regard to the SMS based utility payment and baking services even though the prior approval is required from CBSL. Almost all banks accept the fact that these services can benefit the bank only as an value addition opportunity to their customers.

5.1.1 Commercial Bank


Commercial Bank of Sri Lanka is one the largest licensed commercial banks privately incorporated in Sri Lanka with over 150 branches and ATM machines across the island. The bank owns an asset base of Rs 210 billion as at September 2006 [5]. For last few years technology had given them the edge over other banks and they continue investing more on new technology to stay ahead in the industry.

Few years ago they launched a SMS alerts on account transactions to Dialog customers before they launched 'Com-eLoad' facility with the same operator in late 2005. Later in early 2007 they extended the facility to Mobitel's subscribers as described in Section 2.5.3. The facility is available to Dialog's prepaid subscribers while Mobitel's both prepaid and postpaid subscribers can benefit from the facility [27].

Commercial Bank's IT infrastructure is using standard protocols and speed of the WAN and LAN is capable of integrating with external SMS based mobile applications. IT infrastructure of the bank has gone through a major overhaul recently, with the upgrade of both production as well as backup machines to latest models. The bank has a strong concern on information security for SMS based applications and they continuously upgrade their LAN and WAN with latest security technologies.

According to the Section 4.5.2, Commercial Bank customers have shown the highest service reliability for electronic and mobile base services offered. The same research findings have also revealed that the Commercial Bank customers have shown highest security confidence on SMS based utility payment services. According to these findings highest awareness and highest service usage were also shown by the Commercial Bank customers. This is easily understandable because Commercial Banks 'Com e-Load' is the highly advertised service offered by all 4 banks.

5.1.2 Hatton National Bank

 University of Moratuwa, Sri Lanka.
Hatton National Bank is another leading private licensed commercial bank, which owns an asset base of Rs 187 billion as at September 2006 [5]. HNB too has an island wide branch network of over 150 branches.

HNB has launched a SMS banking, postpaid bill pay and prepaid reload solution for Mobitel subscribers in year 2005. They have launched a SMS banking and prepaid reload solution for Tigo subscribers very recently in August 2007. In addition to this the bank has launched another operator independent SMS based product few years ago, which can be accessed by subscribers in all mobile networks in the country.

It was found out during the study that the bank is troubled by some internal policy issues when launching SMS based utility payment and banking application with certain operators.

According to the Section 4.5.1, researcher's quantitative study has yielded the result that HNB customers are heavily used to SMS transactions in comparison to other banking customers. However Section 4.5.3 says HNB customers have show one of the

lowest security confident on SMS based utility payment and banking services among 4 bank's customers.

5.1.3 Seylan Bank

Seylan Bank too owns more than 100 branches and banking centers spread across the country with an asset base of over Rs 130 billion as at September 2006 [5]. The Bank has launched SMS banking services with Dialog, Mobitel and Tigo few years ago. They have also launched a SMS alerts solution on account transactions as well as on credit card transactions some time back.

However the bank has not made any significant investment on creating awareness among bank customers on these services.

Analysis of the responses of this research participant has revealed that the Seylan bank customers are least used to SMS transactions in comparison to other banking customers. According to the same findings Seylan bank customers have shown the lowest service reliability as well as lowest security confident among 4 banks for the electronic and SMS based services. In addition to that Seylan Bank customers have shown the worst results for social influence, easy usability, awareness and the service usage according to same findings.

5.1.4 Sampath Bank

Sampath is the bank, which first introduced ATM technology to Sri Lanka in year 1987. Currently the bank has an island network of over 100 branches and ATM machines. The bank owns an asset base of Rs 100 billion as at September 2006[5]. According to the researcher's observations Sampath bank has implemented highest number of electronic and mobile applications among these four (4) banks. They were again the first among these 4 banks to launch Internet banking services as well SMS alerts service on account and credit card transactions. However the researcher has found out that the bank's investment on creating awareness on new technology is not up to the satisfactory level in comparison to some other private licensed commercial banks.

SMS alerts on account transactions was introduced by the banks in late 2003 and was later extended to the credit card transactions in year 2005. These services were not even available in some of the developed countries at that particular time. These services are also available for subscribers in any mobile network in Sri Lanka.

Sampath has launched SMS banking services with Dialog, Tigo and Mobitel, which enable Sampath savings and current account holders to inquire balance, transfer funds, etc. However they have launched SMS prepaid reload and postpaid bill pay services only to Mobitel subscribers.

Sampath Banks IT infrastructure too is capable of integrating with any external SMS based mobile applications. They too have a greater concern on the security of the information transmitted between the bank and mobile operator. . The bank always tries to secure the network with latest security technologies. Similarly they expect that the mobile operator also to follow the same procedures.

As described in Section 2.6.3 Sampath's latest mobile based product 'Mobile Cash' was launched in late August 2007.

Researcher's quantitative study has revealed that the Sampath Bank customers have shown the best results for the social influence as well as for the easy usability of SMS based utility payments banking service transactions.

5.1.5 Other Banks

Some other private licensed commercial banks such as HSBC and NDB have started to invest heavily on electronic and mobile technology as well as on the awareness in recent times. As described in Section 2.6.2, highly publicised NDB's eZ Pay with Dialog is the best example for it. However the researcher has found out that even after the three (3) months since the product launch, it has not reached the satisfactory level of success expected at the beginning. One of the main obstacles faced by these banks is the unavailability of an island wide branch network as their services are still restricted to major urban areas in the country.

5.2 Operator Specific Results

Though the quantitative survey was carried out with a sample selected from Mobitel subscribers, status of the SMS based utility payment and banking services of all four (4) existing mobile operators were investigated by the researcher during the qualitative study. Though the researcher possesses adequate contacts in all 4 current mobile operators, it was extremely difficult to gather information due to highly competitive nature of the industry.

Mobile industry too does not have any regulatory requirements with regard to the SMS based utility payment and banking services. But all mobile companies believe that they have potential revenue enhancement opportunities through these services. However in most of the mobile networks, communication up to the SMSC is protected with 3-DES encryption technology but the information transmitted between SMSC and mobile applications may be not that protected. Nevertheless the transmission between mobile operator application and the banking application is again protected through secure VPN links.

5.2.1 Dialog

Dialog Telekom is the leading mobile telecom player in the country, which owns more than 50% of the Sri Lankan mobile market as stated in Section 2.1.3.

Dialog has launched SMS Banking service with Sampath Bank and Seylan Bank. The SMS based services include account balance inquiries, fund transfers, credit card status inquiries, etc. Dialog recently launched SMS based mobile payment solution with NDB in August 2007, which has been described in details in Section 2.6.2. The company has very recently launched a SMS based product named 'eZ Reload D2D', which enables transferring credit between 2 Dialog mobile numbers.

Company has a strong IT infrastructure and resource base capable of dealing with any external banking application. The company has a strong concern on the security of the information and they always try to secure their LAN, WAN with latest security technologies.

5.2.1 Mobitel

Mobitel has already launched SMS based prepaid reload and postpaid bill pay services with Commercial Bank, HNB and Sampath Bank where Mobitel subscribers banking with any of these banks can re-load their prepaid account or pay their post paid bill through the above services. The business model applied here is that Mobitel pays a certain percentage of the paid amount as commission to these banks.

In addition to this, Mobitel has launched SMS Banking service with HNB, Seylan Bank, Sampath Bank and Pan Asia Bank. The SMS based services include account balance inquiries, fund transfers, credit card status inquiries, etc.

Mobitel too has recently launched product named 'Smart Share', which supports credit transfer between 2 Mobitel prepaid numbers.

Currently Mobitel is the only provider, which offers the user friendly OTA SIM menu for SMS based services to its subscribers. This user-friendly menu eliminates the hassle of remembering a different short code for each and every application.

Company's IT infrastructure is capable of dealing with any external banking application. The company has a strong concern on the security of the information and they too always try to secure their LAN, WAN with latest security technologies.

5.2.3 Tigo

Tigo, previously known as Celltel, has launched SMS banking services with Seylan Bank and Sampath Bank few years ago. As Section 2.5.5 describes they have launched SMS banking and prepaid SMS reload services with HNB very recently in August 2007. However the company has not made any significant investment on creating awareness among Tigo subscribers on these services.

5.2.4 Hutch


Hutch has not launched any SMS reload/bill pay or SMS banking solution in collaboration with any bank up to now.

However their recently launched ‘Me2U’ service is considered to be a SMS based payment service as it will transfer money from one mobile number to another mobile number as described in Section 2.6.1.

5.3 Hypothesis Testing

The first hypothesis investigated the relationship of the impact of social influence towards SMS based utility payments against three variables, security confidence, service reliability and the SMS usage intensity. The results of the linear regression analysis indicate that a significant linear relationship exists between social influence and all other three variables. The researcher thus rejects the null hypothesis (H_{01}) and accepts alternative hypothesis (H_{A1}). It concludes that there is sufficient evidence, at the 5% level of significance, that a linear relationship exists between social influence and security confidence, service reliability and the SMS usage intensity.

$$SI = \text{Intercept} + \beta_1 * SC + \beta_2 * SR + \beta_3 * SI + \varepsilon \quad \text{----- (Eqn. 2)}$$

Where:  SI = Social Influence, SC = Security Confidence,
SR = Service Reliability, SI= SMS Usage Intensity
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The second hypothesis investigated the relationship between the impact of awareness, social influence and ease of use on SMS based utility payments and banking service usage. The results of this linear regression analysis indicate that a significant linear relationship does not exist between SMS based utility payments and banking service usage and ease of use, which was then excluded from the analysis.

The researcher thus accepts null hypothesis (H_{02}) and concludes that there is insufficient evidence, at the 5% level of significance, that a linear relationship exists between service usage and awareness, social influence and ease of use.

$$SU = \text{Intercept} + \beta_1 * AW + \beta_2 * SI + \varepsilon \quad \text{----- (Eqn. 4)}$$

Where: SU= Service Usage, AW= Awareness
SI = Social Influence

However the linear model shown in Eqn. 4, which shows a linear relationship between service usage, awareness and social influence, was accepted during the regression analysis in Chapter 4.7.2.

5.4 Other Findings

Majority of the respondents believe that the convenience and the time saving are the greatest benefits gained by using SMS based utility payments and banking services. Very few numbers of mobile subscribers believe that they can gain a cost benefit using the services. Majority of the respondents also expressed the lack of awareness and security confidence on these SMS based services. Certain set of respondents expressed the fact that they are not in a position to acquire these services since the mobile numbers is not registered to their own name. However these responses too should count to the awareness as there is no such mechanism between the bank and the mobile operator to validate the ownership of the mobile number.



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6. CONCLUSION

6.1 Summary

It has been identified that Sri Lankan mobile industry has grown up in millions of subscribers in recent times with modern development of the technology. General public is always looking out for the convenience with ever increasing busy life style with the present day world. With the technology being available, the banking or making payment through a simple SMS on the move is expected to create a huge transformation of the society. However it is not the reality in Sri Lanka as explained in Section 4.1. Even at least 1% of the mobile subscribers in the country are not interested about this technology, which is already available to them.

Researcher's main objective during this research study was to evaluate the critical success factors of the SMS based utility payments and banking services in the Sri Lankan context. It was expected to identify the barrier that has caused these services to be unsuccessful in the country. It was also expected to create a model that can be used to promote the services in the country as well as provide recommendations to the banking and mobile telecom sectors on successful implementation of these services.

Research process was executed according to the plan to achieve these objectives defined in Section 1.6. Initially a comprehensive literature review was conducted for global research findings on mobile payments, SMS banking and payments. Then the conceptual framework was developed based on the literature and local industry observations. These concepts were then operationalised in to the pilot questionnaire as explained in Chapter 3. During the qualitative study most of the industry related information were gathered and the quantitative study was performed through a survey, conducted with the selected sample of mobile and banking consumers. The main objective of the qualitative study was to identify the influential factors pertaining to mobile operator perspectives as well as banking perspectives applicable to the entire country. User perspectives were intended to be identified during the consumer survey.

Data collection from the selected user sample is the most difficult tasks undertaken by the researcher during this study. Researcher had to translate the questionnaire in to the

native language to get more accurate responses. Most of the respondents were needed to be reminded or even assisted over the phone to fill up the questionnaire.

Data gathered during the survey were analysed using SPSS statistical tool. Correlation test was performed to identify the positive or negative correlation between variables. Hypothesis testing and model building was performed using multiple linear regression tests.

Since this research was undertaken by the researcher as a student, there were number of limitations in terms of resources and time. However the researcher would be satisfied with the outcome of this research with the available resources and time frame.

6.2 Results

It was found out during this research that SMS based utility payment and banking services are not aligned with the business strategy of both mobile operators as well as banks in Sri Lanka. Most of the organisations have implemented the services just as a hygiene factor for their respective consumers. Out of the 4 selected banks Commercail Bank is well ahead of others banks in SMS based utility payment and banking services in Sri Lanka. Sampah Bank is little behind the Commercial Bank mainly due to the lack of commitment towards awareness up to now. Seylan Bank has posted the lowest success for these services among the selected banks.

There must be a social influence or a common force towards these services in the society, just like the general trend towards the eChannelling, for the services to be successful in the country. This research findings has confirmed that the social influence is depend on the confidence on security, the reliability of the services and the SMS usage intensity among the general public. However the social influence alone would not help expand the development of services, proper awareness also an essential requirement. Easy usability has no impact on the increase of the service usage in Sri Lanka.

7. RECOMMENDATIONS

Both mobile operators and banks in Sri Lanka must take required steps to build up the public image on SMS based utility payment and banking transactions. It can not be achieved overnight. Peoples spending habits, perceptions and strongly held beliefs need to be changed.

Mobile operators need to put more effort and investment on increasing the reliability and the availability of the services. They need to align these services with their annual business plan as these services are clear revenue opportunities for them. They must upgrade all the infrastructure facilities utilised for these services in a long term plan to improve the secrecy, accuracy and the speed of the information transition.

Both operators and banks must then take care of the awareness creation. However the infrastructure development has to be completed before make any investment on awareness creation.



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8. FUTURE STUDY

As already explained, this research too is restricted due to natural limitations. The research was carried out to identify ordinary users spending patterns, preferences while mobile operator and banking perspectives were evaluated separately. There is the opportunity for any researcher to investigate any correlations between user perspectives, operator perspectives and bank perspectives in the Sri Lankan context.

Further one can categorised users on different behavior and spending pattern and identifying best suited SMS based payment products for each category. Dialog NDB's easyPay types of services can also be investigated as it requires consumer to acquire a specially design SIM card to do the transactions.



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10 . ANNEXURE

10.1 Annexure A: Consumer Survey Questionnaire - Sinhala



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SMS මගින් කෙරෙන බැංකු කටයුතු සහ බැංකු ගිණුමෙන් කෙරෙන ගෙවීම් සඳහා පෙළඹීමත්, භාවිතයත් ව්‍යාප්තවීමට බලපාන සාධක හඳුනා ගැනීම

ශ්‍රී ලාංකික ජංගම දුරකථන පාරිභෝගිකයන් අතර SMS නැතහොත් කෙටි පණිවුඩ සේවය හරහා කෙරෙන බැංකු කටයුතු සහ බැංකු ගිණුමෙන් සිදු කෙරෙන ගෙවීම් සඳහා පෙළඹීමටත්, භාවිතය ව්‍යාප්ත වීමටත් බලපාන කරුණු අධ්‍යයනය කිරීමට මෙම ප්‍රශ්නාවලිය සකසා ඇත.

මෙය මොරටුව විශ්ව විද්‍යාලයේ තොරතුරු තාක්ෂණය පිළිබඳ පශ්චාත් උපාධි පාඨමාලාවේ සමීක්ෂණ ව්‍යාපෘතිය සඳහා මෙම සමීක්ෂණකරු විසින් සකසන ලද්දකි.

රහස්‍ය භාවය

ඔබගේ පිළිතුරුවල සම්පූර්ණ රහස්‍ය භාවය ආරක්ෂා කරන බවටත්, එම තොරතුරු මෙම සමීක්ෂණ ව්‍යාපෘතියේ දත්ත විමර්ශනය සඳහාම පමණක් භාවිතා කරන බවටත් මම පොරොන්දු වෙමි. ඔබගේ නම හෝ ලිපිනයෙන් ඔබගේ අනන්‍යතාවය හඳුනාගැනීමට කිසිවිටකත් අවශ්‍ය නොවන බව ද දන්වමි.



මෙම කර්තව්‍යය සාර්ථක කරගැනීමට ඔබගෙන් ලැබෙන කාලය සහ සහයෝගයට මාගේ ගෞරවනීය ස්තූතිය පුදකර සිටිනෙමි.

සමීක්ෂණකරු : ඩබ්ලිව්. සුරංග ජයසේකර
විද්‍යුත් තැපෑල : surangajay@yahoo.com ජංගම දුරකථන : 071 4704444

SMS බැංකු පහසුකම

SMS බැංකු පහසුකම ජංගම දුරකථනය හරහා පාරිභෝගිකයාට ලැබෙන විශේෂ සේවයකි. එහිදී දුරකථන පාරිභෝගිකයාට තමාගේ බැංකු ගිණුමේ ශේෂය පරීක්ෂා කිරීම, තම ගිණුමෙන් තවත් ගිණුමකට මුදල් බැර කිරීම, මාසික බිල්පත් ගෙවීම ආදී සේවාවන් රැසක් ජංගම දුරකථනයේ කෙටි පණිවුඩ සේවය හරහා ලැබෙන උපදෙස් තුලින් ලබාගත හැක.

- විනයේ කර්මාන්ත හා වාණිජ බැංකුව (ICBC)

- මෙහි ඇති ප්‍රශ්නාවලට පිළිතුරු ඊට ආදළ කොටු ලකුණු තුල $\sqrt{\quad}$ හෝ X යෙදීමෙන් හෝ පිළිතුරු යටින් ඉරක් ඇඳීමෙන් ලබාදිය හැක.
- කරුණාකර වඩාත්ම සුදුසු එක් පිළිතුරක් පමණක් තෝරන්න.
- කරුණාකර ඔබගේ වෙනත් අදහස් සහ යෝජනා තිබේ නම්, ඉඩ සපයා ඇති ස්ථානවල ඒවා නොපැකිලව සඳහන් කරන්න.

සාමාන්‍ය තොරතුරු

1. ස්ත්‍රී / පුරුෂ භාවය

i. පුරුෂ ii. ස්ත්‍රී

2. වයස් කාණ්ඩය

i. අවු. 20 හෝ අඩු

ii. අවු. 21 සහ 30 අතර

iii. අවු. 31 සහ 40 අතර

iv. අවු. 41 සහ 50 අතර

v. අවු. 51 හෝ වැඩි

3. ලැබූ උසස්ම අධ්‍යාපන තත්ත්වය

i. අ.පො.ස. (සා/පෙ) ට අඩු

ii. අ.පො.ස. (සා/පෙ)

iii. අ.පො.ස. (උ/පෙ)

iv. ඩිප්ලෝමා හෝ උසස් ඩිප්ලෝමා

v. උපාධි හෝ වැඩි

4. ඔබගේ ප්‍රධාන බැංකු සේවා සපයන්නා

i. කොමර්ෂල් බැංකුව

ii. හැටන් නැෂනල් බැංකුව

iii. සේලන් බැංකුව

iv. සම්පත් බැංකුව

v. වෙනත්

'වෙනත්' නම්, නම :

5. ඔබ වැඩිපුරම බැංකු කටයුතු කරන ආකාරය

i. බැංකු ශාඛාවට යාමෙන්

ii. ATM යන්ත්‍රය මගින්

iii. අන්තර්ජාල බැංකු පහසුකම මගින්

iv. දුරකථන බැංකු පහසුකම මගින්

v. SMS බැංකු පහසුකම මගින්

ජංගම දුරකථන සහ බැංකු පාරිභෝගික දත්ත

1. අ) ඔබ, ඔබගේ බැංකුව සහ ජංගම දුරකථන සේවා සපයන සමාගම එක්ව පිරිනමන SMS හරහා ලබාගත හැකි සේවාවන් සඳහා කෙතරම් දුරට හුරු පුරුදු වී තිබේ ද ? උදා: SMS බැංකු පහසුකම, බැංකු ගිණුමෙන් ජංගම දුරකථන බිල්පත ගෙවීමේ පහසුකම

- i. ඉතා ඉහළ ii. ඉහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම්:

ආ) ඔබගේ බැංකු ගිණුමෙන් මුදල් අඩුවන පරිදි, ජංගම දුරකථන බිල්පත ගෙවීමට ඔබ කෙතරම් දුරට හුරු පුරුදු වී තිබේ ද ?

- i. ඉතා ඉහළ ii. ඊහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම්:

2. SMS මගින් ගෙවීම් කිරීමට ඔබ පෙළඹුණු ආයතනම හේතුව කුමක් ද?

- | | |
|----------------------------------|--------------------------|
| i. ඕනෑම වේලාවක ගෙවීම් කළ හැකිවීම | <input type="checkbox"/> |
| ii. වඩාත් පහසුවීම | <input type="checkbox"/> |
| iii. කාලය ඉතිරිවීම | <input type="checkbox"/> |
| iv. මුදල් ඉතිරිවීම | <input type="checkbox"/> |
| v. වෙනත් | <input type="checkbox"/> |

ඔබගේ පිළිතුර 'වෙනත්' නම්, එය :

3. ඔබගේ බැංකුව සහ ජංගම දුරකථන සේවා සපයන සමාගම එක්ව පිරිනමන, SMS මගින් ගෙවීම් කළ හැකි සේවාවන් පිළිබඳ ඔබ කෙතරම් දුරට අසා තිබේද?

- i. ඉතා ඉහළ ii. ඊහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම්: :

4. ඔබගේ බැංකුව විසින් ලබාදෙන ජංගම දුරකථන හරහා ලබාගත හැකි වෙනත් සේවාවන් පිළිබඳ ඔබ කෙතරම් දුරට අසා තිබේද? උදා:SMS Alerts
- i. ඉතා ඉහළ ii. ඉහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම්: :

5. ඒ පිළිබඳ පිළිබඳ දන්නවානම්, ඔබ එම සේවාව / සේවාවන් සඳහා ලියාපදිංචි නොවීමට බලපෑ වඩාත් ආසන්නම හේතුව කුමක් ද?

- i. ලියාපදිංචි වීමේ ක්‍රියාවලිය දුෂ්කරවීම
- ii. ජංගම දුරකථනය ඔබේ නමින් ලියාපදිංචි වී නොතිබීම
- iii. SMS මගින් මුදල් ගනුදෙනු කිරීමේ ඇති වැඩි අවදානම
- iv. වැඩි මුදලක් වැයවෙතැයි සිතීම
- v. වෙනත්

ඔබගේ පිළිතුර 'වෙනත්' නම්, එය :

..... University of Moratuwa, Sri Lanka.

6. ඔබ ඇත ප්‍රදේශයක සංචාරය කරන විට ඔබගේ පෙර ගෙවුම් ජංගම දුරකථනයේ ශේෂය සියල්ල හඳිසියේ වැය වන බවට මොහොතක් සිතන්න. ඔබට ඔබගේ දුරකථනය ඊ-ලෝඩ් කරගැනීමට ස්ථානයක් සොයා ගැනීමට නොහැකි නිසා මහත් දුෂ්කරතාවයන්ට මුහුණදීමට සිදු වේ. ඔබ නැවත පැමිණිවිට, ඔබගේ බැංකුව මගින් බැංකු ගිණුමෙන් ඊ-ලෝඩ් කරගත හැකි පහසුකම සපයන්නේ නම්, ඔබ හැකි ඉක්මනින් ඒ සඳහා ලියාපදිංචි වීමට කටයුතු යොදන්නේ ද?

- i. ඔව් ii. නැහැ

'නැහැ' නම්, ඒ ඇයි:

7. ඔබට බැංකු කවුන්ටරයෙන් හෝ ATM යන්ත්‍රයක් මගින් ලබාගත හැකි සමහර සේවාවන් (උදා : ශේෂය විමසීම, ඔබේ ගිණුමෙන් තවත් ගිණුමකට මුදල් බැර කිරීම), SMS කෙටි පණිවුඩ හරහා කෙරෙන උපදෙස් තුලින්, ඔබ ගමන් කරමින් සිටින විට පවා, ලබාගත හැකි නම් ඔබ හැකි ඉක්මනින් SMS බැංකු පහසුකම ලබාගන්නේ ද?

- i. ඔව් ii. නැහැ

'නැහැ' නම්, ඒ ඇයි?:

8. ඔබගේ ජංගම දුරකථන සේවා සපයන සමාගම විසින් ලබාදෙන SMS හරහා ලබාගත හැකි සේවාවන්ට ඔබ කෙතරම් දුරට හුරු පුරුදු වී තිබේ ද?
- i. ඉතා ඉහළ ii. ඉහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම් :

9. බැංකු ශාඛාවකට ගොස්, ATM යන්ත්‍රය හරහා හෝ අන්තර්ජාල බැංකු පහසුකම හරහා බැංකු කටයුතු/ගෙවීම් කිරීම වෙනුවට, SMS හරහා එම කටයුතු කිරීමට ඔබගේ හිතමිත්‍රාදීන්ගෙන් කෙතරම් දුරට අනුබලයක් ලැබෙනවාද?
- i. ඉතා ඉහළ ii. ඉහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම් :

10. ඔබගේ ජංගම දුරකථනය හෝ බැංකුව විසින් ලබාදෙන රහස්‍ය අංකය (PIN) හඳුසියේ නැති වුවහොත්, ඔබේ මුදල් නැතිවීමට ඉඩ ඇතැයි ඔබ සිතන නිසා SMS හරහා බැංකු කටයුතු හෝ ගෙවීම් කටයුතු කිරීම අනාරක්ෂිත බව ඔබගේ හැඟීමයි.
- i. ඔව් ii. නැහැ

ඔබගේ අදහස් ඇත්නම්:

11. සාමාන්‍යයෙන් මාසයකට ඔබගේ ජංගම දුරකථනයෙන් වෙනත් දුරකථන වලට කොපමණ (SMS) කෙටි පණිවුඩ ප්‍රමාණයක් යැවෙන්නේද?
- i. 50 ට වැඩි ii. 26-50 iii. 11-25 iv. 1-10 v. කිසිදු නැත

ඔබගේ අදහස් ඇත්නම්:

12. සාමාන්‍යයෙන් මාසයකට ඔබගේ ජංගම දුරකථනයෙන් SMS හරහා ලැබෙන සේවාවන් ලබාගැනීම පිණිස, කෙටි පණිවුඩ (SMS) කොපමණ ප්‍රමාණයක් යැවෙන්නේද?
- i. 25 ට වැඩි ii. 16-25 iii. 6-15 iv. 1-5 v. කිසිදු නැත

ඔබගේ අදහස් ඇත්නම්:

ප්‍ර. 11 සහ 12 දෙකම සඳහා ඔබගේ පිළිතුර 'නැතැ' නම් පමණක්, ප්‍රශ්න අංක 13 ට පිළිතුරු සපයන්න.

13. අ) ඔබගේ GSM ජංගම දුරකථනය SMS තාක්ෂණය ඇතුළත් කොට නිෂ්පාදනය කර ඇති බව දන්නවාද?

- i. ඔව් ii. නැතැ

ඔබගේ අදහස් ඇත්නම්:

ආ) ඔබගේ ජංගම දුරකථන සම්බන්ධතාවයේ SMS පහසුකම සඳහා (කෙටි පණිවිඩ යැවීමට සහ එන පණිවිඩ ලබා ගැනීමට) දෛනික හෝ මාසික ගාස්තු අය නොකරන බව ඔබ දන්නවාද?

- i. ඔව් ii. නැතැ

ඔබගේ අදහස් ඇත්නම් :

14. ඔබගේ ජංගම දුරකථන සේවා සපයන සමාගම විසින් ලබාදෙන SMS හරහා ලබාගත හැකි සේවාවන්ට සිංහල භාෂා සහය නොමැතිකම ඔබට

- i. කිසිම අපහසුතාවයකට පත් නොකරයි
 ii. අපහසුතාවයකට පත් නොකරයි
 iii. මධ්‍යස්ථ තත්ත්වයක් ඇති කරයි
 iv. අපහසුතාවයකට පත් කරයි
 v. ඉතා අපහසුතාවයකට පත් කරයි

ඔබගේ අදහස් ඇත්නම්:

15. ඔබගේ ජංගම දුරකථන සේවා සපයන සමාගම විසින් ලබාදෙන SMS හරහා ලබාගත හැකි සේවාවන්වල භාවිතයට ඇති පහසුව (User Friendliness) කෙතරම් දුරට සතුටුදායක මට්ටමක පවතීද?

- i. ඉතා ඉහළ ii. ඉහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම්:

16. ඔබගේ ජංගම දුරකථන සේවා සපයන්නාගේ ආවරණ පරාසය පිළිබඳව ඔබ තුළ ඇති තක්සේරුව කෙතරම් දුරට සතුටුදායක මට්ටමක පවතීද?

- i. ඉතා ඉහළ ii. ඉහළ iii. සාමාන්‍ය iv. එහෙල v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම්:

17. ඔබගේ තක්සේරුවට අනුව, ඔබගේ ජංගම දුරකථන සේවා සපයන සමාගමේ කෙටි පණිවිඩ (SMS) යොමුකිරීමට ගන්නා කාලය (Delivery Time) සහ ඒ සඳහා පිළිතුරු ලැබීමට ගන්නා කාලය (Response Time) පිළිබඳව ඔබ තුළ ඇති විශ්වාසය කිනම් මට්ටමක පවතීද?

- i. ඉතා ඉහළ ii. ඉහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම්:

18. ඔබගේ තක්සේරුවට අනුව, විද්‍යුත් සේවා සහ ජංගම දුරකථන හරහා ලබාදෙන සේවාවලදී, අඛණ්ඩ සේවාවක් සැපයීමට ඔබගේ බැංකුව සතු තාක්ෂණික හැකියාව පිළිබඳව ඔබේ විශ්වාසය කිනම් මට්ටමක පවතීද?

- i. ඉතා ඉහළ ii. ඉහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම් :

19. ඔබගේ තක්සේරුවට අනුව, ඔබගේ මුදල්වල ආරාක්ෂාවත්, රහස්‍ය භාවයත් පවත්වා ගනිමින් SMS හරහා සිදුකෙරෙන බැංකු සහ ගෙවීම් සේවාවක් එක්ව ඔබ වෙත ලබාදීමට, ඔබගේ බැංකුවට සහ ජංගම දුරකථන සමාගමට ඇති හැකියාව පිළිබඳව ඔබේ විශ්වාසය කිනම් මට්ටමක පවතීද?

- i. ඉතා ඉහළ ii. ඉහළ iii. සාමාන්‍ය iv. පහළ v. ඉතා පහළ

ඔබගේ අදහස් ඇත්නම්:

20. ඔබ දුරකථන බැංකු පහසුකම සහ අන්තර්ජාල බැංකු පහසුකම ගැන වඩාත් සැලකිලිමත් නොවන්නේ දුරකථන ඇමතුම් ගාස්තු සහ අන්තර්ජාල ප්‍රවේශ ගාස්තු වැඩි නිසා ඒ සඳහා සාපේක්ෂව වැඩි වියදමක් දැරීමට සිදුවන නිසයි.

- i. වඩාත් එකඟ වේ
- ii. එකඟ වේ
- iii. මධ්‍යස්ථයි
- iv. එකඟ නොවේ
- v. කොහෙත්ම එකඟ නොවේ

ඔබගේ පිළිතුර iv හෝ v නම්, ඒ ඇයි?.....

21. SMS මගින් කෙරෙන බැංකු කටයුතු සහ ගෙවීම් සේවාවන්ට හුරුවීම තුලින්, අනෙක් බැංකු කටයුතු/ගෙවීම් කෙරෙන ආකාරයට සාපේක්ෂව (උදා : බැංකු ගාඩා, ජංගම දුරකථන ඊ-ලෝඩ් කරන අලෙවිසැල්) ඔබට සැලකිය යුතු මූල්‍යමය වාසියක් අත්කර ගත හැකිය.

- i. වඩාත් එකඟ වේ
- ii. එකඟ වේ
- iii. මධ්‍යස්ථයි
- iv. එකඟ නොවේ
- v. කොහෙත්ම එකඟ නොවේ

ඔබගේ පිළිතුර iv හෝ v නම්, ඒ ඇයි ?

22. ඔබගේ ජංගම දුරකථන සේවා සපයන සමාගමේ පාරිභෝගික සේවා සැපයීමේ තත්ත්වය පිළිබඳ ඔබ කෙතරම් දුරට සැහිමකට පත්වන්නේද?

- i. ඉතාම තෘප්තිමත්
- ii. තෘප්තිමත්
- iii. මධ්‍යස්ථයි
- iv. අතෘප්තිමත්
- v. ඉතාම අතෘප්තිමත්

ඔබගේ අදහස් ඇත්නම්:

23. ඔබගේ බැංකුවේ පාරිභෝගික සේවා සැපයීමේ තත්ත්වය පිළිබඳ ඔබ කෙතරම් දුරකට සැහිලකට පත්වන්නේද?

- i. ඉතාම තෘප්තිමත්
- ii. තෘප්තිමත්
- iii. මධ්‍යස්ථයි
- iv. අතෘප්තිමත්
- v. ඉතාම අතෘප්තිමත්

ඔබගේ අදහස් ඇත්නම්:

24. මෙහි දැක්වූ කරුණුවලට අමතරව, SMS මගින් කෙරෙන බැංකු කටයුතු සහ ගෙවීම් කටයුතුවලට පෙළඹීමෙන් ලබාගත හැකි වෙනත් වාසි සහගත තත්ත්වයන් තිබේද? එසේ නම් සඳහන් කරන්න

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25. මෙහි දැක්වූ කරුණුවලට අමතරව, SMS මගින් කෙරෙන බැංකු කටයුතු සහ ගෙවීම් කටයුතුවලට හුරුවීමෙන් සිදුවන වෙනත් අවාසිදායක තත්ත්වයන් තිබේද? එසේ නම්, සඳහන් කරන්න.

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මෙම සමීක්ෂණයට සහභාගිවීම පිළිබඳව ඔබට බෙහෙවින් ස්තූතිවන්ත වන අතර ඔබ දැක්වූ සහයෝගය ඉතා අගය කොට සලකමි.

10.2 Annexure B: Consumer Survey Questionnaire - English



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Identification of influential factors for SMS based utility payments and banking services and its continual usage

This questionnaire is designed to study the influential factors for SMS based utility payments and banking services adaptation and its continual usage among Sri Lankan general public.

It is a part of the research project carried out by this researcher for MBA in Information Technology at the University of Moratuwa.

Confidentiality

I assure you that your responses are kept strictly confidential and will only be used for data analysis of this research project. There is nothing on the form that will allow researcher to identify you and there is no requirement to identify your self by name or address.



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Thank you very much for your time and cooperation. I greatly appreciate your cooperation in furthering this research endeavor.

Researcher : W.Suranga Jayasekara

Email: surangajay@yahoo.com, SMS: 0714704444

SMS Banking

SMS banking is a mobile banking service for customer to make enquiry, transfer, remittance, spending and bill payment according to the customer's short message instructions sent through mobile phone. Result will be sent back to customer by short message. - Industrial and Commercial Bank of China

- Questions in this survey should be answered either by putting ticks, x on check boxes or under lining the answer.
- Please select only one most appropriate answer
- Please do not hesitate to express your own comments (if any) in the space provided.

General Information

1. Gender

- i Male ii Female

2. Age Group

- i 20 or less years
- ii Between 21-30 years
- iii Between 31-40 years
- iv Between 41-50 years
- v Over 50 years

3. Highest education qualification

- i Below GCE O/L
- ii GCE O/L
- iii GCE A/L
- iv Diploma or Higher Diploma
- v Degree or above

4. Your main banking partner

- i Commercial
- ii HNB
- iii Seylan
- iv Sampath
- v Other

Specify (If Other)

5. Your most frequent mode of banking

- i  Visiting Bank Branch
- ii ATM
- iii Internet Banking
- iv Telebanking
- v SMS Banking

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Mobile and Banking Consumer Inputs

1.a) To what extent you have been using SMS based services jointly offered by your bank and the mobile service provider such as SMS Banking, SMS Bill Payment, etc?

- i. Very High ii. High iii. Average iv. Low v. Very Low

Comments (If Any).....

b) To what extent you are used to pay the monthly bill of your mobile connection through SMS based bill payment service from your bank?

- i. Very High ii. High iii. Average iv. Low v. Very Low

Comments (If Any).....

2.) What is the main reason for you to use the SMS based bill payment option from your own bank account?

- i High Availability
- ii More Convenience
- iii Time Saving
- iv Minimal Cost
- v Any Other

Specify (If Any Other).....

3. To what extent you are aware of the SMS based services jointly offered by your bank and mobile service provider, which involves a payment transaction? (E.g. SMS Banking, Mobile Bill Payment through SMS)

- i. Very High ii. High iii. Average iv. Low v. Very Low

Comments (If Any).....

4. To what extent you are aware of any other services offered by your bank, which can be obtained through mobile phones? (E.g. SMS Alerts)

i. Very High ii. High iii. Average iv. Low v. Very Low
Comments (If Any).....

5. If you are aware of the services, why you have not still registered for the SMS based bill payment option from your own bank account?

- i Registration process is complex
- ii Mobile is not registered to your name
- iii Security risk is higher
- iv Cost can be higher
- v Any Other

Specify (If Any Other).....

6. Assume you will consume all available credit of your prepaid mobile connection and the balance suddenly become zero while you are traveling in a remote area. You can not find any place to re-charge you connection for few days and you are facing serious difficulties due to the lost of contact. Do you get registered for the banks SMS prepaid reload facility as soon as possible if the service is available from your bank?

- i Yes
- ii No

If No, Specify the reason

7. If you can receive the certain services offered at a bank counter or at an ATM (Eg. Balance Inquiry, Fund Transfer) just by sending a short message even while moving, you will quickly switch to the SMS option.

- i Yes
- ii No

If No, Specify the reason

8. To what extent you are familiar with SMS based services offered by your mobile service provider and bank.

i. Very High ii. High iii. Average iv. Low v. Very Low

Comments (If Any).....

9. The level of encouragement you receive from your colleagues and associates to use SMS based utility payments and banking services instead of other available modes such as branch visit, ATM or Internet banking.

i. Very High ii. High iii. Average iv. Low v. Very Low

Comments (If Any).....

10. Do you think that doing transactions through SMS is not safe because you may lose money if your mobile phone or PIN number is lost?

i. Yes ii. No

11. Number of peer to peer short messages sent out from your mobile on average per month

i. Above 50 ii. 26-50 iii. 11-25 iv. 1-10 v. Never

Comments (If Any).....

12. Number of peer to application short messages sent out from your mobile on average per month

i. Above 25 ii. 16-25 iii. 6-15 iv. 1-5 v. Never

Comments (If Any).....

Note: Q13 should be answered only if "Never" for both Q11 and Q12 above.

13. a) Do you know that your GSM phone is SMS enabled?

i. Yes ii. No

Comments (If Any).....

b) Do you know that SMS is free of subscriptions for your mobile connection?

- i Yes ii No

Comments (If Any).....

14. You are highly concerned on the unavailability of native language support for SMS based applications offered by your mobile service provider.

- i Not Concerned at all
ii Not Concerned
iii Neutral
iv Concerned
v Highly Concerned

Comments (If Any).....

15. You level of satisfaction with regard to the 'user friendliness' of the SMS based applications offered by your mobile service provider.

- i.Very High ii.High iii.Average iv.Low v.Very Low

Comments (If Any).....

16. You level of satisfaction with regard to the mobile network coverage provided by your service provider in almost all places you are traveling

- i.Very High ii.High iii.Average iv.Low v.Very Low

Comments (If Any).....

17. Reliability of your mobile service provider in terms of delivery and response time for SMS transactions.

- i.Very High ii.High iii.Average iv.Low v.Very Low

Comments (If Any).....

18. Reliability of your bank in terms of 100% service availability for electronic and mobile based services offered.

- i. Very High ii. High iii. Average iv. Low v. Very Low

Comments (If Any).....

19. Your level of confidence on the security of the information passed between the bank and your mobile phone when a SMS based transactions is taken place.

- i. Very High ii. High iii. Average iv. Low v. Very Low

Comments (If Any).....

20. You very rarely use the Telebanking and Internet banking options as the telephone call charges and Internet charges are usually high.

- i Strongly Agree
- ii Agree
- iii Neutral
- iv Disagree
- v Strongly Disagree

Comments (If Any).....

21. You can gain a significant cost benefit by getting used to SMS based banking and utility payments services over the other baking and payment options such as visiting bank or retail outlet, etc.

- i Strongly Agree
- ii Agree
- iii Neutral
- iv Disagree
- v Strongly Disagree

Comments (If Any).....

22. You level of satisfaction with regard to the customer service assistance offered by your mobile service provider.

- i Highly Satisfied
- ii Satisfied
- iii Neutral
- iv Dissatisfied
- v Highly Dissatisfied

Comments (If Any).....

23. You level of satisfaction with regard to the customer service assistance offered by your bank.

- i Highly Satisfied
- ii Satisfied
- iii Neutral
- iv Dissatisfied
- v Highly Dissatisfied

Comments (If Any).....

24. Do you know any other advantages of SMS based banking and utility payments?
If so please specify.

.....

25. Do you know any other disadvantages of SMS based banking and utility payments? If so please specify.

.....

Thank you for participating in this survey and greatly appreciate your cooperation!

10.3 Annexure C: Mobile Sector Questionnaire - Qualitative Study



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Questionnaire for Mobile Companies – Mobile Telecom Sector Inputs

1. Number of SMS based services launched by your employer, mobile telecom company, which involve a payment transaction? (Eg. SMS Banking, Bank Pre-paid Re-load)

- i None
- ii 1 to 3
- iii 3 to 5
- iv 6 to 9
- v 10 or above

2. Do you think that mobile telecom companies can provide a well secured medium for SMS based banking and payment transactions in Sri Lanka?

- i Yes
- ii No

3. Your employer's or mobile telecom company's investments on SMS based banking and utility payment services.

- i.Very High
- ii.High
- iii.Average
- iv.Low
- v.Very Low

Comments (If Any).....

4. Do you think your company has carried out sufficient communication campaign to create a proper awareness level on SMS based utility payments and banking services among your customers?

- i Yes
- ii No

5. Does your mobile telecom company find it easy to jointly work with different banks in implementing and promoting SMS based banking and utility payment services?

- i Yes
- ii No

If No, Please specify the reason/s

6. Does your employer or mobile telecom company face any regulatory barriers from Telecommunication Regulatory Commission or any other institution for SMS based banking and utility payment services?

- i Yes ii No

If Yes, Please specify

7. Does your employer or mobile telecom company have any internal policy or procedural hurdles to overcome before formulating alliances with banks?

- i Yes ii No

If Yes, Please specify

8. Your employer or mobile telecom company has potential revenue enhancement opportunities through banks SMS bill pay facility.

- i Strongly Agree
- ii Agree
- iii Neutral
- iv Disagree
- v Strongly Disagree

Comments (If Any).....

9. Do you know any other advantages/benefits gained by the society by promoting SMS based banking and utility payments in the country? If so please specify.

.....

10. Do you know any other barriers that would disturb the development of SMS based banking and utility payments in Sri Lanka? If so please specify.

.....

Thank you for participating in this survey and greatly appreciate your cooperation!

10.4 Annexure D: Banking Sector Questionnaire - Qualitative Study



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Questionnaire for Banks – Banking Sector Inputs

1. Number of electronic and mobile banking products already launched by your employer or bank? Eg. Internet banking, SMS banking

- i None
- ii 1 to 3
- iii 3 to 5
- iv 6 to 9
- v 10 or above

Comments (If Any).....

2. Your confidence on your partnering mobile service provider's ability of assuring the information security for SMS based banking and payment applications.

- i.Very High ii.High iii.Average iv.Low v.Very Low

Comments (If Any).....

3. Does your bank find it easy to jointly work with different mobile operators in implementing and promoting mobile based banking and payment applications?

- i Yes ii No

If No, Please specify the reason/s

4. Your employer's or bank's investments on electronic and mobile payment solutions.

- i.Very High ii.High iii.Average iv.Low v.Very Low

Comments (If Any).....

5. Do you think your bank has carried out sufficient communication campaign to create a proper awareness level on SMS based banking services and utility payments among bank customers?

- i Yes ii No

6. Does your employer or bank face any regulatory barriers from Central Bank or any other institution for launching SMS based banking and utility payment services?

i Yes ii No

If Yes, Please specify

7. Does your employer or bank have any internal policy or procedural hurdles to overcome before formulating alliances with mobile operators?

i Yes ii No

If Yes, Please specify

8. Your employer or bank has sufficient value addition opportunities to their consumers through SMS based banking and utility payment services.

i Strongly Agree
ii Agree
iii Neutral
iv Disagree
v Strongly Disagree

Comments (If Any).....

9. Do you know any other advantages/benefits gained by the society by promoting SMS based banking and utility payments in the country? If so please specify.

.....

10. Do you know any other barriers that would disturb the development of SMS based banking and utility payments in Sri Lanka? If so please specify.

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Thank you for participating in this survey and greatly appreciate your cooperation!