THE FUTURE OF SELF-SERVICE IN A CASHLESS SOCIETY

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DECLARATION

I hereby declare that the research dissertation entitled “The Future of Self-Service in a Cashless Society” is submitted in partial fulfilment of the requirements of the MBA in Project Management, is my original work and that it has not previously formed on the basis of any other academic qualification at any institution.

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ABSTRACT

The whole world, it would seem at first glance, has been moving toward a "cashless society" ever since the introduction of ATMs and Credit Cards. As a result of on-going and frequent technological advances, society has been experimenting with the diverse use of plastic cards in just about every area of human activity involving financial transactions. The common concept of "shopping" has been effectively redefined to enable efficient customer- care and service through the upgrading of possible alternatives in the use of credit/debit cards.

This dissertation, therefore, explores 'the future of self-service in a cashless society' as it progresses to every socio-economic aspect of life today. As the core of the challenge is to correctly predict, and then promote, changes in human behaviour, this promotes an understanding of the dynamics involved and suggests a basis for improving future business and customer interaction for the future.

The dissertation reviews a number of literatures under its literature review in order to provide ground work for the selected topic. It ranges from the beginning of trade and currency up to the use of self-service technology today and the social effects that comes with its use.

The research's methodology include a self conducted survey consisting of quantitative approaches and hypothesis in order to identify the relationship between usage of self-service technology devices and digital cash options available in the society today. The respondents to the survey include predominantly consumers in Sri Lanka, Australia and India in varying demographics. The methodology further take into account published surveys by reputed institutions in the service industry.

The findings of this dissertation concludes that there is a gradual progression towards using digital cash and self-service technologies in developing countries while developed economies are moving towards more advanced means of using the same. This study further recommends certain procedures which businesses can adopt in order to gain a maximum benefit of these advancing changes.

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DEDICATION

Dedicated to

My beloved parents,

Wife Dhammika and

Daughters Sachini and Sanduni

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LIST OF ABBREVIATIONS

- ATM Automated Teller Machine
- B2B Business to Business
- B2C Business to Consumer
- C2C Consumer to Consumer
- EFT Electronic Funds Transfer
- EFTPOS Electronic Funds Transfer Point of Sale
- E-Money Electronic Money
- EPS Electronic Payment System
- E-tailing Electronic Retailing
- M-money Mobile Money
- P2P Peer to Peer
- POS Point of Sale
- SST Self Service Technology

CHAPTER 1

1.0 INTRODUCTION

1.1 General

Over the course of history, there have been many different forms of payment systems, including barter, gold, and paper currency. In the mid-twentieth century, charge cards made their appearance, prompting pundits to predict the imminent demise of cash and the emergence of a "cashless society". Today, we still pay for purchases mostly with cash or cheques, although credit-card usage is fast catching up with the use of paper instruments. In this dissertation, we analyze the costs and benefits of the various payment instruments involved in the shift toward a cashless society.

Today more than ever success in business depends largely on putting the perceived needs – and, yes, even the whims and fancies – of potential customers before all else. This wasn't always so in the past. Before the advent of the Internet people had little choice however to put up with inconvenience, bad service, poor selection in the range of articles available and even non-competitive pricing, however, not anymore. Internet proved to be the worldwide tsunami that changed the business landscape beyond recognition, empowering global customers with the realization that they, each one of them, was the uncrowned king of all they surveyed; it created in the process a customer-centric culture that businesses ignored at their own peril. Paying mere lip-service to meaningful customer-care was, from then on, a no-go.

1.2 Background

The main goal of this study is to provide the reader with a clearer understanding of developments in the Self-Service Technology (SST) market that could be considered

as indicating the arrival of a "cashless society", and also consider the potential impact that 'digital money' – also called 'electronic money' – could have on a country's monetary policies.

SST is one of the fastest growing segments in the Business World. Indeed, it has become a critical tool in managing the cost structure of businesses in specific sectors such as Banking, Travel and Healthcare, enabling them to use the new technology to offer customers innovative solutions on fund transfers, online reservations and bill settlement. The technology offers customers the hitherto unheard of convenience of selecting the required services online at any time on a round-the-clock basis from anywhere in the world, resulting in a win-win situation for both parties, the customer as well as the business offering such state-of-the-art technologies. With the advent of self-service solutions, businesses can divert the use of the human resources available to other important managerial issues.

This research paper requires a discussion on cashless society in the future. Thus according to Kupetz (Kupetz, 2007) the counterfeiting of paper currency is likely to explode in the United States within the next five to ten years, the inevitable result of innovations in optical scanning technology. Accordingly one of the many obvious drawbacks to paper currency in the twenty-first century would be the growing ease of printing fake bills. However, the rapid growth of new wireless telecommunications technologies is speeding up the coming of a cashless society that addresses these drawbacks.

Kupetz (Kupetz, 2007) went on to quote Nicholas Negroponte, author of the best-selling book *Being Digital*, noting that the author's astute observation differentiating "between atoms and bits" was a good place to start to understand the implications of a cashless world.

"Paper money and coins," wrote Negroponte, "are atoms; they have to be carried, exchanged, sometimes repatriated, and eventually replaced with new paper and new coins. Digital money is also carried (probably in an 'electronic wallet' in some other electronic device) and exchanged, however it never wears out, gets torn or lost, and – with good security – can never be stolen." (Negroponte, 1996)

Hence the question remains as to why we were not further down the path toward "cashlessness", given the available technology. "The answer," it is noted by Kupetz is that, "may be a combination of generational and social factors. In the United States, government policy makers tend to be older and not as receptive to new technology. 'If it isn't broke don't fix it' best describes the prevailing mind-set. However U.S. policy makers may not be the only ones who want to leave well enough alone. American consumers have been slow to demand the latest technology offerings as compared with the people of South Korea, Japan, or China, for example. The case needs to be made that the world is hardly getting along fine with cash." (Kupetz, 2007)

Senior economist Reynolds Griffith of Stephen F. Austin State University, USA, writing in the 2001 Fall/Winter issue of *Journal of Business and Economic Perspectives* noted: "With the amount of electronic money still small compared to other forms, the effect on monetary policy is not yet fully determinable. However, central banks and economists must try to anticipate the effects before it becomes more significant." (Griffith, 2001)

Griffith observed that at one extreme was the opinion that the monetary policy implications of electronic money were nil. At the other was the possibility of a substantial effect, even to the elimination of monetary policy. He noted "yet, even if their currencies are unlikely to be wholly replaced by digital creations, central banks cannot afford to ignore the effects of such technology." (Griffith, 2001)

Reynolds Griffith, having noted that the European Central Bank had in the year 2000 provided a good concise definition of 'electronic money' as being "broadly defined as an electronic store of monetary value on a technical device that may be widely used for making payments to undertakings other than the issuer without necessarily involving bank accounts in the transaction, however acting as a prepaid bearer instrument", quickly added: "We should note that 'technical device' does not necessarily mean physical device." (Griffith, 2001)

Reynolds Griffith also noted that electronic funds transfer systems were already in common use. "When a customer pays for a purchase with a debit card, the amount

may be electronically taken from the customer's account and transferred to the merchant's account. Does this mean that the use of electronic money is already widespread? Do these qualify as electronic money? Some writers would say so," he said, because 'electronic cash' was the digital replacement for banknotes and coins, in other words, electronic money for small transactions "as well as the immense torrents of digital funds that zip through international and national payments networks, such as SWIFT, Fedwire, and CHIPS." (Griffith, 2001)

However, a committee of the Bank for International Settlements makes the distinction as follows: "Electronic money products are defined here as stored value or prepaid products in which a record of the funds or value available to the consumer is stored on a device in the consumer's possession." (Griffith, 2001)

A key element in determining the effect on monetary policy was who would **issue** electronic money, noted Reynolds Griffith. If domestic banks, it would be no different from existing deposits or the bank notes of the 19th century. It could be measured and regulated easily by the banking authorities. If issued by domestic non-bank sources, it could be treated like Travellers' Cheques and measured as part of the money supply, thereby having little impact on monetary policy. (Griffith, 2001)

However what if electronic money supplied by issuers outside its jurisdiction circulated in a central bank's realm? asked Reynolds Griffith, and noted that it would affect both the measurement of the money supply as a monetary policy indicator and the effectiveness of monetary policy instruments. (Griffith, 2001) This would be like the situation already faced in countries where the US dollar circulated as an alternative medium of exchange.

Tatsuo Tanaka, of the Centre for Global Communications, International University of Japan, writing in the peer-reviewed internet journal, *First Monday*, on "Possible Economic Consequences of Digital Cash", recognized this extra-territorial issuance of electronic money as a key element:

"The most important characteristic of digital cash is its transnationality; digital cash has no national borders – that is, it is not controlled by any central bank of any

nation-state. If digital cash circulated only within a traditional national border and was controlled under a central money authority, there would be no economic implications. However in reality, digital cash has no national borders – a fact that will bring both new benefits and new problems to the economy as a whole. The main benefit will be an unprecedented efficiency of international payments. The problem will be that digital cash's transnationality will tend to increase the instability of the monetary system. This problem has the potential to cause conflict between digital cash providers/users and the central banks of nation-states." (Tanaka, 1996)

In Tanaka's view, digital cash may cause some problems in part because it permits seamless transactions across national borders. He wrote: "Should sales taxes be imposed on Internet transactions? Suppose a Chinese software developer uses a server in the United States to sell his software, say to a customer in Japan. Which sales tax rate should be applied, and by whom? Which country should benefit from the tax? Conflicts over international taxation of digital commerce, which have appeared only occasionally so far, could intensify. This problem may need to be resolved by a whole new view on international taxation. Since digital cash is untraceable, not leaving well-defined records for a tax authority to follow, taxation will not be easy even if there are adjustments to tax regulations." (Tanaka, 1996)

The untraceability of digital cash might encourage criminal activities such as money laundering, because sending real money as digital cash means transport across national boundaries without any real evidence of transfer, Tanaka noted.Of course, not all electronic money is untraceable, he added. "Traceable electronic payments would not cause taxation and other problems, thanks to residual transaction records. If digital cash in its untraceable, real cash-like form spreads in cyberspace, taxation and illegal transfers of funds will become a serious issue." (Tanaka, 1996)

Tanaka's conclusion of 1996 is even more pertinent today: "It is the very transnational character of digital cash that will open new business opportunities around the world; however, it would also bring vexing problems for governments. The solutions to these problems may very well lead to a more controlled cyberspace with parallel structures and regulations governing the use of funds. Alternatively, the

economy of the Internet may be regulated by those who best know cyberspace, the netizens, technicians, and agents of this borderless place, in the form of new and responsive digital bureaucracy. The economic consequences of the large-scale use of digital cash clearly indicate that some form of control will occur. Only time will tell if the history of virtual commerce will be peaceful, successful, and tightly coupled with current operational features of the international financial community." (Tanaka, 1996)

In that context, it needs to be remembered that security is already a high-priority issue with banks the world over even with actual cash. Until now, their focus was mostly on preventing robberies at branch offices and hold-ups of their security vehicles transporting cash and valuables. Additionally, banks now have to deal increasingly with sophisticated cyber attacks on their complex online computer networks and self-service terminals. The total installed combined count of such operational units in 2010 for all self-service technologies – including ATMs, Self-Service Kiosks and Vending Machines – was estimated at 28.2 million the world over and this figure is expected to rise to 33.8 million units by 2015. (NCR Corporation, 2009)

1.3 Problem Identification and Justification

It is fairly clear from the preliminary inquiries made in the area of self-service technology that the success of innovations in the self-service industry depends on addressing certain identifiable issues and concerns. Hence, the purpose of this study is to address the following identified issues and concerns.

- The high priority manufacturers of such technologies place on user-safety against fraud. This should include making users aware of the risks they run when using self-service equipment, along with advice on how to identify and effectively counter them.

- How well businesses understand the consumer needs in the future and realise that physical presence is no longer required to strengthen one's customer-base.
- Consumer acceptance in implementing the self-service technology to cater for the growing demand, making the technology accessible and user-friendly.
- How to balance the socio-economic factors with the advancement of technology and how best to make fringe sectors of the society participate in these innovations and initiatives.

The outcome of this research will, hopefully, enable both individuals and businesses to gain a better understanding of the likely future changes in the execution of financial transactions, and how they are likely to affect both individuals and businesses. This dissertation will focus on the importance of vigilance of the many innovative changes continually taking place in effecting financial transactions prompted by technological advances.

1.4 Objectives

The core purpose of this dissertation is to visualize broadly the emerging scenario where innovative advances in both 'self-service' and 'mobile' technologies are quietly and without fanfare moving us inevitably into the altogether new age of a "cashless" society. The two technologies doubtless complement each other, and clearly define the way in which society will carry out future transactions on a day-to-day basis. The common denominator governing these two concepts – the advanced 'self-service' technologies, on the one hand, and the fast emerging 'mobile' technologies on the other – is that the two already intermingle successfully in many aspects of human activity involving financial transactions.

Hence this dissertation is designed to obtain the following objectives:

1. Trace the development of self-service and digital-cash options in the present context.

2. Project the future trends of self-service and digital-money toward the creation of a "cashless society" and how businesses and individuals can adapt to them.
3. Recognise the issues that surround the use of self-service and suggest means of addressing them.
4. Analyse the socio-economic consequences of such a radical shift in a broad teleological perspective covering social, technological and economic implications of 'self-service' in an inevitable 'cashless society'.

1.5 Methodology

This dissertation required a fairly detailed review of literature on the subject in books, journals, conference proceedings, online resource, vendor articles and also the publications of leading banks. It was also considered necessary to discuss and exchange views with selected personnel in institutional users of self-service technologies such as the members of Bank IT teams largely to validate at first hand the conclusions of authors in the literature surveyed. Both a qualitative and quantitative design was adopted in reviewing the literature on the subject, focusing on the need to understand both the pros and cons as expressed by the actual users of self-service technologies.

1.6 Arrangement of the Dissertation

The dissertation on the 'future of self-service in a cashless society' will be organised in the following manner.

Chapter 1: Introduction – this chapter provides a comprehensive background of the study. It highlights the background to the study outlining the nature of self-service technology today and the growing demand for using tech-driven service options. The chapter further identifies the problem that this study seeks to address such being obtaining a sound understanding of the demand and supply for self-service technology and cashless options. It also outlines the objectives of the study and briefs the methodology that would be adopted to achieve the objectives.

Chapter 2: Literature Review- this chapter is dedicated to analyse the number of literature related to the topic on the self-service technology and cashless society including books, journal and periodical articles, online resources, reports and surveys. It provides a detailed background to the literature already exist is structured in a chronological manner to ensure logical flow of arguments and ideas. Hence the chapter first explains the historical account of trade and use of currency and traces the evolution of money from the pre-historic stages to the present day which is dominated by digital cash. It then proceeds to highlight the present state of service industry and the advancement of self-service devices like ATM and varied digital cash options. The chapter then describe the emerging trends mainly on mobile-self-service technology, m-money and idea of branchless banking. Moreover it analyses the issues surrounding self-service technology, e-money and m-money as identified in the literature. The chapter concludes with an analysis on the social impact of self-service technology and developments connected therewith.

Chapter 3: Methodology – this chapter highlights the methods use to address the issues identified under chapter 1. It outlines the various approaches such as case-studies, sampling and data collection that is used to obtain the relevant data for the purpose of this study.

Chapter 4: Data collection and Analysis - this chapter illustrates the data collected according to the methodology outlined above. It further provides analysis of the represented data. The chapter further uses data based on published surveys in order to make a comparative analysis.

Chapter 5: Conclusion and recommendations – this concluding chapter summarises the analysis and observations made in the previous chapters and further consist of a gist of recommendations on how to utilise the future of self-service technology in the best possible manner.

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 General

This chapter summarizes the various articles, conference proceedings and vendor magazines reviewed during the preparation of this study, focusing both on literature dating from the advent of self-service technology to more recently published material encompassing the use of the internet to enhance its usage.

The chapter presents a detailed background based on the literature in a logical flow of idea. Hence the chapter first explains the historical account of trade and use of currency and traces the evolution of money from the pre-historic stages to the present day which is dominated by digital cash. It then continues to draw attention to the present state of service industry and the development of self-service devices like ATM and varied digital cash options. The chapter then illustrate the emerging trends principally on mobile-self-service technology, m-money and possibility of introducing branchless banking. Moreover it analyses the issues relating to self-service technology, e-money and m-money as identified in the literature. The chapter concludes with an examination of the socio-economic impact of self-service technology and developments connected therewith.

2.2 A Historical Account

This chapter seeks to provide an outline of the historical backdrop to self-service technologies as well as cash. It is essential to understand the historical background of both concepts to appreciate its implications on society today as well as in the future. The study under this chapter primarily starts with how trade initially started and how it later developed into the cash transactions that we know today. This retrospective chapter defines the factors that shaped the primary trading system into a trade using a

medium and how that medium has changed ‘shape’ over time. It also provides a perspective as to what can be expected in the future in terms of self-service technologies in a cashless context and to what extent it will retain its link to the initial idea of trade.

This section further traces the development of plastic cards as a medium of exchange that substitutes for the use of money. The discussion moves along with the gradual advancement in self-service technologies resulting from the increase in the use of virtual cash systems. The chapter concludes with a comprehensive analysis as to how the status quo came to be with the seemingly cashless society, on the one hand, and a steadily expanding use of self-service technologies, on the other.

2.2.1 The roots of trading

Trade has taken place throughout recorded history of the human race. Perhaps its roots run even further back. It is believed that trade initiated with human communication (Watson, 2005). Trading was the main feature of prehistoric people, who bartered goods and services from each other in the absence of any use of a medium known today as currency.

The barter system requires the exchange of goods of equal value. This excluded the requirement to assess and match the value using a medium. It was then perceived to be possible to assess one good or service from another. (O'Sullivan & M, 2003, p. 243) This system, was indeed a ‘cashless’ society by the very definition of the word.

The barter system, although seen as an ancient means of conducting primarily bilateral or seldom multilateral trading, exists in parallel to monetary systems even with the gradual use of currency.

Trade is triggered by demand and supply. The basic economics prevailed even in the early stages of human history. The growth of domestic trading systems inadvertently expanded on a larger global scale, in particular the emergence of trading lines such as the Silk Road, which linked the East with Europe on trade of goods and services. Long-range trade routes first appeared in the 3rd millennium BC, when Sumerians in Mesopotamia traded with the Harappan civilization of the Indus Valley. They

established trade colonies for this purpose which the Greeks called emporia. At the beginning of Greek civilization and until the fall of the Roman Empire in the 5th century, a financially lucrative trade conveyed valuable spice to Europe from the East. Commerce allowed the Roman Empire to flourish and endure. (Watson, 2005)

2.2.2 Revival of the barter system

Modern trade and barter has developed into a sophisticated tool that can sometimes help businesses increase their efficiencies by utilising their unutilised capacities. The worldwide organized barter exchange and trade industry has grown to a billion dollar a year industry and is used by thousands of businesses and individuals. The introduction of the internet and sophisticated software programs has made it easier to carry out these activities and has further developed the barter industry's growth. Organized barter has developed globally to the point where virtually every country now has a formalized barter and trade network of some sort. Multifaceted business models based on the concept of barter are possible today since the arrival of new technologies. Barter usually replaces money as the method of exchange in times of monetary crisis, such as when the currency may be either unstable (e.g., hyperinflation or deflation) or simply is unavailable for conducting commerce.

2.2.3 The evolution of trade and cash

It is important to trace the evolution of trade and how it led to the use of currency with its expansion. This first stage of currency, where metals were used to correspond to stored value, and symbols to represent goods, fashioned the basis of trade for over 1500 years.

- ***Coinage and paper money***

These factors led to the shift of the store of value being the metal itself: at first silver, then both silver and gold. Metals were mined, weighed, and stamped into coins. This was to guarantee the individual taking the coin that he was getting a certain acknowledged weight of precious metal. Coins could be counterfeited, however they also created a new unit of account, which helped lead to banking. Archimedes' principle provided the next link: coins could now be without difficulty tested for their

fine weight of metal, and thus the value of a coin could be determined, even if it had been debased or tampered with. (Watson, 2005)

The advantages of paper currency were numerous: it reduced transport of gold and silver, and thus lowered the risks; it made loaning gold or silver at interest easier, since the specie (gold or silver) never left the possession of the lender until someone else redeemed the note; and it allowed for a division of currency into credit. (Datamatrix UK Ltd, 2007)

However, since a note has no intrinsic value, there was nothing to stop issuing authorities from printing more of it than they had specie to back it with. Secondly, because it increased the money supply, it increased inflationary pressures, a fact observed by David Hume in the 18th century. The result is that paper money would often lead to an inflationary bubble, which could collapse if people began demanding hard money, causing the demand for paper notes to fall to zero. (Datamatrix UK Ltd, 2007)

- ***Development of commodity money***

Many cultures around the world eventually developed the use of commodity money. The shekl was originally a unit of weight, and referred to a specific weight of barley, which was used as currency. (Kramer, 1998) The first usage of the term came from Mesopotamia circa 3000 BC. Societies in the Americas, Asia, Africa and Australia used shell money – often, the shells of the money cowry (*Cypraea moneta L.* or *C. annulus L.*).

The system of commodity money eventually evolved into a system of representative money. This occurred because gold and silver merchants or banks would issue receipts to their depositors – redeemable for the commodity money deposited. Eventually, these receipts became generally accepted as a means of payment and were used as money.

Later on the idea of commodity money took the form of Banknotes which was first issued in Europe by Stockholms Banco in 1661, and were again also used alongside coins. By the beginning of the 20th century almost all countries had adopted the gold

standard where by the currency backed their legal tender notes with fixed amounts of gold. (Lowrey, 2011)

Subsequent to World War II, at the Bretton Woods Conference, most countries adopted fiat currencies that were fixed to the US dollar (Lowrey, 2011). The US dollar was in turn fixed to gold. In 1971 the US government suspended the convertibility of the US dollar to gold. Many countries later divorced their currencies from the US dollar, and began to rely on the legal mandate of their respective governments when it comes to issuing commodity money.

2.2.4 The emergence of plastic card

The concept of using a card for purchases was described in 1887 by Edward Bellamy in his utopian novel *Looking Backward*. Bellamy used the term *credit card* six times in this novel. (Bellamy, 2000)

The modern credit card was the successor of a variety of merchant credit schemes. It was first used in the 1920s, in the United States, specifically to sell fuel to a growing number of automobile owners. In 1938 several companies started to accept each other's cards. Western Union had begun issuing charge cards to its frequent customers in 1921. Some charge cards were printed on paper card stock, however, were easily counterfeited. (Federal Bureau of Consumer Affairs, 1995)

The Charga-Plate, developed in 1928, was an early predecessor to the credit card and used in the U.S. from the 1930s to the late 1950s.

The concept of customers paying different merchants using the same card was expanded in 1950 by Ralph Schneider and Frank McNamara, founders of Diners Club, to consolidate multiple cards. The Diners Club, which was created partially through a merger with Dine and Sign, produced the first "general purpose" charge card, and required the entire bill to be paid with each statement. That was followed by Carte Blanche and in 1958 by American Express which created a worldwide credit card network (although these were initially charge cards that acquired credit card features after BankAmericard demonstrated the feasibility of the concept). (Federal Bureau of Consumer Affairs, 1995)

- ***The expansion***

However, until 1958, no one had been able to create a working *revolving credit* financial instrument issued by a third-party bank that was generally accepted by a large number of merchants (as opposed to merchant-issued revolving cards accepted by only a few merchants). A dozen experiments by small American banks had been attempted (and had failed). In September 1958, Bank of America launched the *BankAmericard* in Fresno, California. BankAmericard became the first successful recognizably modern credit card (although it underwent a troubled gestation during which its creator resigned), and with its overseas affiliates, eventually evolved into the Visa system. In 1966, the ancestor of MasterCard was born when a group of banks established Master Charge to compete with BankAmericard; it received a significant boost when Citibank merged its proprietary Everything Card (launched in 1967) into Master Charge in 1969. (Five Star Commerce, LLC, 2009)

The fractured nature of the U.S. banking system under the Glass–Steagall Act meant that credit cards became an effective way for those who were travelling around the country to avail themselves of credit in places where they could not directly use their banking facilities. In 1966 Barclaycard in the UK launched the first credit card outside of the U.S. (Five Star Commerce, LLC, 2009)

The design of the credit card itself has become a major selling point in recent years. The value of the card to the issuer is often related to his usage of the card, or to his financial worth. (Federal Bureau of Consumer Affairs, 1995) This has led to the rise of Co-Brand and Affinity cards - where the card designs is related to the "affinity" (a university or professional society, for example) leading to higher card usage. In most cases a percentage of the value of the card usage is returned to the affinity group. (Five Star Commerce, LLC, 2009)

2.2.5 Debit and ATM cards

A debit card (also known as a bank card or check card) is a plastic card that provides the cardholder electronic access to his or her bank account/s at a financial institution. Some cards have a stored value with which a payment is made, while most relay a

message to the cardholder's bank to withdraw funds from a designated account in favour of the payee's designated bank account. The card can be used as an alternative to cash payment when making purchases. In some cases, the cards are designed exclusively for use on the Internet, and hence there is no physical card. (General Books LLC, 2010)

In many countries the use of debit cards has become so widespread that their usage, in value terms, has overtaken or entirely replaced the use of cheques and, in some instances, cash transactions. Like credit cards, debit cards are used widely for telephone and Internet purchases. (General Books LLC, 2010)

However, unlike credit cards, the funds paid using a debit card are transferred immediately from the bearer's bank account, instead of having the bearer pay back the money on receipt of the monthly statement either by email or in the post. (General Books LLC, 2010)

Debit cards usually also allow for instant withdrawal of cash, acting as the ATM card for withdrawing cash and as a cheque-guarantee card. Merchants may also offer cash-back facilities to customers, enabling a customer to withdraw cash along with his or her purchase. (Federal Bureau of Consumer Affairs, 1995)

2.2.6 Self-service technology

Self-Service Technologies (SSTs) are technological interfaces allowing customers to obtain services independent of involvement of direct service employee (Zeithaml, Bitner, & Gremler, 2002). Self-Service technologies are replacing many face-to-face service interactions with the objective of making service transactions more accurate, convenient and faster.

There are four primary types of SST according to (Zeithaml, Bitner, & Gremler, 2002). They include:

1) Telephone & interactive voice-responsive (IVR) systems - Many companies utilize this form of SST for customer orders, customer billing inquiries, and customer

surveys. Credit card companies, insurance companies, pizza restaurants, and even universities have taken advantage of these.

2) Interactive free-standing kiosks - Many malls and retail outlets offer these both inside and outside their stores as a way to help potential customers determine availability and location of a product in their facility. Some even print coupons. Large discount chains use kiosks in each store to help you determine what size battery or windshield wiper to put on your car, for example. You will also find kiosks at airports and hotels that print airline tickets and allow for quick checkout, and at movie theatres and malls that print movie tickets.

3) Internet based or other on-line connection systems - ATM's and pay-at-the-pump gas stations are two widely used examples of on-line technologies. Internet banking and bill management services are also becoming quite popular. Package delivery services also allow you to track movement of packages on a round-the-clock basis.

4) Video/DVD/CD based technologies - This type of SST is typically used for educational purposes. Corporate entities use this media to train their employees, to familiarize sales representatives with new products, and to introduce new products to consumers. Universities have also gotten into the act in the last decade, providing undergraduate, graduate, and continuing education classes by video and CD formats.

For the purpose of this study, the scope will be restricted to the use of self-service technologies in the context of a cashless society. To that end, what becomes essential is the interplay between various methods of cash-substitution via the use of self-service technologies. It is at this point that the use of credit and debit cards as well as other ‘smart cards’ come into play. Therefore, the following chapter will analyse in depth how this has in fact been accomplished in the present context. Moreover, it will provide details of how their usage has been embraced by both developing and developed nations alike.

2.3 The Current Conditions

This section summarizes the discussions and the various data collected indicative of how Self-Service Technologies are moving toward a cashless society. As previously described, Self-Service Technologies are technological interfaces allowing customers to avail themselves of services independent of involvement of direct service employees. Self-Service Technologies are replacing many face-to-face service interactions relating to transactions between customers and institutions.

Customers perform more transactions at ATMs than at any other delivery channel, according to Mr. Peg Bost, Director of Financial Industry Marketing – Diebold a leading ATM vendor. (Diebold, Incorporated, 2012) The same document also confirms that 90% of US consumers use ATMs and total ATM transactions are 44 billion globally, with 14 billion occurring in the United States. Similarly another ATM vendor, NCR, confirms (NCR Corporation, 2009) that 80% of its transactions take place at ATMs.

Hence, ATM and mobile self-service technology has been selected as the most trusted self-service channel for the purpose of this study; its scope will be confined to the use of Self-Service Technologies in the context of a cashless society. To that end, what becomes essential is the interplay between various methods of cash-substitution via the use of self-service technologies. It is at this point where the use of credit cards, debit cards, and 'smart cards' come into play. Therefore, the information set out below will analyze in detail how this has in fact been accomplished in the present context. Moreover, it will provide details of how their usage has been embraced by both developing and developed nations alike.

NCR, Diebold and Wincor are the three major players dominating the self-service industry in providing market-solutions. Presently SST solutions are used mainly in the financial, travel, hotel, and healthcare industries, as well as in Super Markets and other point-of-sale (POS) outlets.

About NCR

National Cash Register Corporation (NCR), headquartered in Georgia, USA, is a global technology company whose services and products help connect, interact and transact business on a global scale. NCR's assisted and self-service solutions and comprehensive support services address the needs of several sectors including retail, financial, travel, healthcare, hospitality, entertainment, gaming, public sector, and the many telecom service providers.

ATM

An Automated Teller Machine is a computerized device that provides the customers of a financial institution with the ability to perform financial transactions without the need for human intervention in the form of a clerk or bank teller.

Most modern ATMs identify the customer by the plastic card that the customer inserts into the ATM. The plastic card can contain a magnetic stripe or a chip that contains a unique card number and some security information, such as an expiration date and Card Validation Code (CVC). Authentication of the user is by the customer entering a Personal Identification Number (PIN).

Kiosk

A Kiosk is a computer terminal featuring specialized hardware and software designed within a public exhibit that provides access to information and applications for communication, commerce and entertainment. In terms of growth, self-service Kiosks are projected to experience the maximum growth in installations with a compound annual growth rate of 9.3%. This sector was estimated at 1.6 million units in 2010 and is expected to reach 2.5 million units by 2015. (NCR Corporation, 2009)

Vending machine

A Vending Machine is a machine which dispenses items such as snacks, beverages, alcohol, cigarettes, lottery tickets, consumer products and even gold and gems to customers automatically after a customer inserts a credit card or sufficient cash to cover the purchase. The vending machines represent the largest segment in this

market, accounting for more than 85% of deployments to date. This sector was estimated at 24.4 million units in 2010 and is expected to increase at 3.2% compound annual growth rate to reach 28.6 million units in 2015. (NCR Corporation, 2009)

2.3.1 Learning about the latest developments in ATM technology and use

It was noted that during the study on this research paper that all ATM manufacturers continue to invest in market research and product development, which has led to new multifunction ATMs being available. This is a range of ATM technologies from the key global manufacturers (Diebold, NCR, Wincor) that enable the following functions to be performed in addition to the cash transactions.

- Phone Top up
- Utility Bill Payment
- Receipt & Voucher Printing
- PIN Change
- Payments & Transfers
- Advertising and Discount Vouchers
- Personalization allows the consumer to define his or her preferred language

Also please make a note that many of the above are subject to the capabilities of the switching network and therefore, progress in terms of multi functionality will require investment and development in conjunction with the network provider.

As we know, the ATM (Automated Teller Machine) is a computerized device that provides the customers of a financial institution with the ability to perform financial transactions without the need for a human or bank teller.

In 2008, the European ATM security team estimated that there were 383,951 ATMs in Europe and more than 1.5 Million ATMs around the world (ATMs in Europe). Seventy two percent of the total number of European ATMs is located in five countries; UK, Spain, Germany, France and Italy. The total number of European ATMs has increased by 6% from the previous year.

ATM Screen

Select Transaction
Press cancel if error
Fast Cash - Withdrawal
- Deposit
- Transfer
- Inquiry

ATM Screen

Which transaction would you like?	
Fast Cash	Withdrawal
Re-order checks	Deposit
	Transfer
	Balance Inquiry
Special Offer	Other Services

Today's consumer expects a high quality experience with any computer based technology. That consumer will hardly be impressed with the simple text interface that was introduced with second generation ATMs (at left). New ATM functionalities deliver screen content (at right) that is more aligned with the expectations of today's self service consumer.

For example (Diebold, Incorporated, 2012) with the introduction of Diebold's 4GLTE enabled ATM concept follows launch of the company's prototype for the world's first virtualised ATM both innovations demonstrating Diebold's efforts to leverage the latest technology to deliver a more accessible, reliable, secure ATM service reducing complexity of managing the self-service channel. The difference between the traditional ATM with the new ATM is that it has the potential to communicate directly with the third parties such as service providers or monitoring centres.

KIOSKS in Travel

According to SITA's 7th Annual Airline IT Trends Survey, self-service Kiosks are big business at airports. 36% of the airlines responding to the survey have already deployed them. (SITA, 2011)

Airlines have warmed to the devices, which allow them to reduce counter staff and speed passenger-movement through the airport. America's Delta Airlines, for

example, reckons that 28 million of its passengers are now checking in using a Kiosk. (Frary, 2005)

Europe has a long way to go before reaching those heady heights. However, the Kiosk is rapidly becoming a familiar part of airport furniture. The take-up of Kiosk check-in can only increase, particularly with the roll out of the common use self-service Kiosks that can be used by a number of different airlines. (SITA, 2011) At dedicated terminals like Terminal Four at Heathrow for British Airways, or the American Airlines terminals at John F. Kennedy airport in New York, there is no incentive to install self-service Kiosks, but as part of a large, single network, airlines cannot fail to see the benefits. (Frary, 2005) A big network carrier might normally have to maintain 500 Kiosks worldwide; if it can share some of those in locations where it has a smaller presence, so much the better financially for the airline. (Frary, 2005) This will mean however that some of the time-saving services that carriers proudly advertise to distinguish themselves will become available to all carriers, including the smallest carriers.

While airlines have already embraced the Kiosk culture, hotel firms are following in their footsteps. The ability to use express check-out, through an alternative television in the guest room, has been around for a number of years however this is now being extended to standalone Kiosks in the lobby. (NetWorld Alliance, 2008) Hilton was one of the first companies to go down the self service Kiosk route. It began trials of IBM self service Kiosks in 2004. Hotel guests arriving at Honolulu International Airport could use Kiosks to check in to the Hilton Hawaiian Village Beach Resort, even before claiming their baggage and leaving the airport. (Frary, 2005)

An ATM vendor survey conducted by NCR in 2010 for consumers (Rose, 2010) found nearly 3 in 4 respondents would be more likely to choose a travel provider that offers them greater control over managing their entire travel experience through self-service technology. This is further substantiated by the subsequent report by NCR (Aberdeen Group, 2010) that collaborates the findings of the previous 2010 report

citing that best-in-class hospitality organisations are twice as likely to utilise self-service technology.

Self Service in the Hotel Industry

The hotel industry has had less success than the airline industry in moving to an online self-service environment, although there have been some key initiatives such as direct booking links between hotel groups and their corporate clients.

A research paper by VDC (VDC Research Group Inc., 2010) deals with the future of self-service technology in the hospitality industry. Initially, it was identified that the investment in infrastructure for this sector was prohibitive when compared to the level of investment required for other sectors. The author deals with the advantages derived by the hospitality industry from the introduction of Kiosks (self-service equipment), while also discussing the use of other innovative devices such as mobile terminals, smart phones and interactive displays. The paper concludes that self-service technologies are vital and help bridge the gap between IT operations and strategic planning for world class hospitality enterprises and helps the growth of smaller companies striving to differentiate themselves from the rest of the pack. (VDC Research Group Inc., 2010)

One of the problems for the hotel industry is that there is no player that can cover all the accommodation needs of a multinational corporation from the geographical and pricing standpoints. There are no "Standardized Rules" on pricing of a product feature so the intervention of a consultant is often required. (VDC Research Group Inc., 2010)

2.3.2 Variety of cash options

Credit Cards and Debit Cards remain the dominant cashless consumer devices and their popularity is steadily gaining over cash. According to the American Bankers Association, use of cash fell from 39% 1999 to 32% in 2003. Use of debit cards has risen to 31% of all purchases, up from 21% four years ago. (Kupetz, 2007)

The popularity of debit cards has no doubt contributed to the development of several other devices, technologies and services that differ from the conventional credit card only in form, not functionality.

The toll tag, an electronic device in a vehicle that allows drivers to pass through tollbooths in highways and freeways without stopping, is fast growing in popularity in almost every country. In fact, the popularity of this method of payment is because it does not involve any potential delay at tollbooths should the driver not have the exact amount payable. Most motorists have welcomed the toll tag device because it obviates the necessity, not merely to carry sufficient cash but also to have the exact toll-fee ready to hand every time.

The toll tag device requires motorists to maintain a prepaid balance in their 'electronic account', and get a welcome bonus in the form of a discount when using the toll tag method instead of paying cash at the tollbooth. Many cities worldwide offer special lanes for tag users, so that they don't have to slow down or, as happens quite often, wait in queues behind non-toll tag users and suffer annoying delays.

During the writer's visit to Sweden and Norway late on an official assignment in May 2011 and it was noticed that the banks in those two countries actually *discourage* use of cash considering it a security risk. The growing trend, therefore, is to use the self-service channel for e-banking. Although a visitor to Sweden and Norway, the writer had difficulty encashing his Travellers' Cheques at the bank counter, and was compelled to seek alternatives.

Japan is famous for many things, not least the range of vending machines. Unlike those in many western cities, Tokyo's machines are almost always freely accessible round-the-clock at conveniently-located 'service windows', probably because vandalism of such public utilities in Japan is relatively low compared to several other countries. In 2001, Coca Cola, Itochu Corporation and NTT DoCoMo, the giant Japanese wireless operator, launched several "Cmode" information terminal vending machines in Japan that allow customers to purchase a Coke using only their handset. (NTT DoCoMo, Inc., 2002) The machines also allow customers to accumulate user points that can be exchanged for soft drinks or ring-tone downloads and are equipped

with loudspeakers that allow them to disseminate information, such as disaster updates from local government agencies. (NTT DoCoMo, Inc., 2002)

In early 2003, France launched computerized smart cards, called Moneo Cards, for smaller transactions that would otherwise require cash. Because the Moneo Card is not tied to a user account, privacy and fraud are no longer concerns. However, in the event of loss of a smart card, there exists the possibility of the finder getting access to the credit available. To confine the potential loss to bearable limits, the Moneo Card has a maximum credit 'storage' limit of around $100 at any one time. CNN reports that millions of consumers use the Moneo Card regularly.

The mobile phone is already the dominant consumer device facilitating the migration to a cashless society in the Asian region (Japan, China, Singapore, India and Sri Lanka) and in Europe, far more so than in the United States. Some leading Asian companies, among them Casio and Sony, already offer a host of cashless services on their products.

2.3.3 E-Commerce & E-Business

E-Commerce is a sub-product of self-service technology and various applications of e-Commerce are continually influencing trends and prospects for business over the internet, including e-Banking, e-Tailing and online publishing / online retailing. The more developed and mature e-Banking environment plays an important role in e-Commerce by encouraging consumers to shift from traditional modes of payment (i.e. cash, cheques or any form of paper-based legal tender) to electronic alternatives (such as e-Payment systems), thereby completing the e-Commerce loop.

The major benefits to be derived from transition to e-Commerce are:

- Expanded Geographical Reach
- Expanded Customer Base
- Increased visibility through search-engine marketing
- Provide potential customers valuable information about one's business
- Availability round-the-clock, all-year round.
- Helps build consumer loyalty

- Reduces marketing & advertising costs considerably.
- Collection of Data

2.3.4 Electronic payment

An Electronic Payment System (EPS) is one that enables financial exchange between buyers and sellers in the online environment and is facilitated by a financial instrument such as an encrypted credit card number, electronic cheque or digital cash, all of them backed by a bank acting as the intermediary.

Available literature on the Electronic Payment System (EPS) is a clear pointer to some of its consumer confidence factors:

- Protection from fraud through efficient record keeping
- Transaction privacy and safety
- Offers customers a wide array of competing payment services that, taken together, help cater to all customer requirements.
- Wide choice of payment methods

2.3.5 e-Bank

E-Banking includes the now familiar and relatively mature e-based products used in developing markets such as telephone banking, credit cards, ATMs and direct deposits. It also includes electronic bill payments and other products mostly in the development stage, including stored value cards (e.g., Smart Cards / Smart Money) and internet based stored value products. The following gives a broad picture of e-Banking in three ASEAN countries.

- ***The Sri Lankan Experience:***

Dialog Telekom PLC and NDB Bank have pioneered a mobile payments system, termed as eZ Pay, and launched the South Asia's first m-Commerce Service in Sri Lanka in 2009. Today eZ Pay is available for Seylan Bank credit and debit card holders as well. Several leading banks will make available eZ Pay accounts for their customers in the near future. eZ Pay offers a bundle of benefits that includes Convenience – lead a cash free life style; Reach – access to a growing merchant

network across Sri Lanka; Low transaction cost – viable for all Sri Lankans; Speed – transaction completed in less than 25 seconds and Secure money – PIN protected with transaction logs. eZ Pay facilitates 03 types of transactions. (eZ Pay, 2008)

1. m-Payments

- Over-the-counter transactions - paying for goods and services at an eZ Pay accepting merchant
- Dialog Mobile Payments – Settlement of Dialog Mobile Postpaid bills/ topping up Prepaid connections from anywhere anytime using eZ Pay
- Remote Utility Bill Payment – Settlement of utility bills including water, electricity, insurance, club payments from anywhere anytime using eZ Pay
- Credit Card Repayments – Settlement of Credit Card bills from anywhere anytime using eZ Pay

2. m-Banking

- Cash Withdrawals - Withdraw cash at any Authorized eZ Pay Top-up agent
- Cash Deposits - Deposit cash at any Authorized eZ Pay Top-up agent
- Balance Check – Check your eZ Pay account balance anywhere anytime
- Mini-Statements – Get the last 5 transactions of your eZ Pay account from anywhere anytime

3. m-Transfer

- Person to Person Money Transfers – Carryout instant money transfers from your eZ Pay account to your friends eZ Pay account within Sri Lanka
- Foreign inward remittances which will be activated shortly.

- ***The Philippine Experience:***

Citibank, Bank of Philippine Islands (BPI), Philippine National Bank (PNB) and other large banks pioneered e-Banking in the early 1980s. Interbank networks in the country like Megalink, Bancnet and BPI 'Expressnet' were among the earliest and biggest providers of ATM technology.

BPI launched its Expressnet online in January 2000. The most common online financial services include deposits, fund transfers, applications for new accounts, stopping payment on issued cheques, housing and automobile loans, use of credit cards and making remittances.

- ***The Singapore Experience:***

In Singapore, more than 28% of internet users visited e-Banking sites in May 2001. Research by Net Value (an internet measurement company) showed that while the number of people engaging in online banking in Singapore had increased, the average time spent at sites decreased by approximately four minutes between March and May 2001. (Geminideal, 2011) This decline was attributed to more visitors spending their time completing transactions, which took less time than browsing different sites. According to the survey, two out of three visitors made a transaction. All major banks in Singapore boast an internet presence, and all of them offer a wide range of products directly to consumers through proprietary internet sites. These banks soon shifted from an initial focus in retail banking to SME and corporate banking products and services. (Geminideal, 2011)

- ***The Malaysian Experience:***

E-Banking in Malaysia began in 1981 with the introduction of ATMs. This was followed by tele-banking in the early 1990s where the telecommunication devices were linked to an automated system through the use of Automated Voice Response (AVR) technology. Then came PC Banking / Desktop Banking using proprietary software, which was more popular with corporate customers than with retail customers. (Geminideal, 2011)

On June 1, 2000, the Malaysian Central Bank formally allowed local commercial banks to offer Internet Banking services. On June 15, 2000, Maybank (www.maybank2u.com), one of the largest banks in Malaysia, launched the country's first internet banking service. The bank employed 128-bit encryption technology to secure its transactions. Other local banks in Malaysia now offering e-Banking services are, South Bank, Hong Kong Bank, HSBC Bank, Multi-Purpose

Bank, Phileo Allied Bank & RHB Bank. Banks that offer WAP on mobile banking are OCBC, Phileo Allied Bank and United Overseas Bank. (Geminideal, 2011)

The most common e-Banking services include banking inquiry functions, bill payments, credit card payments, fund transfers, share investing, insurance, travel, electronic shopping and other basic banking services.

2.3.6 e-Money

E-Money takes a variety of forms (Federal Bureau of Consumer Affairs, 1995). These can be outlined as following:

Prepaid Cards:

A payment card, preloaded with your own available funds at accounts, which you can then transfer by using the self service technology, wherever the payment card is accepted, including over the internet and internationally.

E-wallet:

Similar to a prepaid card, it is a stored value card typically used for making small low value payments at retailers, city-wide transit systems, toll roads, vending machines and car parks. E-Purse is often a separate feature added to a debit or credit card, although cards can be sold separately.

Mobile Money:

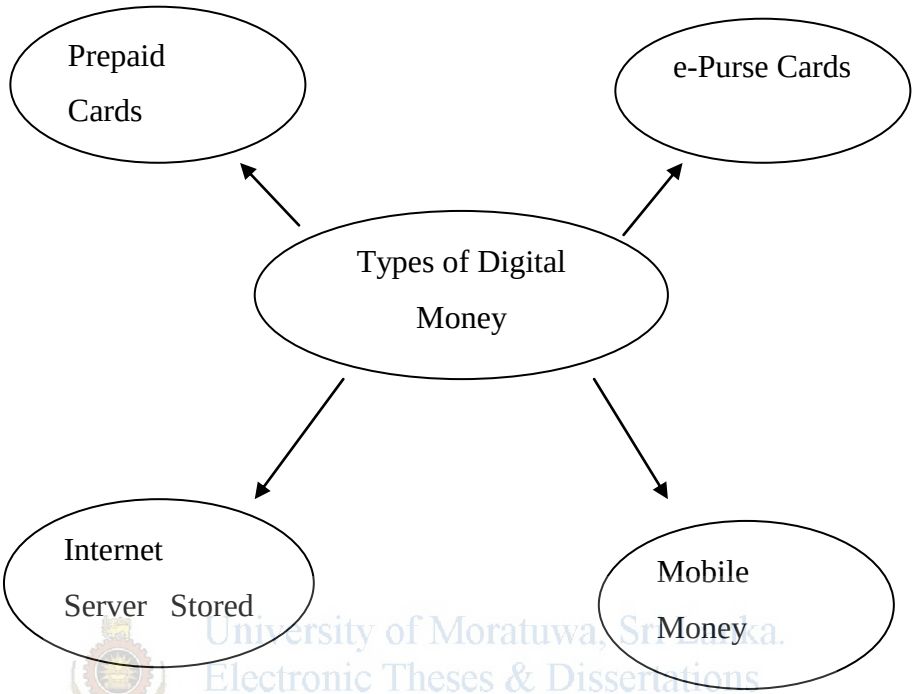
In our definition of mobile money we distinguish from basic mobile money transfer providers, which allow customers to transfer money via their mobile phone from their existing bank account to another, by stipulating that money must be stored in the mobile money scheme account.

Internet Server Stored Value Payments:

This refers to services such as PayPal which allow customers to transfer/store money on their (PayPal) account, which can then be used to make internet payments. While

service providers such as PayPal allow clients to store value in accounts, and then make payments from these accounts for services such as online purchases.

The figure below gives a somewhat narrowly-defined idea of digital money.



2.3.7 e-Tailing

E-Tailing or electronic retailing is the selling of retail goods on the internet. It is the most common form of business to consumer (B2C) transaction.

1997 was considered the first big year for e-Tailing. This was when the Dell computer company recorded multimillion dollar orders taken at its website. Also, the success of Amazon.com (which opened its virtual doors in 1996) encouraged Barnes & Noble to also open an e-Tail site. Security concerns over taking purchase orders over the internet gradually receded. In the same year, Auto-by-Tel sold its millionth car over the web and CommerceNet / Nielsen Media recorded that 10 million people had made purchases on the web.

2.3.8 International studies on internet banking and performance

Table 2. 1 International Studies on Internet Banking and Performance

	Study	Country and sample size analyzed	Sample Period	Results
1	Egland et al. (1998)	U.S., 8983 banks	1998	No evidence of differences in the performance of the Internet and non-Internet banks.
2	Furst et al. (2000a, 2000b, 2002a and 2002b)	U.S., 2517 National Banks	Q3, 1999	Internet banks outperformed non-Internet banks in terms of profitability. Offering internet banking didn't have a statistically significant impact on profitability.
3	Sullivan (2000)	Tenth Federal Reserve District, 1618 banks	First Q 2000	Measures of profitability for Internet banks are similar to those of the non-Internet banks.
4	Carison et al. (2001)	U.S., 2517 National Banks	Q2, 1998 – Q4, 2000	Internet banking is not having an independent impact on bank profitability.
5	DeYoung (2001a)	U.S., 6 pure play Internet banks and 522 benchmark banks.	1997:Q2 – 2000:Q2	Poor financial performance of pure play Internet banks.
6	DeYoung (2001b)	U.S., 10 Internet – only and 569 benchmark banks	1997:Q2 – 2000:Q4	Poor financial performance however higher assets growth of pure play Internet banks.
7	DeYoung (2001c and 2005)	U.S., 12 Internet only banks and 644 benchmark banks	1997:Q2 – 2001:Q2	Poor financial performance however higher assets growth of pure play Internet banks.
8	Hasan et al. (2002)	Italy, 105 banks	1993-2000	In respect of almost all performance variables, the Internet group outperformed the non-Internet group. Highly significant relationship between offering of Internet banking and bank profitability.

9	Delgado et al. (2004)	European Union, 13 primarily Internet banks and 335 established traditional banks	1994-2004	Lower profitability of primarily-Internet banks as compared to newly chartered non-Internet banks. Evidence of technology based scale efficiencies to Internet banks however not of technology based learning effects.
10	Hernando and Neito (2005)	Spain, 72 commercial banks	1994-2002	Performance of Multichannel banks is better in terms of ROE, higher commission income and lower general expenses. The adoption of the Internet as a delivery channel has a positive impact on banks' profitability measured both in terms of ROA and ROE and no statistically significant impact on risk.
11	Sathye, M (2005)	Australia, 61 Credit Unions	1997-2001	Internet banking doesn't have a significant impact on performance and risk profile of banks.
12	Delgado et al. (2006)	15 E.U. Countries, 15 Primarily-Internet banks and 335 Traditional banks	1994-2002	Lower profitability of Primarily-Internet banks as compared to newly chartered non-Internet banks. The adoption of Internet banking affects profitability negatively.
Source: (Malhotra & Singh, 2009, pp. 46-47)				

2.4 The Emerging Trends

In consideration of the survey results and the plethora of literature and other public surveys available, what is evident is that the emergence of a cashless society is inevitable. The young are moving away from being 'cash-preferred' customers to being more self-serviced customers.

The question lies as to what can be materially different from the status quo in a future service economy. What sort of new gear will industries have to be equipped

with in order to sustain the cashless society's demands and needs? In this respect the following main conclusions can be arrived at:

1. the rise in mobile self-service technology
2. use of m-money
3. possibility of branchless banking

2.4.1 The rise in mobile self-service technology

"The Mobile Marketing Association reported in 2009 that most national and regional banks offered some form of mobile banking. The association also conservatively forecasted a sevenfold increase in the number of mobile banking service users by 2015. As consumers make the shift from using home-based PCs to mobile devices for their banking activity, financial institutions must determine which mobile banking format will best suit both their customers' needs and their own business goals. This special report will provide an overview of the features and the benefits for banks and customers. The report also will discuss obstacles to adoption of current mobile banking formats, including the mobile Web, mobile apps and text banking, and will provide insights into the future of this growing service area." (Cluckey, 2009)

One of the primary trends in the area of self-service is undeniably the invocation of mobile technology. As mobile phones are gaining momentum in usage and technological sophistication, it is spreading to almost every aspect of human interaction. . Just like in the times when the computer and the internet crept into our daily lives, the mobile too is making its way as the preferred alternate to home computing.

Therefore, it is important to assess and understand the impact of mobile technology in the service economy and how this enhances the potential of a virtually cashless society. This solution gives financial institutions a simple and fast way to set up a range of mobile banking services, such as account balance checks, transaction history, money transfer between accounts, bill payment and branches and ATM location.

According to NCR (NCR Corporation, 2009) there is potential for a new global banking platform enabling banks to offer their customers, banking services via downloadable apps, mobile browser or SMS. The solution provides all the features consumer need to manage their funds on the move and enables banks to scale and integrate mobile with other online Kiosks, ATM and teller banking channels, helping to drive adoption of mobile banking and deliver new services across integrated channels. The mobile banking usage rates by consumers have increased by 100 percent in a wide range of countries since 2010 according to TNS research. (Frank, 2011) ABI research predicts 400 million global consumers are expected to be using mobile banking by 2014. (Frank, 2011) In the same document, NCR's new mobile banking platform build on NCR's existing mobile banking experience and travel mobile services leadership, through its acquisition of Mobiqa, to provide support for more than 10,000 mobile devices, more than 600 wireless providers, and in more than 200 countries. (Frank, 2011)

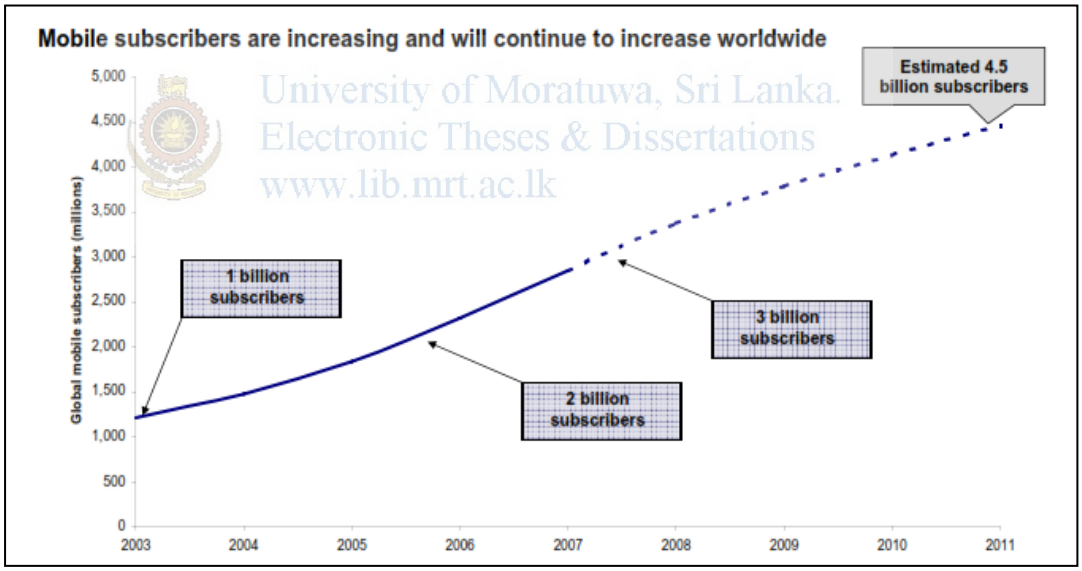
The consumer interface is consistent across multiple devices and modes, providing support for multiple languages and currencies. NCR (NCR Corporation, 2009) mobile banking also offers multi-channel enrolment, letting consumers sign up at ATMs, online or in-branch Kiosks As mobile devices offer greater control on how people manage their finances, mobile banking will need to evolve to deliver new services that leverage the advantages of the channel and integrate seamlessly with other self-service channels. Scheduling and managing appointments across mobile and other channels, receiving e-receipts on transactions at the ATM and mobile cheque deposits are examples of how banks will create competitive advantage by delivering an integrated experience for their customers across banking channels.

The mobile device, be it a Nokia, an iPhone, Blackberry or even the now famous Tab, all incorporate advanced mobile technology that allows one to perform functions anytime, anywhere, a concept which was thought impossible as recently as five years ago. With the expansion of self-service technology in almost every aspect of life, mobile technology has proven to be the fancy new kid in town with functions all tech-savvy and sophisticated.

Even a developing country like Sri Lanka which is not as developed in terms of self-service technology as Australia or USA, is branching out into mobile facilities that endorse self-service technology. This trend is due to a variety of reasons as the research shows. Hence, this section will explore the growing application of mobile self-service technology by use of statistics and surveys and deduce why mobile self-service technology is gaining momentum even in least expanded self-service technological contexts and what the future holds for mobile self-service technology.

2.4.2 Global overview

According to *Wireless Intelligence database*, there are over 2.8 billion mobile subscribers (making up of 40% of world population) in 2006-7 with nearing 100% subscription in developed nations (EDC-GSMA). As the figure below shows it has been estimated that four hundred million new connections will be established during the period of 2007-2008, with new connections in excess of one million per day.



Source: (EDC-GSMA)

Figure 2. 1 Increase of mobile subscribers globally

This rapid growth is being led by emerging markets like China, India and Brazil with Asia having the highest number of net additions. It was also noted in this study that Africa was the fastest growing region in terms of mobile connections.

Therefore, in addition to making voice calls, the mobile phone has become a versatile device with many capacities and capabilities, thereby becoming a personal necessity in both developed and developing markets.

It is an undisputed fact that the mobile phone offers a convenient means of accessing key personal information while on the move, anytime, anywhere. In particular in developed markets, this situation represents a convenience that is not available with any other consumer channel like a home PC or kiosk which, by their very nature, lacks mobility. In addition, in many developing countries, many people may not have bank accounts but are more than likely to own mobile phones.

Hence the mobile phone offers the potential to provide different types of financial services including both informational and transactional. As there is a variety of solutions and technologies available to facilitate mobile financial services, the mobile wallet, an application that stores payment instrument information − and can be used to make payments or money transfers – is a simple solution that is gaining considerable momentum and fame as a convenient option replacing the carriage of over cash or cards.

2.4.3 Understanding mobile-payment ecosystem

The mobile payments landscape is complex, combining as it does several types of mobile payment services such as remittance and/or contactless point-of-sale payments. In order to enable mobile payment services there are various technologies such as Near Field Communication (NFC) or SMS, and combinations of them which together with business models spin up a variety of mobile payment services. Moreover, the world of mobile payments is occupied by different stakeholders, such as financial institutions, mobile network operators (MNOs), technology providers, and the ultimate arbiter, the state regulators. (Boer & de Boer, 2010)

The confusion resulting from an absence of clear definitions of mobile payments hinders a better the understanding of the issues. Therefore it is first necessary to clarify the various aspects of mobile payments and classify the services, methods and

stakeholders in order to appreciate the vital role mobile technology can play hand-in-hand with self-service technology in a cashless context.

- ***Defining mobile payments***

In the context of a financial transaction the mobile phone can be used for multiple procedures, which are all directly connected to each other. There is often confusion and overlap between a mobile payment, mobile banking, and the use of the mobile phone to simply order goods or receive delivery while paying by other means. (Boer & de Boer, 2010)

— Mobile payment: defined as a transfer of funds in return for goods or services, where the mobile phone is used for both the start as well as the verification of the said payment. The location of the financier and supporting infrastructure is not significant: he may or may not be 'mobile' or 'on the move' or at a Point of Sale; the payment will be processed by credit cards or by a prepaid wallet. For example funds are transferred and debited from the prepaid amount or billed by the network operator.

— Mobile order: dealings where the mobile phone is used to commence the order, but not to make the payment. Example: food ordered online via the mobile phone and paid for in cash on delivery.

— Mobile delivery: transactions where the mobile phone receives notification of the delivery of goods or services, but is not used to make the payment. Example: an event ticket is issued on the mobile phone.

— Mobile authentication: use of the mobile device to validate the user either as part of a payment transaction or to give admission to some information or functionality. i.e. Commonwealth Bank Australia requires the verification of a code sent to the registered mobile number when making online transfers or changing withdrawal limits.

— Mobile banking: access to banking functions via the mobile phone. This includes the provision of all of the banking functionality already provided by online banking

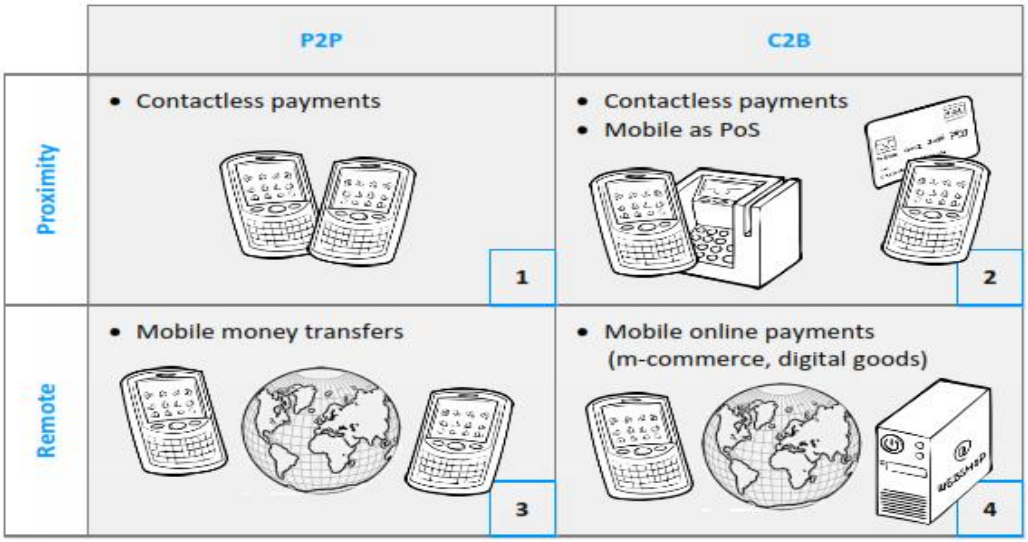
while also including other methods of telephone banking. Example: view account balance and transaction history via the mobile browser or app.

- ***Mobile payment categories***

In this part we aim to categorise the various methods. (Boer & de Boer, 2010) We base the categorisation of services on the criteria of the actors involved (relation) and location. Payments can be done between consumers (P2P or C2C) or between consumers and companies (C2B).In addition; payments can either be executed in proximity, for example at the counter in a shop, or remotely, for example paying online via a mobile phone.

As a result we can distinguish 4 categories of mobile payments subdivide under two headings which are depicted in the following figure:

a. Proximity payments
    a.1 Contactless payment
    a.2 Mobile phone as PoS device
b. Remote payments
    b.1 Mobile phone transfers
    b.2 Mobile online payments



Source: (Boer & de Boer, 2010, p. 14)

Figure 2. 2 Categories of mobile payments

a. Proximity payments

1. Contactless payments

Contactless payments are payments completed in proximity without making any contact. i.e. paying at a PoS by holding your mobile phone in proximity to a designated device, transfer money to your friend by moving the phones towards each other or by paying your train ride by holding the phone close to the reader. Contactless payments can thus be made between consumers (P2P) and between consumers and merchants (C2B).

There are numerous methods to perform contactless communication such as Near Field Communication (NFC), a contactless communication technology which is perhaps the most common and famous means in the field of contactless mobile payments. Other methods include mobile internet and Bluetooth.

2. Mobile phone as PoS device

A recent phenomenon is the use of the mobile phone as a point of sale (PoS) in order to accept card payments. Using an additional device known as an external card reader and an application for the mobile phone to support the newly-attached device, the phone can be enabled to accept card transactions typically supporting payments between consumers and small enterprises. They are specifically targeted for enterprises not large enough for traditional PoS devices, thereby providing access to small businesses which cannot afford the high infrastructure costs of large PoS networks.

Verifone, the US provider of PoS solutions and also mother of the PayWare solutions, provides a device surrounding the iPhone through which the card can be swiped. (VeriFone Holdings Inc., 2010) Outside the US, in Europe there is the initiative of Barclaycard. Barclaycard, the largest UK credit card issuer and provider of PoS solutions, announced in 2010 at the Mobile World Congress that the company was working on an iPhone PoS device to accept both conventional and contactless payments. (Barclays Bank PLC, 2010) Perhaps the most well-known example is when, in 2009, Jack Dorsey, former founder of Twitter, announced his mobile

payment start-up Square. This new system created troubling issues as it offered a cards payment service without a contract, monthly fee or minimum monthly transaction value thereby being categorised as a high-risk merchant and hence not qualified for merchant accounts with credit card acquirers. (Siegler, 2010) (Boer & de Boer, 2010, p. 63)

Moving a step ahead, Google's Android mobile platform integrates NFC technology via Google's Nexus S device. The *Intuit* (Intuit Inc., 2011) has effectively transformed its existing GoPayment mobile credit card processing application to the renewed GoPayment application which no longer transfers credit card data via a specific card reader. Instead the data is transmitted via radio waves without any add-on card reader hardware. (Boer & de Boer, 2010, p. 64)

b. Remote payments

3. Mobile money transfers

This involves a transfer of funds from one consumer to another over long distance, either between consumers within the same country as in the US where there is a large market for peer-to-peer mobile money transfers facilitated by the PayPal services, or situations where consumers send money overseas. This is most commonly known as remittance.

Remittances therefore form a huge market particularly in emerging economies. According to a recent report of The World Bank (Mohapatra, Ratha, & A, 2011) remittances amounted to USD 325 billion in 2010, and is expected to reach USD 404 billion by 2013. Due to the lack of banking infrastructure and available alternatives, mobile remittances constitute an ever larger share of this market.

For example such an initiative was launched in mid-July 2011 by Japanese mobile operator DoCoMo under the DoCoMo Money Transfer heading which enables Filipinos residing in Japan to send cash directly to over 8.5 million Smart Money accounts of relatives and friends in the Philippines. (Boer & de Boer, 2010, p. 70)

4. Mobile online payments

These are payments via the mobile browser or via an app on the mobile phone which can be executed in the B2C- environment involving m-commerce and digital goods.

In terms of m-commerce, online business models are incorporated into mobile devices in order to maximize revenue opportunities. This creates incentives for developers to build their own m-commerce applications on the mobile device in order to facilitate the m-commerce needs of users.

According to a study by ABI Research, (Allied Business Intelligence Inc., 2010) it is estimated that shoppers from around the world will spend about $119 billion on goods and services bought via their mobile phones. According to the same study n the United States alone, mobile shopping increased from $396 million in 2008 to $1.2 billion in 2009, and mobile campaign spending also increased by 25 to 30% in 2009, with companies shelling out just under $313 million.

A few such m-commerce trends include:

- Bargain hunting

  Bargain hunting has become extremely popular with mobile applications like RedLaser (Apple Inc.) (eBay Inc.) that enable users to scan product bar codes and find out its various prices at different retailers. This is a classic example of self-service technology where shoppers are combining the worlds of online mobile shopping with traditional physical shopping in order to ensure they get the best prices.

- Mobile ticketing

  This enables customers to order, pay for and validate tickets from any location and at any time through mobile phones. Mobile tickets reduce the production and distribution costs incurred through traditional paper-based ticketing methods while on the other hand increasing customer convenience.

  For example eBay's new beta application, eBay Go Together, allow users to invite friends to events through Facebook or email and then split the cost using PayPal or credit/debit cards. (eBay Inc., 2011)

– Tangible goods

  According to a survey by the Mobile Marketing Association, (Mobile Marketing Association, 2010) 17% of mobile commerce was used for purchasing applications and ringtones, while another 6% of people used their phones for discounts and coupons, and another 6% used their phones to buy tangible goods— that is, actual goods that one can put in one's hands. According to Mobile Commerce Today eBay has been the standout leader in mobile commerce with their iPhone app launched in 2008, and their Blackberry and Android applications launched in 2009 and 2010. (Tode, 2011) In 2009, the company witnessed over US$600 million in goods sold via the mobile app, marking a 200% increase from 2008. (Siwicki, 2011) The app notified bidders with push alerts and SMS notifications regarding outbid and enabled them to bid again or keep track of ending auctions. According to eBay, (eBay Inc., 2011) one item is purchased every two seconds using eBay mobile app, with apparel, auto parts, cell phones/accessories, sporting goods and collectibles ranking as the top five categories of purchased items.

– Marketing

  According to a study by the Forrester Research, (Mulpuru, 2010) a reported 74% of online retailers either have in place or are developing mobile commerce strategies, while 20% have already implemented their complete plans. (Retailer Daily, 2011) Retailers are also investing further time and money into creating novel ways to reach consumers via their mobile phones with campaigns that boost either the brand identity or the shopping experience.

2.4.4 Key stakeholders in a mobile self-service technology

In the context of expanding mobile self-service technology, there are several players whose presence and contribution become indispensable. They are the mobile network operators who invest in the mobile platforms that enable m-commerce and m-self-service technology, the financial institutions, whose facilitation to such new technologies are vital and, most importantly, the merchants and consumers through whose continuing demand the entire system is driven.

– *Mobile network operators (MNO's)*

Mobile payments can become an attractive proposal for achieving a return on the investments made in infrastructure and expenditure associated with increases in air time and data usage. For MNOs mobile payments hints at the possibility of enabling diversification into different areas of the consumers' needs and lifestyles.

– *Financial institutions*

Financial institutions on the other hand make a defensive play when it comes to mobile payments. From a retail banking perspective, financial institutions are focused primarily on the protection of the current accounts and ancillary loan facilities. Therefore, mobile payments become more often than not a pioneer in loss for these more profitable facilities. Moreover, from a wholesale banking perspective, financial institutions are already disinter-mediated to some extent from their wholesale customers through third parties in the subject of online payments. Therefore financial institutions aim to avoid the worsening of this situation through third party mobile payments. Moreover, mobile payments also provide incentive to realize the need to reduce the use of cash and other associated costs. Furthermore in developing countries mobile payments offer the opportunity to cost effectively tap the under or un-banked sections of such society. This would be discussed in detail in the subsequent section on m-money.

– *Merchants*

Point-of-Sale mobile payments are capable of providing quicker checkout facilitation and the ability to provide real-time marketing signals to the consumer through messages sent to the customer's phone. Although it is yet uncertain if, and to what extent, customers would appreciate such messaging by the merchant, it can be said that un-manned or remote Point-of-Sale locations could well benefit from such mobile payments by way of a reduction in servicing costs. Remote mobile payments provide another means for merchants to adopt a cost-effective channel when compared to other options.

– *Consumers*

As an end consumer, the mobile phone has undoubtedly achieved a permanent place in one's pocket, gaining a similar status to the traditional wallet. It has become an indispensable item that could be found in the possession of most customers. Furthermore, consumers are growing more comfortable in resorting to their phones to complete many tasks and much reliance is increasingly being placed on them to complete transactions at the touch of a button anytime, anywhere. Therefore mobile phones nowadays not only make voice calls as they used to, they have become a multi-media and multi-functional device with a plethora of applications that can perform a variety of functions thought impossible not too long ago. But the question remains whether customers are ready to abandon their traditional wallets and rely on mobiles to make financial payments.

- ***Mobile Wallet***

According to survey results published by EDC-GSMA Mobile Financial Services Survey 2007 (Zafar & Krugel, 2008) Mobile Wallets are projected to increase significantly up to 1.4 billion by the year 2015.

The Mobile wallet is a complementary concept that evolves from the notion of mobile money. When mobile money refers to funds transferred using mobile phones, the mobile wallet becomes the virtual wallet that allows you to carry everything you traditionally tend to carry in your wallet, not merely cash alone.

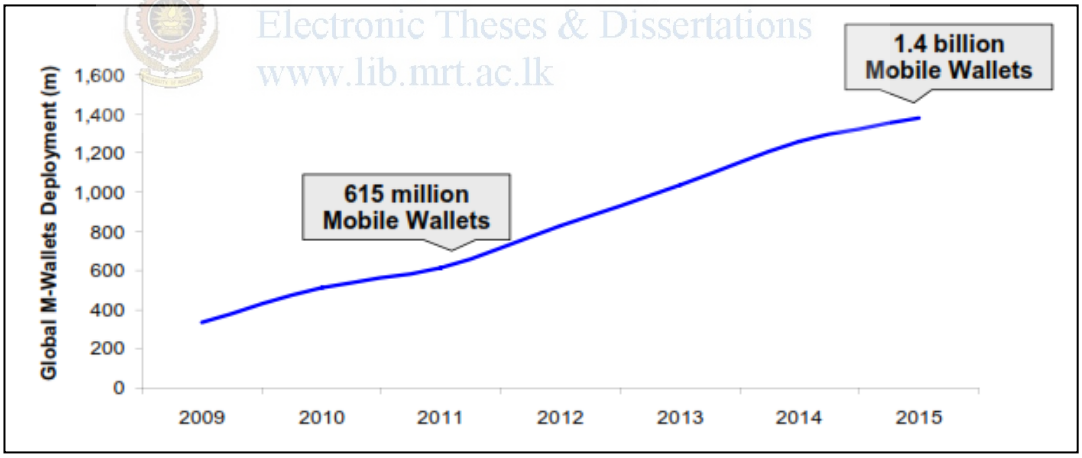
The PayPal mobile wallet and Google mobile wallet, the two applications that are already in the market, were both launched this year, and allows customers possessing mobile phones with supporting applications (such as Google's Android OS) to store credit card details, gift cards, loyalty card details from retailers and even frequent flier details all in one location. The PayPal mobile wallet is linked to the user's PayPal account into which he can electronically transfer funds from his bank account or credit card.

What is required by the user is to practically wave the mobile phone at a mobile-wallet reader at a store in order to complete a purchase or transaction. The

applications use the NFC (Near Field Communication) technology which was discussed previously, to transmit data over short distances. However this requires an embedded NFC chip in the mobile phones, similar to the ones found in credit cards, for them to be used in the 'mobile wallet' application.

Although the mobile wallet is still in its development stage, it provides a window into the next generation of self-service technology in an absolute cashless context. The consumers are no longer confined to using cards which they must carry with them to make payments or redeem points. The ubiquitous mobile phone will enable them to do everything they did before, with ease and without hassle. Investment in mobile wallet technology will inexorably lead, ultimately, not only to a cashless society but also to a society sans the plastic card alternative. The additional bonus will be value cards that store cash in electric form in one's mobile phone, and readily available for use any time anywhere without any physical constraint.

As studies show, mobile wallets are gaining momentum as a convenient alternative to the traditional wallet for a busy and fast-moving society.



Source: (Zafar & Krugel, 2008, p. 6)

Figure 2. 3 Increase in the use of mobile wallets

2.4.5 Banking to the next level: notion of branchless banking

Branchless banking today faintly resembles what was in trend a decade ago. It was suggested in 1999 when the internet was at its heights that "clicks" would soon

replace the “bricks”, (Mas & Rotman, Going Cashless at the Point of Sale: Hits and Misses in Developed Countries: Focus Note 51, 2008) while some pioneering European firms such as the Midland Bank in the United Kingdom introduced internet and phone-based banking solutions. (Ivatury & Mas, 2008) At that point of time only eight percent of the world population possessed mobile phone subscriptions, and when it came to extending banking services to the marginal sectors of society, it primarily dealt with establishing microfinance services with personal direct contact with the poor.

- ***Branchless banking today***

The Consultative Group to Assist the Poor (CGAP) which is an in-house organisation of the World Bank and functions as an independent policy and research centre dedicated to advancing financial access for the world's poor. CGAP provides market intelligence, promotes standards, develops innovative solutions and offers advisory services to governments, financial service providers, donors, and investors. (CGAP: Consultative Group to Assist the Poor) The CGAP has done extensive studies and research on the possibilities and potential for establishing branchless banking solutions to make the poorer sections of the society more financially inclusive. Thus, in its study on *Scenarios for Branchless Banking 2020* (Pickens, Porteous, & Rotman, 2009) identifies the following as observations when it comes to branchless banking today.

a. Financial inclusion in most developing countries is increasing, mainly due to the expansion of conventional banking means such as branches and ATMs.
b. Bricks-and-mortar growth is intrinsically limited by cost. Although no such cost is involved in branchless banking thus making it relatively cheaper, it has only reached a modest growth in most countries.
c. The following factors come into operation where branchless banking is shaping up:
    i. industry confidence in future profitability;
    ii. facilitating regulatory change;
    iii. a striking fall in connectivity costs;

iv. Creation of cash-handling agents via existing networks.

d. The present enthusiasm on the possibility of branchless banking is gaining momentum and shifting to a reality. The success in reaching the unbanked requires among other things a better understanding of the poor people's financial needs and adoption behaviour. This feature is only recently receiving recognition.

In 2009 the GSM Association (EDC-GSMA) reported more than four billion mobile subscriptions on a global scale, with emerging markets claiming 80% of the new subscriptions being obtained by lower-income customers. Therefore branchless banking is increasingly being identified as a means of accelerating financial inclusion in developing societies. This is achieved by enabling large commercial banks and upcoming MNOs to outreach for the unbanked sectors of society mainly by managing the costs and risks involved in providing financial services. (Mas, The Economics of Branchless Banking, 2009)

In recent history the most outstanding example of branchless banking comes from Kenya with its M-PESA initiative offered by the country's largest MNO, Safaricom. (Ivatury & Mas, 2008) Since it was launched in 2007, over 7 million subscribers have been included. This trumps the example set by branchless banking solutions in Brazil which relied on POS devices assigned to authorised-agents, where it was claimed in 2005 that Brazil had established a financial service point at every municipality in the country. These success stories have awakened many investors to the rewards of investing in branchless banking.

The above proves that the idea of branchless banking is gaining momentum. Therefore, the million-dollar question is: how can the private sector and the government together facilitate the expansion of branchless banking within the unbanked segment of the community in future?

In many developing economies, there has been consistent economic growth resulting in an influx of new wealth and thereby a demand for financial services. (Jack & Suri, 2010) This demand, coupled with the competition that has arisen from liberalisation of such services, has been the key factor facilitating the expansion of the financial sector.

Information Technology on the other hand has been the driving force behind the growth in financial services. The establishment of ATM networks and branch networks have helped the financial sector to go on-line as well as mobile. For example, the Mexican bank, Banco Azteca, made use of a vigorous e-banking system that increased its deposit base from zero to eight million customers. (Rhyne, 2009) For the Equity Bank in Kenya, growth has been attributed to the mobile ATM deployment that increased its deposit base from 10,000 customers to 3.4 million customers in less than ten years. (Equity Bank, Kenya)

However, it has also been recognised that ATMs have become a part of conventional banking channels and, hence, be subject to the limitations already faced by conventional banking methods. For example, the Bank of America closed down 10% of its branch network in the USA stating that it was necessitated by the change in customer preference for new channels of communication such as internet and mobile. (Kitchen, 2009) Therefore when it comes to developing countries, the amount of resources required to reach that degree of per capita financial service points achieved in developed countries is unbelievably high. For example, it has been estimated that, based on current cost curves, Kenya would need to spend USD 2 billion for its financial sector to reach mere middle-income levels of ATMs and branches. This figure, it is noted, would be over six times the current profit of the country's banking sector as a whole. Therefore, the search for lower cost channels to deploy financial services becomes a key issue for the banking sector in developing countries. It has been observed by scholars on the subject (Mas & Siedek, Banking through Networks of Retail Agents: Focus Note 47, 2008) (Ivatury & Mas, 2008), that the crucial element in branchless banking is reducing the fixed costs through the use of existing facilities, whether they are owned by agents (POS) or the customers (mobile phones).

- ***Scenarios for branchless banking in developing countries***

On a global scale branchless banking today serves over a one million low-income clientele and still manages to earn a profit. (Mas & Heyer, Seeking Fertile Grounds for Mobile Money, 2009) Particularly countries like Brazil, South Africa, Philippines and our neighbours India and Pakistan are starting to deregulate their financial

sectors in order to welcome investors who see opportunities for profit in serving the marginalised sections of society.

– The Brazilian experience

The inception of the business correspondents (BCs) strategy was in Brazil where the banks had deployed agents since the 1970s. (Mas & Siedek, Banking through Networks of Retail Agents: Focus Note 47, 2008) Yet it was only in 1999 that the Central Bank of Brazil allowed vendors, lottery outlets and post offices to carry out functions similar to that of a bank branch. The Caixa Economica, a state-owned bank, using this leverage finalised a conversion of over nine-thousand lottery kiosks into banking agents.

It was estimated that in 2005 a total of USD 1 billion in transactions were recorded through Brazil's 90,000 agents, and 12 million new accounts were opened in this network within a span of three years. (Bankable Frontier Associates, 2009) Banking agents were deployed at POS devices such as smart card and/or biometric readers, barcode scanners and even in some situations to PCs that were connected to the bank's server using an online data connection and mobile phones. These BCs were authorised to collect and pay-out money and enable money transfers via the POS. This trend gradually spread to other Latin American countries and notably to Peru where it was estimated that forty bank agents could be established for the price of opening of one branch.

– The Indian experience (Ghate, 2008)

In India for example, the Reserve Bank of India (RBI) introduced a policy in early 2006, permitting the use of "business correspondents" also known as agents by bank branches in order to increase the clientele and encourage financial inclusion. These business correspondents (BCs) are empowered to pay out a minimum value credit facility and recover the principal and interest, collect deposits and remittances and extend micro-insurance and other financial products on behalf of the banks for a commission that would be paid as indemnity. According to the *Rangarajan Committee on Financial Inclusion*, as of now only 27% of farm households have

access to bank credit. Therefore it was recommended by the committee that access to credit and other financial services should be raised to 50% by 2012 and 100% by 2015. It was outlined that the business correspondent model, once facilitated by appropriate technology, would become the core of the strategy, with the ultimate objective of establishing at least one BC in every village.

– The Pakistani experience (EasyPaisa)

Easypaisa is the largest branchless banking service in Pakistan which offers the most convenient access to financial services through mobile and over the internet. In 2009, with approval by the State Bank of Pakistan, Telenor Pakistan, an innovative telecommunication service provider partnered with Tameer Micro Finance Bank to pioneer a branchless banking system for the first time in Pakistan. With Easypaisa, customers have access to the most convenient means to conduct their financial transactions such as payment of bills, sending and/or receiving money within Pakistan, receiving foreign remittances, purchasing airtime for their mobile phones or giving donations. These services are not only limited to the mobile and internet, however; with an agent base of over 20,000 already, it has been able to make financial inclusion of the poor a reality. This is in fact a fine example where the conventional means of serving the unbanked communities is coupled with technological innovation. The Tameer Micro-Finance Bank is specialised in providing mircro-finance services to the poorer sections of society, which is the conventional means of achieving financial inclusion. This system, now coupled with technology, has overcome the inherent limitation of infrastructure and other costs and has successfully reached the unserved in a productive manner. Hence the Pakistani example stands out as a very appropriate one for self-service technology in a cashless society today.

- ***Challenges faced in branchless banking today***

– Although branchless banking seems to address most of the problem issues in conventional banking solutions, it is not without its own drawbacks. Challenges remain even in Latin America where it all started. The basic feature when it comes to serving the hitherto un-served through branchless banking is that users

in such locations primarily use the accounts to access either welfare payments such as pensions or the government dole, or their salaries where employers make direct deposits to their accounts. Other than such withdrawals, the only other transactions are for paying utility bills such as electricity or water. It has been observed that a majority of the customers seldom use other financial facilities available through the branchless banking system such as savings deposits or obtaining credit facilities. This situation prevails in India where payments under the *National Rural Employment Guarantee Act* and monthly pensions are increasingly being deposited directly into bank accounts in Andhra Pradesh and elsewhere.

- The other compelling issue is that, given their financial status, most clients tend to withdraw the entirety of the amounts deposited, leaving close to nothing in their accounts. This restricts the available funds for the banking system to generate credit facilities thus making it difficult to generate a profit.
- Another complexity that has surfaced in Latin America in using agents is the issue of managing their liquidity. As many agents generally handle influx of cash that and hardly any considerable outflows of cash, there is a risk for excessive liquidity. This has made banks to require the agents to refuse hefty deposits or mandate the agents to deposit excessive deposits in bank branches.

2.5 Issues in Advancing Self-Service Technology and How to Address Them

The survey conducted for the purpose of this dissertation produced results which varied between developed and developing markets in terms of the usage of self-service technology in the two societies.

Kupetz, (Kupetz, 2007) discusses the rapid growth of wireless telecommunication systems, thereby indicating the imminent arrival of a “cashless society”. The author claims that digital currency will obviate the extensive counterfeiting of paper currency in the U.S. resulting from major advances in optical scanning technology. He contends that the increasing popularity of credit and debit cards was evidence of

the transition toward a cashless society. The three critical issues identified by the author as likely to determine the success or failure of the migration to a cashless society is security, privacy and ease of use.

2.5.1 Reliability

The reliability issue is deeply linked to ultimate user-confidence which, once established, will promote the expansion, growth and development of self-service technology in a cashless society.

This is further evidenced as all three leading ATM manufacturers have focused heavily on user-security and implemented high levels of privacy protocols to attract and retain customers of ATMs. However, the rapid growth in the number of ATMs has also seen an equally dramatic growth in ATM crime.

There are three basic types of attacks on ATMs.

- Attempts to steal a customer's bank card information.
- Computer and network attacks against ATMs to gather bank and card information.
- Physical attacks on ATMs.
- Attempts to steal a customer's bank card information.
- Computer and network attacks against ATM have to gather bank and card information.
- Physical attacks against the ATM

As per the presentation document presented by Mr. Peg Bot, Director of Financial Industry Marketing, Diebold, the financial institution can be achieved a significant reduction in transaction cost for all online banking.

2.5.2 Security

Security, though distinct from reliability and privacy, can, by it poor quality, exacerbate both privacy and reliability. The two issues are interconnected and impinge on one another. However, security in particular refers to the integrity of the

sensitive information such as credit card details and other personal information that is sent digitally at a POS terminal, internet or even an ATM.

As earlier outlined, security primarily concerns the security over ATM/POS and cyber security. Therefore, the most common means of self-service technology being integrated with ATM technology, a "marriage of convenience" which customers of both developing and developed countries are quite accustomed to, needs further elaboration.

The following possibilities and lee-ways to breach ATM/POS security can be identified as posing major threats.

- Steal Customer's Bank Card Information

The main focus of ATM crime is the theft of the data stored on the bank card. Until recently bank cards used a magnetic stripe to store information to identify the customer and a PIN code to authenticate that information, allowing the cardholder to perform transactions at an ATM. Unfortunately, the magnetic stripe information is simple to copy and counterfeit. Consequently, thieves have focused on methods of collecting this information.

This weakness has been partly addressed by the introduction in Europe of EMV smart cards (also known as chip and PIN cards or chip cards). According to EAST, 90% of European ATMs are now EMV-compliant.

- Card Skimming (Russell, 2009)

This is when the card's magnetic stripe details and PIN are captured at the ATM by a 'skimming device', a modified card-reader secretly attached to an ATM. The skimming device is attached in a way that disguises its presence but allows it to capture the information on the magnetic stripe of the card and the inputs of the customer's PIN. When a customer inserts his/her card into an ATM fitted with a skimming device, the necessary information is being read – and recorded – both by the ATM and the skimming device at one and the same time. The customer, however, is quite unaware of this unlawful duplication, or that the security of the

data on the card has been seriously compromised. The captured information is then used to produce counterfeit cards for subsequent fraudulent cash withdrawals. The customer will only become aware of this when the monthly bank statement reveals cash withdrawals/transactions which he/she never made. Because skimming devices are very sophisticated and often difficult to detect, all customers using their cards on such an ATM become victims of an on-going crime.

Several different methods are used by criminals to do this, and the PIN is obtained either by the usage of a small spy camera or by a PIN overlay (false PIN pad). Increasingly, Bluetooth wireless technology is used to transmit card and PIN details to a laptop at a remote location. This information can then easily be sent anywhere in the world to allow the fast production of counterfeit cards.

- Network Attacks against ATMs

The ATMs communicate with the banking systems through a network connection. Some connections use private and proprietary network protocols but more often these connections are now via the internet using standard network protocols. Thieves will use computer programs (malware) to attack the ATM in order to gain access through a software or computer flaw. Once they have gained access to the ATM, thieves install software that collects card information and PINs. Because detecting a compromised ATM is very difficult, most customers are unaware until too late.

ATMs often now use publicly available operating systems and off the shelf hardware and as a result are susceptible to being infected with viruses and other malicious software. The malicious software is injected into the ATM through network attacks, or through other infected devices. Once installed on the ATM, the malicious software will continue collecting card information and PINs.

- Physical ATM Attacks

ATM physical attacks are carried out with the intention of gaining access to the cash within the ATM safe or the ATM security enclosure. Some of the most common methods include ram raids, explosive attacks (gas & non gas) and cutting (eg: rotary saw, blow torch, thermal lance, diamond drill). Robbery can also occur when ATMs

are being replenished or serviced. Staffs is eight held up as they are carrying money to or from an ATM, or when the ATM safe is open and cash cassettes replaced.

The following two incidents in respect of ATM skimming and shoulder surfing (this is a method used by criminals to obtain a PIN, typically when trapping cards, or when stealing cards by distraction theft. Standing behind the victim, a criminal reads the PIN as it is entered and either memorizes it, writes it down or enters it straight into a mobile phone) was picked from a document published in August 2009 by the European Network & Information Security Agency.

Case No. 1 (Henderson, 2009)

In April 2009, a 33 year old Microsoft employee, who lives in New York city, stopped in the closest chase bank to get some cash to pay his barber. When he inserted his ATM card in the machine, he noticed a bit of resistance. The screen said the machine was unable to read his card. So he tried again. However a second time, the machine gave him an error message.

He was about to give up and try another machine, when a thought popped into his head. He had heard about devices that fraudsters attach to the outside of card readers on ATM machines and, though it seemed unlikely, wondered if that was the source of his problem.

He tried to pull on the green plastic, surrounding the card slot and found that it peeled right off. Behind an extra mirror attached to the machine, he also found a hidden camera positioned right over the key pad, to capture the PIN codes as victim is typed them in.

Case No. 2 (Russell, 2009)

In April 2009, ATMs in Russia were discovered to have been infected with sophisticated malware. The malware was able to not only collect card details however also the PIN. While one specific ATM vendor's machine was successfully targeted, intelligence reports received in March 2010 indicated attempts were made to infect other ATMs.

- ***Addressing ATM Security***

All leading ATM vendors are dedicated to upholding consumer trust and provide the necessary approach to securing the self service channel. The below table provide the current ATM security from NCR and Wincor brands.

Table 2. 2 Vendors addressing ATM security

NCR	**Wincor**
Software Security	Anti Skimming II Module
Card Security	Optical Security Guard
Transaction Security	Biometric Technology
Physical Security	Ink-staining Technology
	PC/E Terminal Security
Source: (NCR Corporation, 2009)	

In furtherance to addressing the potential threats, NCR (NCR Corporation, 2005) has advanced an award-winning technology called Intelligent Fraud Detection (IFD). This mechanism comes with the ability to 'sense' the presence of any device made of any material, including wood, paper, glass or plastic, that has been illegally attached to ATM machines. This technology claims to comprehensively protect self-service units from being compromised.

Use of biometric data to enhance security is analysed in Activist Post (Turbeville, 2012) with respect to the most recent innovations introduced by IMB where the latest product IBM 5 in 5 predicts that biometric data such as finger prints, iris scans and voice recognition, will not only become commonplace for general public however will soon replace all other forms of identifications. Even more starling the level of self-service technology is set for release which will link the human brain directly to the digital world enabling the user to control their reality purely by thought. It further notes that the need to remember multiple passwords will be thus removed enabling much more secure and easy self-service technology in a cashless context.

2.5.3 Privacy

Privacy, considered a primary issue in relation to self-service technology in developing countries, requires in-depth consideration. Privacy, in essence, is the avoidance of unwarranted and uncalled for public release of information relating to oneself, and is a fundamental right of every citizen the world over.

Breach of privacy involves the unauthorized storage and dissemination of personal information to third parties without the express authorisation of the individual concerned. When it comes to self-service technology and cashless transactions that involve making payments over the internet, POS and other means to acquire goods and services, there is a danger of such information of an individual being acquired by third parties and used for fraudulently without the consent or knowledge of the individual. (ATM Security, 2011)

This information may be either personally identifying information (also known as PII) such as NIC numbers, passport details, social security numbers, bank account details and contact details and/or non-personally identifying information (known as non-PII) such as customer behaviour on a website, credit card usage patterns and value card usage. (ATM Security, 2011)

What appears to be the greatest advantage of self-service technology can often turn out to be its greatest disadvantage: storage and instant recall of information, on the one hand, as against a detailed audit trail of one's daily, weekly and monthly transactions, on the other. It is interesting to balance the pros and cons involved. To take a credit card, for example: the issuing bank records usage of the card for every purchase and the customer is often notified by SMS of the use of the card and the amount involved. This could prove a useful safety measure, especially if the card had been stolen; but the recording of all transactions can also be interpreted as having an unhealthy, even sinister aspect, because such information when collected on a day-to-day basis from a wide segment of the population results, almost imperceptibly, in a massive database of people's lifestyles, prompting fears that such detailed data could be used unlawfully by people in positions of power, if they so wish, to achieve their own private agendas. (NCR Corporation, 2005)

The point that needs to be made here is simply that, using physical cash to pay for one's transactions on a daily, weekly or monthly basis, leaves no such audit trail for anyone so inclined to use in the first place, except when the currency is 'marked' by the police authorities prior to making arrests for illegal activity involving cash. (NCR Corporation, 2009)

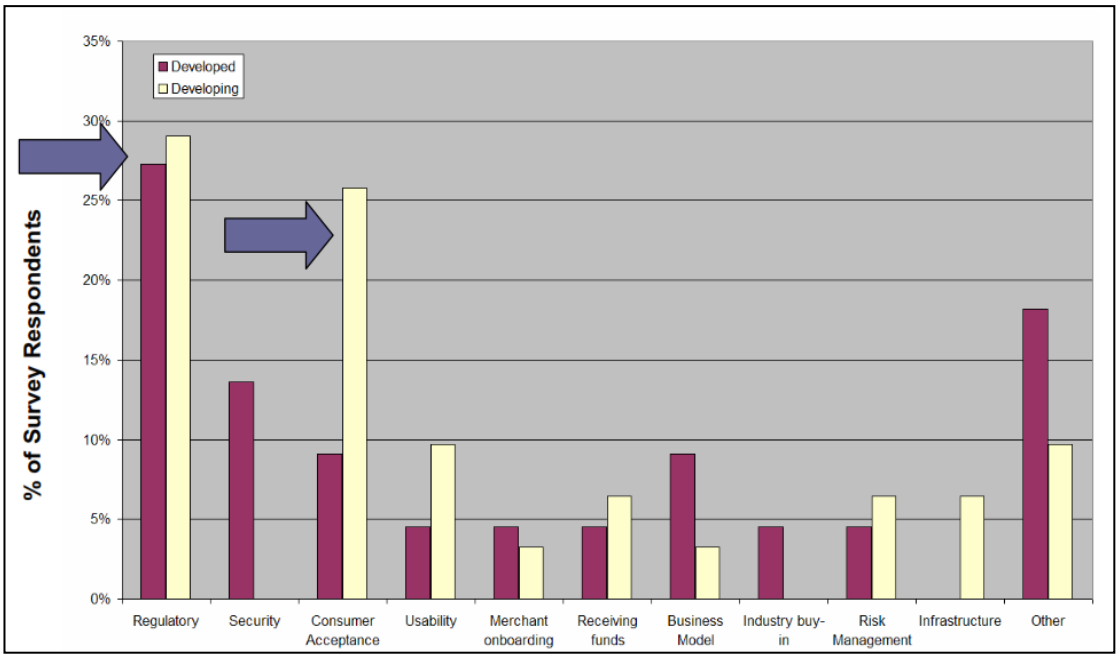
The situation worsens when websites have the capacity to trace the 'behaviour' of consumers, such as their purchase patterns, popular searches, geographic locations and other non-PII information. For example, eBay is capable of making suggestions based on previous searches made by the consumer. This is through tracing the IP address and monitoring the IP behaviour. This is known as 'user profiling' where the data is stored by means of cookies. Although this may be considered quite useful for a consumer, the danger lies in that such information can be obtained by third parties especially where the individual wishes to keep such information private. (ATM Security, 2011)

To address these very real concerns, what is essential is to introduce a stringent legal framework that ensures the privacy of consumers when making purchases through digital means. As it is difficult to restrict storage of user profiles, what can be regulated is the dissemination of the information to third parties. This will ensure that users enjoy a right to privacy even where the digital medium implies traceability. (ATM Security, 2011)

2.6 Issues in E-Money and M-Money Systems and How to Address Them

According to perspectives and forecasts made in the *EDC-GSMA Mobile Financial Services Survey 2007* (Zafar & Krugel, 2008) the key areas of concern that could impede the progression of mobile self-service technology and m-money have been indentified to be:

1. Customer acceptance
2. Regulation



Source: (Zafar & Krugel, 2008, p. 8)

Figure 2. 4 Key issues concerning SST

Although these may vary according to market structure and degree of technological penetration and sophistication, the following common elements were discovered under the survey of the said study. Therefore, for the purpose of this dissertation, these issues will be considered and provided with a solution as the future of self-service technology in a cashless society should tackle these issues and concerns when dealing with electronic and mobile money which both fall under the notion of digital money.

2.6.1 Customer acceptance

Customer acceptance is perhaps one of the key issues that developing markets has to encounter when implementing digital money system of any form. Whether it be electronic, as in transactions made over the internet or the mobile using NFC technology, the success of each relies on how well the customers will acknowledge least accept it.

According to (Ho & Ko, 2008) the extent to which self-service technologies could enhance Customer Value (CV) as well as Customer Readiness (CR). Additionally, it is proposed to consider the influence of CV and CR in the continued use of internet

banking. Design methodology/approach – an online survey was used with a sample of 771 respondents. Structural Equation Models (SEM) was used to examine 11 hypotheses on the theoretical framework.

The acceptance of new technology has been explored quite comprehensively over the last decade. In particular, the technology acceptance model (TAM) suggested by Davis in 1989 has been used to elucidate user behaviour across a wide range of computer-based information systems and information technologies. (Agarwal & Venkatesh, 2002) And recently, the TAM model has been applied to study electronic commerce and Internet e-banking in different contexts. These writings suggest that perceived usefulness, perceived ease of use, security, responsiveness and convenience significantly influence customer interactions and acceptance with Internet e-banking. (Liao & Wing-Keung, 2007) Accordingly individuals are likely to place a great importance on the security of Internet-based financial transactions. (Hoffman & Novak, 2000) This in turn affects how users accept the self-service technology.

The acceptance it is further observed depends primarily on the level of education and degree of exposure to technology and banking practices. (Bernard, Hammond, Morton, & Long, 1981) Generally speaking, higher the level of education, higher one will get accustomed to adapting to new trends. Moreover, the society must also be considered as to how exposed it is to new technology and how willing people are to use them. Therefore it is essential to ensure usability in the applications used to further these innovations. (Benbunan-Fich, 2001)

Moreover, for digital money to become a commonplace there needs to be greater acceptance of the banking-habit within society. The problem in developing countries, which triggers customer reluctance to adapt to changing monetary traditions, is that the banking habit is still not sufficiently entrenched in people's minds.

The lack of banking infrastructure is one contributing factor in this respect. And the other is the social intimidation people of rural areas with little education will have towards dealing with a bank.

Particularly when it comes to making domestic transfers digitally, consumers are generally used to paying with cash. It will take some considerable time and effort before they begin using electronic payments. The level of education mentioned also refers to lack of computer literacy spun due to lack of access and infrastructure to technology which are essential components for a society to be comfortable in using digital money of any form.

Therefore, taking example from the M-Pesa project in Kenya by the MNO Safaricom, the section of society that should be focused when trying to implement a digital-money solution is ideally the young and the unbanked customers.

The young, who are generally speaking, are much more technologically prone than their older generations, and their enthusiasm to try new inventions and trends make them suitable customer section to introduce and build up on digital money solutions.

Secondly the unbanked, who has absolutely no access to banking facilities, can be targeted to launch digital money solutions and introduce them to banking practices in a more convenient and advanced level. Given the cost of establishing new bank branches in remote locations and bearing costs to maintain them, the same can be achieved through introducing digital money solutions to such fringed parts of the society and expect a better return.

Therefore, in order to ensure that customers accept new digital money systems, what a company interested in doing so, a financial institution ideally, is focus on these two sections of the society, as initial implementation in these sections will gradually ensure the acceptance by the entire society.

As pointed out in the earlier chapter on Branchless Banking, the M-Pesa initiative, the proportion of the Kenyans initially exposed to banking practices had doubled with the introduction of the system within a span of merely three years. (Mas & Heyer, Seeking Fertile Grounds for Mobile Money, 2009)

The other related issue with customer acceptance is the pricing strategy. The business model of an innovative project should ideally be offered at an affordable price in order to facilitate consumer acceptance from the start. However, as a digital

monetary transaction system by its very nature is a payment system in itself, therefore the price elements become difficult to determine at a preliminary stage given the uncertainty surrounding customer acceptance.

Particularly, the lack of initial demand suffered by Google Wallet for example from its projected subscribers who are much more comfortable in using cash indicates that regardless of the organisation which initiate such project it is a difficult task to get customers interested.

2.6.2 Regulatory issues

The second issue that crops up when implementing a digital money system is the regulatory impediments imposed by the government and/or regulators of those specific jurisdictions.

The usual practice when it comes to physical money is that a central regulator or authorisation body exclusively governs the issuing of money to the market. For example the Central Bank in Sri Lanka or like the Reserve Bank as in Australia. These central institutions, under the direction of the central and/or federal government, make regulations to control the monetary flow in the market either by issuing more money into the market or restricting it by withdrawing the circulating money by means of issuing bonds.

The purpose of the regulation is to ensure, that the monetary market does not get inflated or deflated with too much or too little money available on the circulation.

However, the problem with digital money is that, the regulators find it difficult to regulate the money generated virtually which does not possess any tangible physical characteristic.

This scenario is seen quite explicitly in credit facilities, generally regulators have specific regulations when extending loan facilities by banks, however the question arises as to whether same regulations will apply to credit facilities rolled over and over through digital means, and if so how that would be possible.

Yang and Gleckman (Yang & Gleckman, 1991) provides a glimpse into the future of the banking industry in the U.S. and the decline of the banking sector's dominance of finance. It predicts a decrease in bank profitability and reasons for the banking sector's troubles. Additionally it states that banks may retain their domination of a few niches such as small-business lending and check clearing. However, eventually, most of today's banks will become just another set of participants in a financial services free-for-all where everyone will be able to invade rival turf. It is identified that the chief beneficiaries will be borrowers, savers, and investors, who will have access to a wider range of services at lower prices with the expansion of technology. The article goes on to provide guidelines as to how to smoothen the transition of the financial services industry mainly in terms of renovation of the banking laws that understands the issues related to consumer lending in a cashless society.

Moreover, it should be also noted that one thing that is escaped out of notice that how the digital money can escape the purview of regulators in situations where digital-money service providers who are not financial institutions like PayPal acting as deposit takers. A feature that is provided by PayPal is that the user can transfer funds from his savings account in a bank or from his credit card. The account act as an ordinary account a customer maintains under a financial institution. Although no interest is paid, PayPal act as a deposit taking website. More or less like a virtual bank which does not fall within the regulations that generally encompass deposit taking financial institutions like banks. Although as of now no such major has arisen with respect to this unnoticed feature of PayPal, it is possible that such may come up if the site is to claim insolvency due to unexpected circumstances.

As regulators strives to gain control in the virtual money market as well, it should be seen as a positive step from the customer perspective as digital transfer of funds can make a amateur user of it quite vulnerable. However, from the financial or other institution's perspectives who are implementing the systems, this is seen as an impediment in terms of expansion and growth as compliance to regulatory schemes comes with a cost.

These costs primarily include market specific licensing and regulatory issues that concerns both financial services sector and the telecommunication sector.

The particular intricacies come when it comes to making cross-border fund transfers or remittances digitally. Either you make a wire transaction through your bank account to which you have access to online from your home or using mobile internet to make a transfer of funds to send gifts to a loved one in another country through facebook for example, provide quite complex regulatory mayhem. (PayPal Inc., 2011)

As every market consists of its own regulatory framework, compliance with different regulatory regimes becomes a complex legal nightmare to tackle. As in the example above, where a user in Sri Lanka, uses facebook to make a purchase for a third party in China using facebook located in USA through the PayPal.au account which he created while he was studying in Australia, the question arises as to which regulatory framework applies for the transaction and which country's regulations the service provider, PayPal and facebook should comply with. The situation worsens if a conflict arises, for example of fraud or misrepresentation and to determine which country has the jurisdiction to litigate on the issue.

Therefore, to address the conflict of laws, countries should be guarded with stringent regulatory framework and a universal code of conduct or regulatory scheme should be implemented to govern cross-border transactions made digitally. Therefore, emerging markets will not be vulnerable in implementing digital monetary schemes and they would legally be on a level playing field to that of more advanced and developed countries.

2.7 The Social Impact of Self-Service Technology in a Cashless Society

Society as it stands to benefit from the development of technology is perhaps a major element that ought to be studied in order to ascertain the actual effectiveness of a technology. Likewise, when it comes to self-service technology its primary stakeholder and partner is the society. The study so far has been to define how a

society so used to using cash will function in the future when digital money replaces it and how self-service technology which now functions using cash will continue its course.

Therefore, the social impact of the dynamics and trends discussed above should be analysed in order to arrive at a comprehensive study on the implications of a self-service technology in a cashless society.

It has been identified through the empirical studies carried out in published surveys and the plethora of literature available on the matter, that the major impact of self-service technology in a cashless context affects primarily the labour market and the daily lifestyle of people.

2.7.1 Impact on labour market: automation and employment- the trends and effects

Labour market, although it does not appear as an area of concern in first glance, the advancing self-service technology has a direct link to the trends shaping up the labour market today. From decision on working hours to number of employees required, the self-service technology is deciding which work can be done by the customer himself and which he needs help with.

Self-service technology is indeed an offspring of automation, where devices are used in place of human labour to serve customers in a more efficient manner. Therefore, just as automation replaces the need to employ human labour, self-service technology also precludes the need for labour in a given context. Automation has gone beyond its inception at the manufacturing level and has reached many areas in the society today. For example the once ubiquitous telephone operators have been replaced by automated telephone switchboards and answering machines that provide self-service to the customer over the phone itself. Thus developments in automation and information processing ensure that work is in general supervisory, rather than laborious in the old-fashioned sense. (Myerson & Ross, 2003)

Therefore self-service technology redefines how we perceive employment. The traditional notion work defined as going to work on a fixed time and confined to one

location is now changing. As self-service technologies expand and cashless means come into the fore, the need to physically accept your pay check is no longer required. New communications systems, such as mobile telephones and the internet, permit staff to escape from such spatial confinement. A category of new office types identified by Myerson and Ross is the 'nomadic' offices, which are no longer dependent on location however are 'geographically distributed across the spectrum of people's lives from home and high street to airport lounge and serviced club, in other words anywhere a machine can be plugged in. (Myerson & Ross, 2003, p. 199) Thereby the nomadic office tends to do away with the only real reason for having centralized workplaces which being direct human interaction, both intentional and casual.

Therefore, there is a gradual increase in different employment arrangements that takes the development in technology into account and facilitate different demographics. Even in Sri Lanka there is a rise in part-time and home employment due to the fact that many works are of supervisory nature as customers in Sri Lanka tend to adapt to self-service technology offered by companies. (Abeyaratne, 2009) The demand for part-time and home-employment has increased the participation of women specially who are in the child rearing ages and undergraduates in the economy that is often categorised under-utilised segments of the population in the country. (De Silva, 1997) Therefore, it can be safely concluded that self-service technology has opened up new employment opportunities for the under-utilised sectors of the society.

The Australian example

For the purpose of this discussion, data based on cross-border surveys had been used, and in particular the *Labour Market Trend Survey: Study into the impact of labour market trends on the workplace, 2011* conducted by the Tempo-Team which is a major employment agency and a provider of broad range of Human Resource services in Belgium, Germany, Luxembourg, the Netherlands and Portugal and across Europe. (Tempo Team, 2011) This dissertation further take into account the *Future Labour Market Trends and Implications For Training* presented at the HTAN

Conference in 2010 by the Australian Government Department of education, employment and workplace relations (DEEWR). (Neville, 2010)

The DEEWR study shows that over the course of last 10 years, part-time employment has increased at twice the rate of full-time employment being 29% compared with 15% of the latter. Hence by 2010, the part-time employment accounts for 30% of total employment in Australia. Moreover, between the period of August 2008 and August 2010 part-time employment has increased by 9.3% compared with full-time employment which has grown only grown by 1.0%. (Neville, 2010)

Overall, the activities undertaken by people in the 15–19 age cohorts over the last few decades show: (Neville, 2010)

- There has been a long-term decline in full-time employment, although recent years have shown some increase (notwithstanding the decline in full-time employment recorded as a result of the global recession);
- An increase in part-time employment; and
- A small rise in participation in full-time education over the last decade, following a large rise between 1986 and 1998.

2.7.2 The skills of a future workforce

In discussing the impact of a technological innovation on employment, economists distinguish between process and product innovations. Whereas the former is associated with changes in the production process, i.e. capital labour requirements for a given level of output, the latter are associated with improvements to the existing products and the development of new ones. Thus skill twist and job dislocation are, perhaps, the two most important employment effects of automation at the micro-level calling for labour input adjustments. (Arayama & Mourdoukoutas, 1987)

The vital question remains to how a firm would deal with the problems of skill twist and labour dislocation. According to the relevant literature, three responses can be construed in this regard.

First, the firm can look into the external market mechanism. This would generally involve layoff of the redundant workers and the hiring of fresh employees with the appropriate skills. This could however result in increasing unemployment.

Second, the institution could resort to its own internal mechanism such as labour deployment measures. This would result in 'skill-securitisation' a notion that is gaining recognition over 'job-security'. (Amerasinghe, 2009) It is argued that skill security which comes with internal labour deployment has long term implications such as making a workman employable given his diverse skills. This counters the fears of not being able to find a job after being laid-off.

Thirdly, it can construct a hybrid of the two mechanisms known as functional adjustment in literature. This is most likely to result in a combination of both labour quantity and labour deployment measure.

These measures manifest the adaptation of an industrial system to automation and self-service technology is closely related to the prevailing labour market mechanisms. On practical terms, different adjustment mechanisms in terms of employment relations can be identified within the firm. Generally external markets are identified with contractual employment, internal markets are identified with non-contractual (lifetime or tenure employment), and functional adjustment is identified with a mix of contractual and non-contractual employment relations.

2.7.3 Impact on daily lifestyle

The increased productivity from reduced labour costs can result in additional benefits: (Porter, 1987, p. 55)

(1) Time savings (require fewer person-hours to perform the same work) owing to computer-aided processing that reduces analysis time and direct data entry via optical character recognition removes the need for keyboard entry;

(2) Operational savings (reduce postage, paper, floor space, and other inputs per unit of output) due to electronic filing and output eliminates paper handling operations and automatic indexing, global editing, automatic formatting, automatic filing of

revisions, and so forth speed up text processing and message systems reduce time spent on memo writing and phone calls.

(3) Faster response time (deliver products or services sooner);

(4) Enhanced quality of work (perhaps also improve job satisfaction);

(5) Expanded services (possibly provide brand new services).

These have a direct link to the social lifestyle of people. From saving time buying one's groceries to conducting supervisory work from home, self-service technology has enabled more spare time for the individual. However, some may argue, that regardless of the technology and machinery that ease the work of humans, they are busier than they ever were. This is probably because, humans with more time to spare, engage in more and more activities, so that there no longer any 'free time' to enjoy. However, theoretically speaking, the use of self-service technology has a direct nexus to making work convenient. (Porter, 1987)

It should also be borne in mind that this convenience comes with a cost, a cost of having the perquisite skills to engage meaningfully in a cashless self-service technological society. This is evidenced from the survey conducted, that respondents aged over fifty-five still prefer to use money instead of self-service technology. This is primarily because they belong to a generation where human interaction and tangibility were key features. The visit to the bank and accepting money from the cheerful officer at the counter, to having a casual conversation with the grocer are still experiences cherished by the older generation. Moreover, as their adaptability to new technology and capacity to learn new things get diminished with age, they clearly become the 'cash-preferred' sectors of a cashless society.

Moreover, from an employee perspective, particularly for persons looking to juggle both housework and career i.e. women with children, self-service technology provides ample opportunities to engage in employment as it creates jobs with flexible hours. This gives women more time to spend at home and pay attention to her household and children. (Amerasinghe, 2009)

Therefore, the social aspect of self-service technology in a cashless society primarily results in creating more spare time due to the convenience in conducting one's activities on a day-to-day basis.

2.8 Summary

It is evident by analysis of the above literature that the gradual development of gold-coins to use of digital money in a variety of forms has led to a much more advanced payment mechanisms.

From its inception of metal coins used instead of a barter system, the use of money has undergone a great deal of changes over time. From evolving to pieces of metal to paper currency, to credit cards and value cards, the currency has now taken the form of mere digits displayed on a digital screen.

The current conditions of using currency today have gone beyond mere geographic and physical limitations. ATM machines now provide the same services a traditional bank counter personnel would provide, sometimes even more efficiently. The expansion in self-service technological devices such as kiosks and vending machines now caters for a wide range of consumer needs in a cost effective manner. This has resulted in increased return on investments as the advanced efficiency and quality of service has in turn strengthened customer confidence and acceptance.

Hence, the existing conditions predict the future trends where the versatility of these various self-service options are delivered through mobile devices. This further curtails the need to physically visit a kiosk or ATM where you are enabled to conduct any transaction with the use of a mobile device.

However, the complete success of these developments depends on how the industries address the issues surrounding the use of self-service technology, digital and mobile money usage and the possibility of establishing branchless banking solutions not only to assist the rich but mostly to make the poor more financially inclusive. Hence it becomes pertinent to address the issues of customer acceptance and regulatory

concerns in order to establish a cost-effective, customer-friendly self-service infrastructure for the future.

As these developments do not take place in a vacuum, they will have considerable impact on each and every aspect of our social life style. Primarily in areas such as employment relations which is bound to undergo drastic changes to match the developments in the self-service technology.

Accordingly, it is pertinent to conclude that the emergence of a cashless society is inevitable as self-service technology continue to grow. Hence, self-service technology will become the primary of a cashless society.

CHAPTER 3

3.0 METHODOLOGY

3.1 General

This chapter highlights the methods employed to address the issues recognized under chapter 1. It outlines the various approaches such as case-studies, sampling and data collection that is used to obtain the appropriate data for the purpose of this study.

3.2 Methodology & Data Collection

Data collection is an important aspect of all research studies. Inaccurate or slipshod data collection will seriously impact on the soundness of the conclusions reached and ultimately invalidate the whole exercise.

Data collection methods for impact evaluation vary along a continuum. At one end of this continuum are quantitative methods; at the other end are the qualitative methods for data collection.

The quantitative data collection methods rely on random sampling and on structured data collection instruments that fit diverse experiences into predetermined response categories. They produce results that are easy to summarize, compare and generalize.

Qualitative data collection methods play an important role in impact evaluation by providing information useful to understand the processes behind observed results and assess changes in people's perceptions of their well-being. Furthermore, qualitative methods can be used to improve the quality of survey-based quantitative evaluations by helping generate evaluation hypothesis, strengthening the design of survey questionnaires and expanding or clarifying quantitative evaluative findings.

3.3 Case Study Research

Case study is the main method. Within it different sub-methods are used: interviews, observations, document and record analysis, work samples and so on. Thus, for the case study researcher all evidences is of some value and this value (trustworthiness) has to be carefully appraised. Reality (and the truth) is not tidy. A judge presiding over a judicial inquiry (as distinct from a court of law) turns no evidence away however assesses what faith can be placed in it, and relates it to other evidences to hand. Broadly speaking, this is the approach of the case study researcher (Gillham, 2005).

Both qualitative and quantitative methods can be applicable for case study research. Quantitative methods are those which involve counting and measuring: the much dreaded subject of statistics. On the other hand, qualitative methods are essentially descriptive and inferential in character and for this reason, are often seen as "soft", however description and inference are also necessary in scientific research (Gillham, 2005).

In research terms, a qualitative approach means to utilize subjective methods very often based on personal opinion, perception or feeling (i.e. quality). Process observation, opinion or expression, unstructured interview and open question surveys are synonymous with qualitative methods. On the other hand, quantitative methodologies involve consideration of size and magnitude and may be perceived as being more analytical in nature than qualitative methods. Structured interviews, structured surveys, symbolic models and physical experimentation are all synonymous with quantitative methods (Holt, 1998).

3.4 Sampling

* There are many sampling methods each designed to achieve certain objectives; (Holt, 1998) identifies some of them as follows.

- Simple random sampling
- Stratified random sampling
- Systematic sampling, and,
- Quota sampling

* The theory behind the simple random sampling is that every item of the population has an equal probability of being selected for the sample. Typically, random numbers are used for selections. The advantage is that it is simple to perform. The disadvantage is that it can generate sample bias.

* In stratified random sampling, the population is firstly classified into mutually exclusive strata and the samples randomly drawn from these strata in such a way as to include proportionate amounts of each. The philosophy behind stratified sample is that it offsets the potential for bias associated with simple random sampling.

* As the name implies, in the systematic sampling method, the sample is systematically drawn from the population.

* Quota sampling is similar in many aspects to stratified random sampling. However, it is not random. Quota sampling is often associated with interview surveys.

3.5 Data Collection

* A mix of survey methods was used in this case study approach as it was found to be well suited to the task of collecting the information required. Both qualitative and quantitative information was utilized in the research.

* Firstly, the survey was conducted to find out the consumer trends in the use of self-service technologies in society today. Special emphasis was placed as to

preference of consumers if the option of cash and/or option of self-service technology are given.

* Moreover, it probed into the concerns which consumers perceive when using self-service technology and digital cash options. It questioned the respondents further on their personal predictions as to the creation of a "cashless society" in the near future.

* The respondents were classified according to their age and career levels in order to make a comprehensive analysis. This cross-section of the society provided a spectrum of responses from total acceptance to self-service technology to disbelief on using self-service technology.

* The groups included, depending the availability of access to such sections,

  - Age 18-25: Undergraduates (Sri Lanka, India, and Australia)
  - Age 26-25: Young workforce (Sri Lanka, India, and Australia)
  - Age 36-55: Mature workforce (Sri Lanka and Australia)
  - Age 55+: Retired workforce (Sri Lanka and Australia)

* The primary data collection was based on surveys conducted in Sri Lanka, Australia and India during the period of October – November 2011. The total number of respondents included 180 from all three countries. The reason for selecting the three includes:

- ***Sri Lanka*** – as a developing country with diverse financial services industry and telecommunication industry always seeking new frontiers, it is essential for Sri Lanka to learn about the dynamics taking place in other countries and how local businesses should address the consumer demands for self-service technology and digital cash options.
- ***India*** – Compared to Sri Lanka, India has much more advancement in terms of self-service technology and use of cashless options. As an industrial nation in Asia with a over a billion consumer base and the extreme penetrative competition within the economy has led to a diverse collection of self-service technologies. India resembles the intermediary step Sri Lanka would become in its course

towards becoming entirely cashless with advanced self-service technologies as in Australia.

- ***Australia*** – In order to make a comparative analysis for Sri Lanka, it is essential to take examples and consumer behaviours in a very developed economy into account. Moreover Australia proved to be useful in terms of providing guidance and lessons as to the issues surrounding the use of self-service technology in Sri Lanka and India as Australia has past the stages of self-service technology which Sri Lanka and India are at in the status quo.

* The study further make use of published surveys that taps to the consumer behaviours patterns more developed countries such as USA. These include:

- Edgar Dunn Company- Advanced Payments Report 2011 (Edgar, Dunn & Company, 2011)
- GSMA Association- Mobile Wallets and Mobile Payments (EDC-GSMA),
- Innopay - Mobile payments 2010: Market analysis and overview (Boer & de Boer, 2010)
- NCR Corporation- NCR 2009 Self-Service Consumer Research (NCR Corporation, 2009)
- NetWorld Alliance - 2009 Self-Service Consumer Survey (NetWorld Alliance LLC, 2009)
- Mobile Payments World - Mobile Financial Services Study 2009 (Mobile Payments World, 2009)

3.6 Summary

The methodology consist of a comprehensive collection of sources, including the literature, published surveys and the survey conducted for the purpose of this dissertation. The aim of using all these different sources is to provide a broad analysis to the problem identified.

CHAPTER 4

4.0 DATA COLLECTION AND ANALYSIS

4.1 General

This chapter is dedicated to examining the consumer trends in the use of self-service technologies in the present society. The observations are based on surveys conducted in Sri Lanka, Australia and India during the period of October – November 2011. There is additional reference to published surveys from which conclusive evidence as to the dynamics in the use of self-service technology and perceptions towards a cashless society has been drawn.

The respondents are categorised into four sections based on their age. Firstly the undergraduates ages ranging from 18 to 25. Then the young working class aged 25 to 35. Thirdly, the baby-boomer or matured working class aged 35 to 55 and finally the group over 55.

The study shows responses from Sri Lanka and Australia for all four sections and selected categories of aged 18-25 and 25-35 from India as a means of taking the dynamics in a more developing and industrialised nation.

4.2 Concerns Pertaining to Use of Self-Service Technology

The following observation can be made with respect to the concerns of using self-service technology in Sri Lanka, Australia and India.

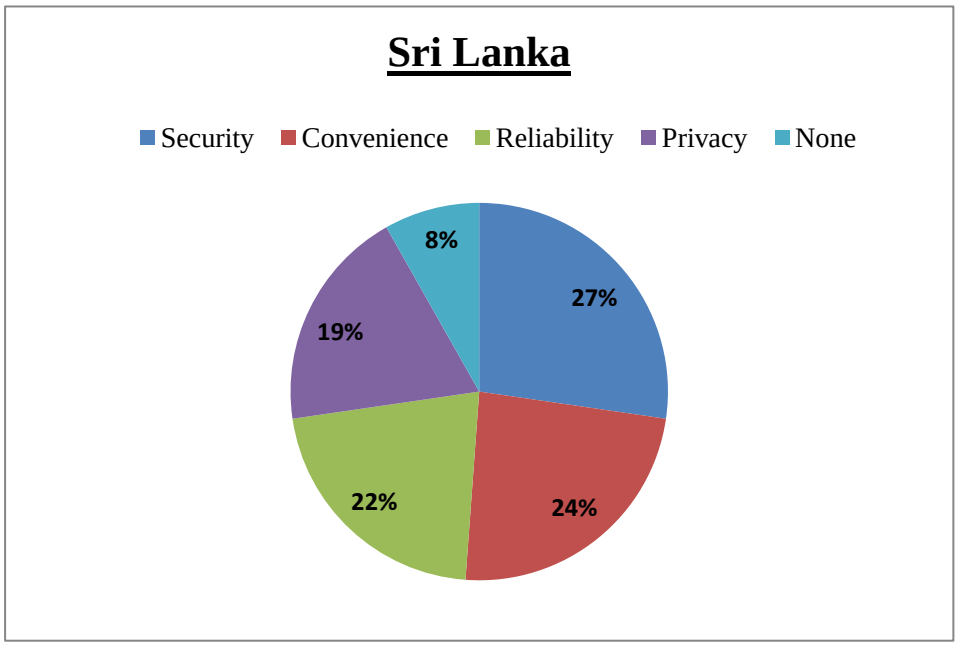


Figure 4. 1 Concerns Pertaining To Use of Self-Service Technology: Sri Lanka

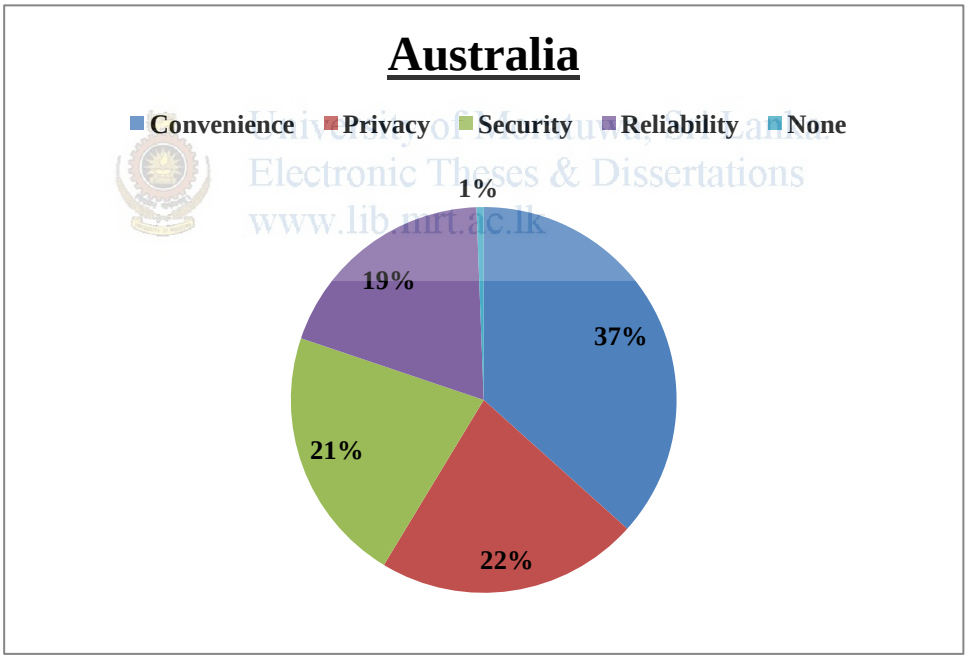


Figure 4. 2 Concerns Pertaining To Use of Self-Service Technology: Australia

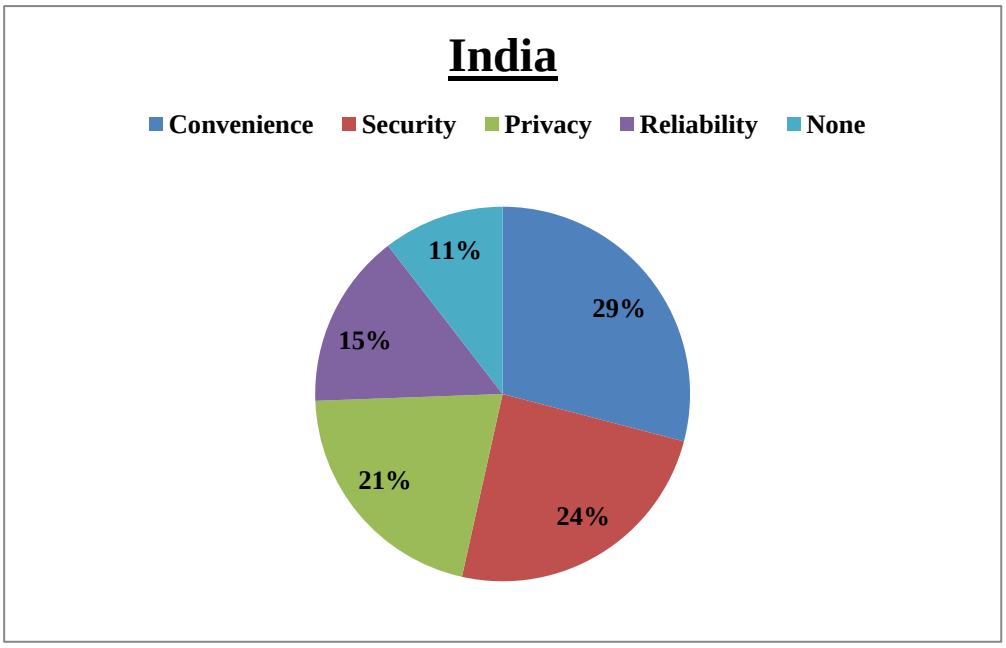


Figure 4. 3 Concerns Pertaining To Use of Self-Service Technology: India

- It can be concluded by the above data that in developed and highly industrial societies, the main concern is for convenience where as Sri Lanka the main issue is security.

- Moreover, it is apparent that India is mimicking the traits in Australia, which being a highly developed country. Whereas Sri Lanka still shows the initial fears which such economies faced at the inception of cashless mechanisms and self-service technology such as reliability and security.

- Hence for Sri Lanka in order to make self-service technology much more accepted by the consumer base, it is essential to address the security issue. With the increase of credit card frauds and other threats such as skimming and hacking becoming a common happening in Sri Lanka, it loses consumer confidence.

- As Sri Lanka still lacks cyber-integrity and there is a higher risk of consumers falling victim to hoax sites and making payments over unsecured systems, there is high potential for hackers to gain access to the sensitive information of consumers. This includes the potential danger of identity theft and other cyber crimes, such as where a website makes a false representation to commit fraud. As there is a lack of a stringent cyber law framework in Sri Lanka at present, the chances of victims

obtaining redress by way of compensation, or the delinquents being caught by the authorities and punished are indeed slim.

- Therefore, all these issues accumulate to make security the top-most concern among Sri Lankans on the use of self-service technology in a cashless context. When consumers make purchases online for goods and services, either using an e-channelling system or online checking system for an airline, or making purchases online through a local store's website, there is still apprehension as to the authenticity or the reliability of the merchant.

- If businesses in Sri Lanka are to accrue a benefit from the growing demand for self-service technology, it is essential to invoke security measures such as use of chip-enabled smart cards over magnetic strip cards, and most of all strengthening the legal framework to address such frauds.

- ***Responses according to age as percentage***

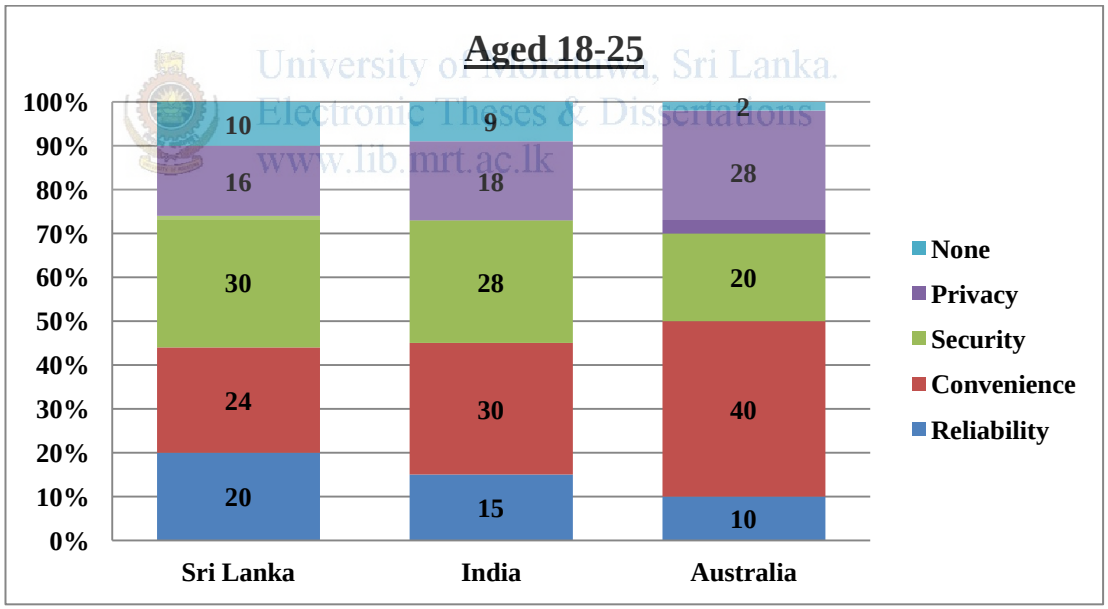


Figure 4. 4 Responses according to age as percentage: Age 18-25

It is manifested that in all three economies the younger generation finds convenience as the biggest factor in using self-service technology. They equally show concerns for security. For developing country like Sri Lanka the respondents of this age group finds reliability to be the third issue when using self-service technology. This relates to the overall response illustrated above.

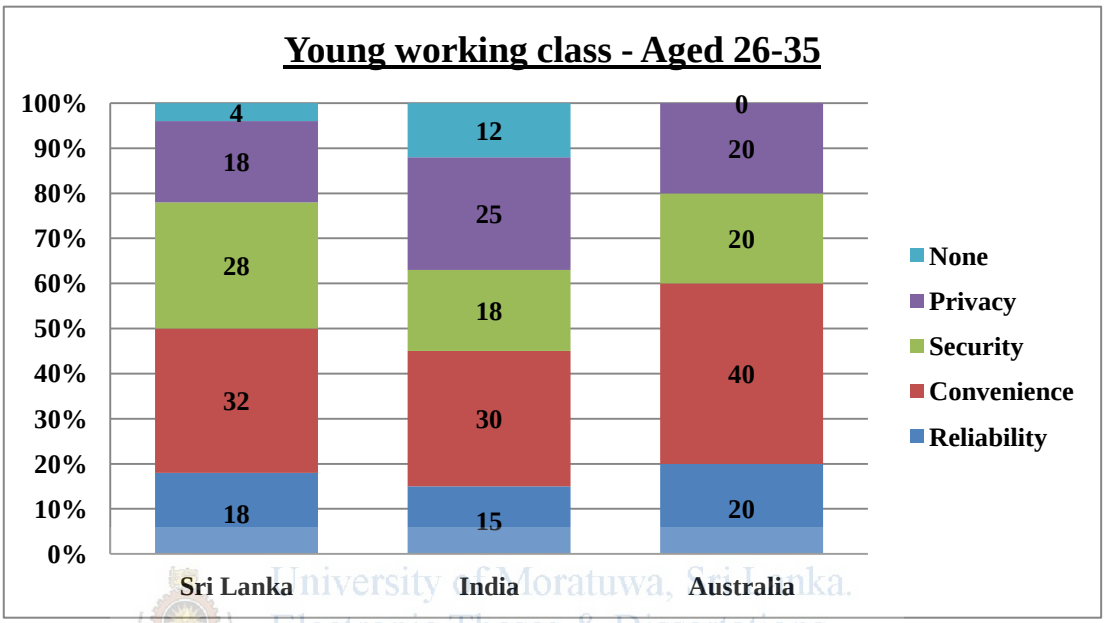


Figure 4. 5 Responses according to age as percentage: Age 26-35

In terms of the young working class, who represent graduates, post graduates and workforce with over 3years of experience in all three economies, convenience has become predominant. As reliability is becoming a lesser important issue, in India and Australia, Privacy is becoming a area of concern. In Sri Lanka, security continues to be an issue when using self-service technology.

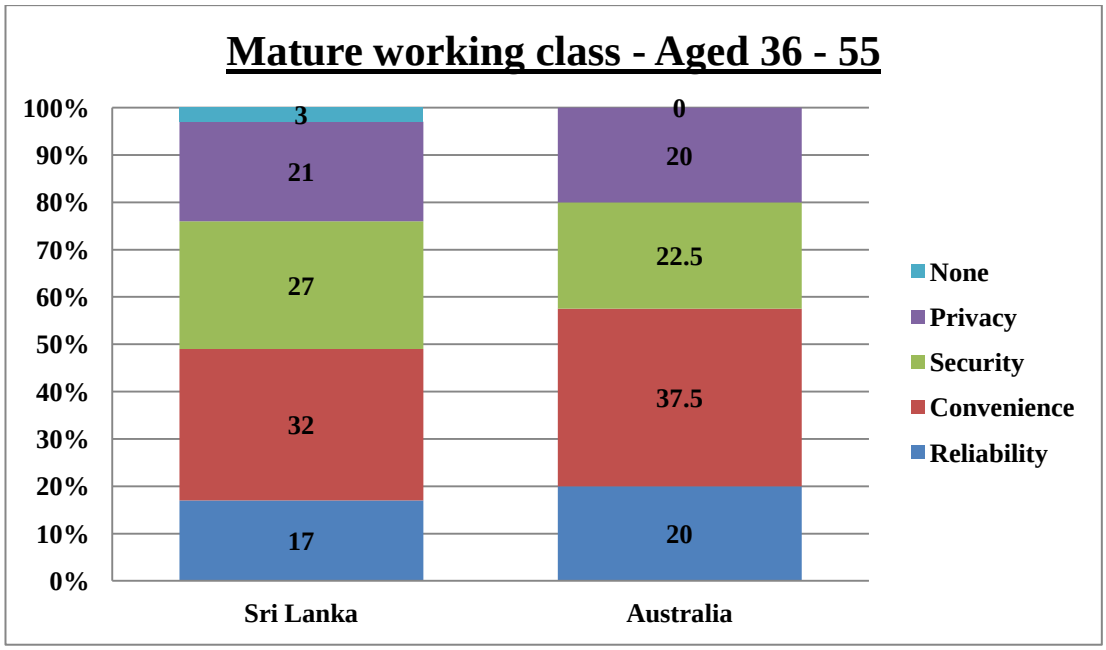


Figure 4. 6 Responses according to age as percentage: Age 36-55

In this data was collected only from Sri Lanka and Australia. It is evident that when it comes to the responses made by the baby-boomers in both economies, convenience seems to be the most acknowledged factor when using self-service technology. While Sri Lanka matured workforce shows equal concerns for privacy and security, the fears of reliability is not much picked upon. On the other hand, in Australia there is equal concern for reliability and privacy when using self-service technology.

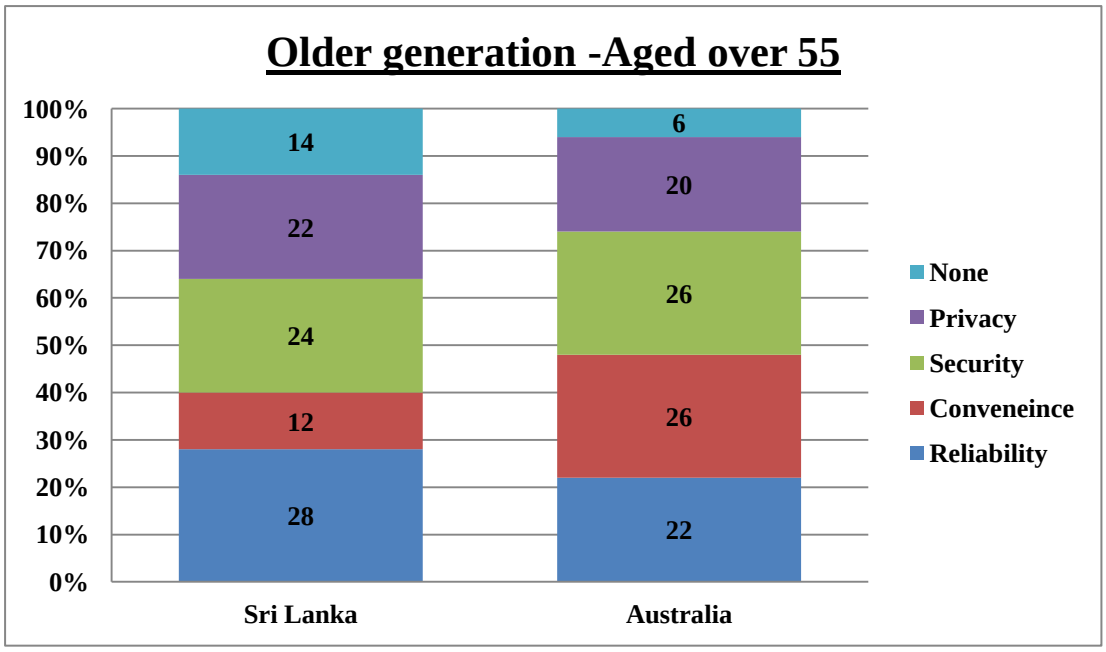


Figure 4. 7 Responses according to age as percentage: Age 55+

In this segment, there is stark difference as to the responses in the two economies. In Sri Lanka the older generation who are not at all used to using self-service technology finds reliability as the biggest concern. Issues such as authenticity and the practice of employing labour to making things done have contributed to this perception. From the interviews conducted it was evident that these older generations are sceptical about placing faith in machines and thus raises concerns for accountability and reliability for the services they demand. This pushes convenience to the back seat where they find it extremely difficult to comprehend the new technology and sophisticated ATMs and other devices. This leads to security and privacy emerging as second and third most acknowledged issues for this age group.

On the contrary, in Australia, where the introduction of value cards and other cashless options has been available from the early 1990s, this generation finds it like its younger counterparts convenience as the biggest factor in using self-service technology. Similar to the younger generations they have issues related to privacy and security. However, relatively speaking, this generation is not so keen or enthusiastic on the convenience as its younger counterparts, as they more sceptic about the security and privacy that surrounds when using self-service technology.

4.3 The Usage

It is essential to understand the frequency of usage in self-service technology by consumers in the selected countries in order to gain a thorough understanding about consumer behaviour and acceptance of new technology.

4.3.1 Usage of cash and self-service technology – Sri Lanka, India and Australia

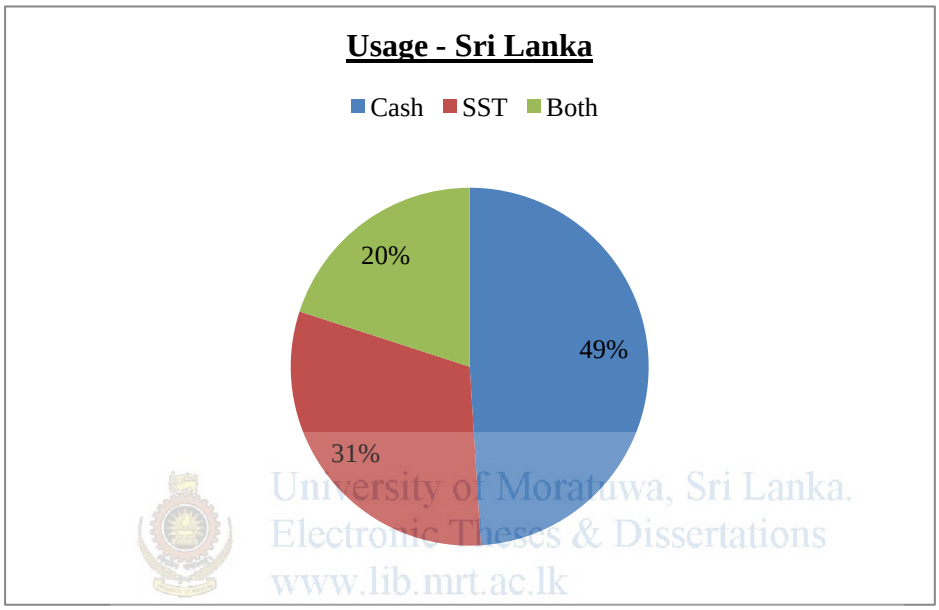


Figure 4. 8 The Usage in Sri Lanka

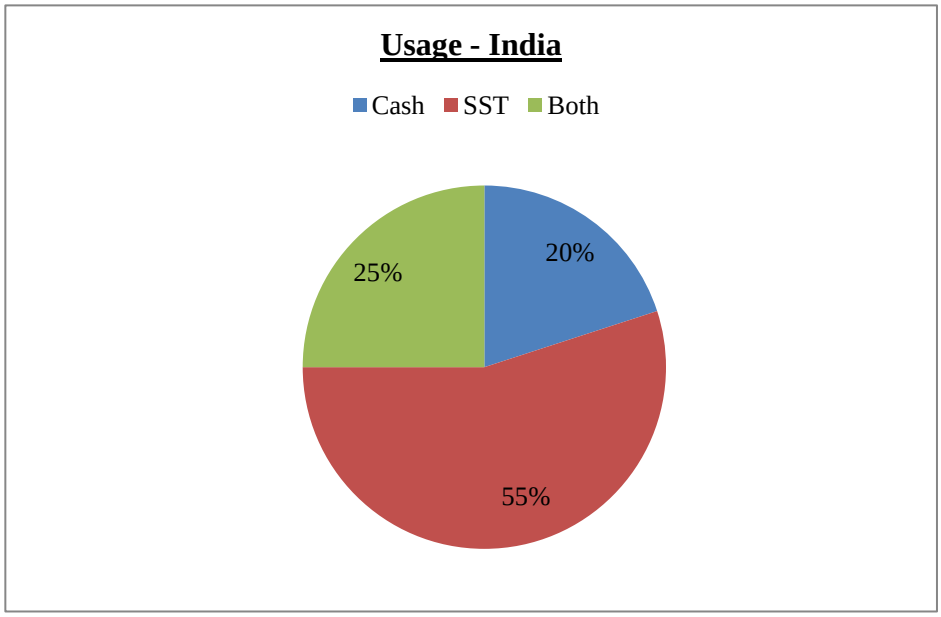


Figure 4. 9 The Usage in India

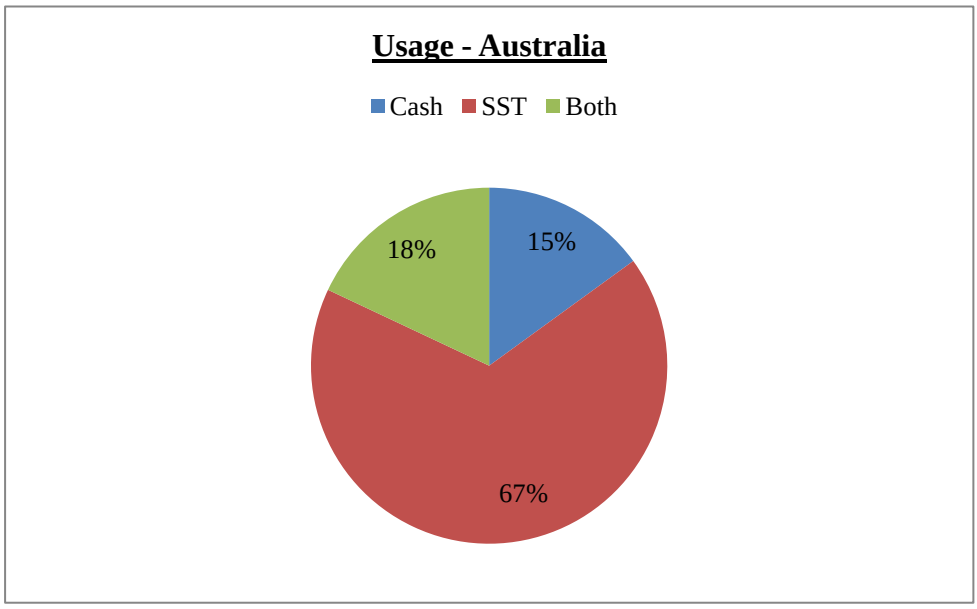


Figure 4. 10 The Usage in Australia

It is evident from the above statistics that persons who prefer the use of cash are diminishing as societies become more industrialised. In Sri Lanka the respondents still prefer the use of cash in their daily activities. Their practices in self-service technology tend to be confined to withdrawal from the ATM instead of using debit or credit cards. As Sri Lanka is still alien to the use of value cards the use of cash further preferred over self-service technology.

India as an economy in transition, shows gradual moving away from use of cash and the segment who use both are as equal to those who use cash alone. This indicates extensive cashless practices are taking place. It is noted that there is a considerable move to use self-service technology unlike in Sri Lanka.

Australia on the other hand, shows completely different situation. The use of cash seems to be lessening along with people using both. The majority of respondents use self-service technologies made available to them from using value cards to self-checkout at supermarkets. They seem to fully embrace the notion of e-wallet in their daily activities.

This is certainly why people in developing countries shows slacking behind when compared to the high usage in developed countries. In the survey conducted for the

purpose of this thesis taking samples from Sri Lanka and Australia what became apparent was majority of respondents in Sri Lanka still prefers use of cash where as it was the opposite response in Australia.

What this indicates is that higher the education level of the society, higher people will rely on digital cash and less on physical cash as with higher levels of education, signals sophistication of work environments that demands convenience and efficacy

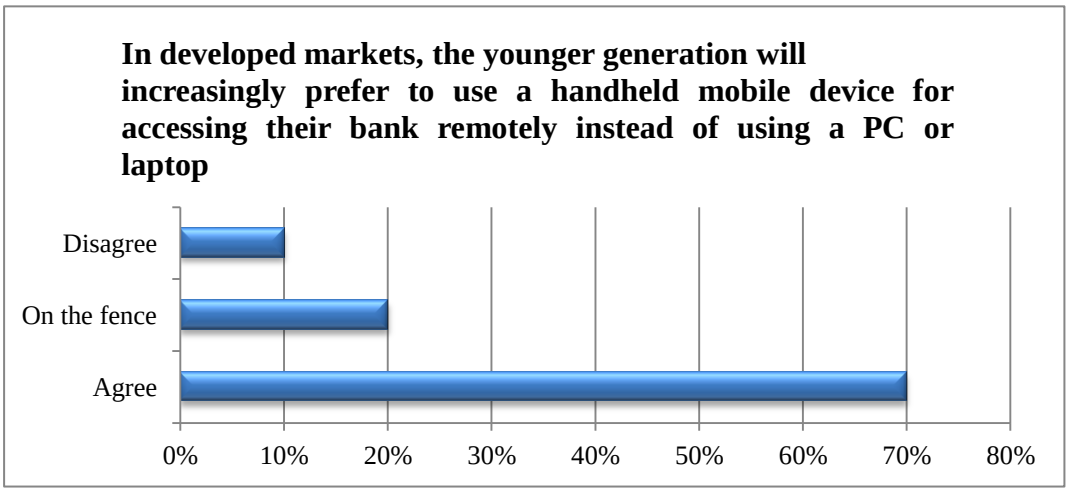
4.2.2 Usage: mobile-money per published surveys

Mobile money is increasingly becoming a versatile concept in almost every aspect of life nowadays. It is gaining momentum and recognition as a convenient and secure means of making transactions in both developing and developed economies. Mobile money coupled with the concept of mobile wallet, portrays the future of self-service technology in a cashless society, where the self-service technology is no longer limited to credit cards or cash. However in fact goes beyond geographic limitations and embracing the users in the remotest corners of the world.

Accordingly mobile money transfers are considered as the most strategically necessary mobile financial service to cater for the future business policies. The survey published by EDC-GSMA Mobile Financial Services Survey 2007 (Zafar & Krugel, 2008) further predicted that 12% of total subscribers in developed markets and 9% in developing markets will make use of domestic money transfers in 2012. This connotes 504 million global consumers. In terms of cross-border remittance it is projected that in 2012, 7% of the subscriber base in developed markets and 4% in developing markets will commence at least one such transaction compiling over 248 million global consumers using mobile cross-border remittance services in 2012.

To substantiate this projection, the study uses statistics published on the EDC Advanced Payment Report 2011 (Edgar, Dunn & Company, 2011) and Payments CM Research – Advanced Payments Report 2009 (Mobile Payments World, 2009) and in order to arrive at solid conclusions.

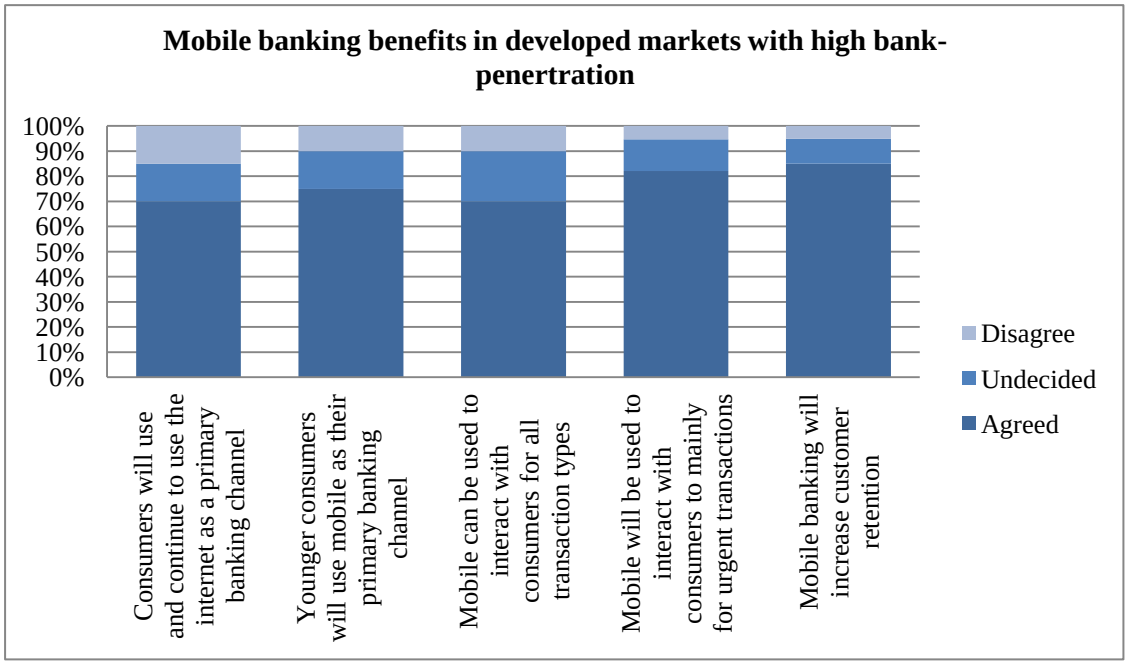
- ***Mobile money in developed economies***



Source: (Mobile Payments World, 2009, p. 9)

Figure 4. 11 Mobile money in developed economies

- Given the trend among young generation, it is a positive step to consider that the mobile money has a lucrative future ahead.
- The same study shows that the main benefit that developed economies aimed to gain through implementation of m-money strategies is customer retention as the mobile solutions will be facilitating users who are already making the demand for mobile-banking and commercial solutions.
- As these users are already accustomed to the usage of internet banking or making purchases online or using self-service options in a store or airport, they manifest an advanced demand to realize the same needs through their mobile phones.
- It is not a question of infrastructure, as one might wonder, however more of a question of convenience. Nor is it a question of banking habits of the customers, as many people in developed economies tend to be quite familiar with banking and other service industries.
- Therefore the need to invest in m-money technologies which in turn advances self-service technology in developed markets fundamentally differs from that of developing markets.
- As the following graph shows, their main perceived benefit is to expand customer base and make profit.



Source: (Mobile Payments World, 2009, p. 20)

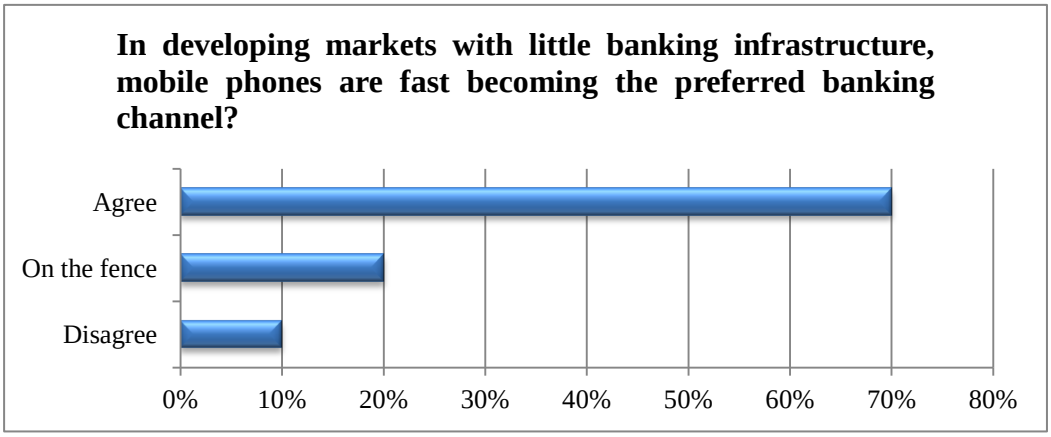
Figure 4. 12 Mobile banking benefits in developed markets

- ***Mobile Money in developing economies***

– The trend towards switching to mobile banking is not merely limited to developed economies.

– The primary reason being that in many developing countries, where there is very minimum banking practices among the citizenry and scarce and under-developed banking infrastructure, mobiles provide the most suitable alternative to tap such un-banked or under-banked sectors of the society.

– Studies shows that mobile phones are fast becoming the preferred banking channel while mobile network operators being recognized as most suited to provide such services.



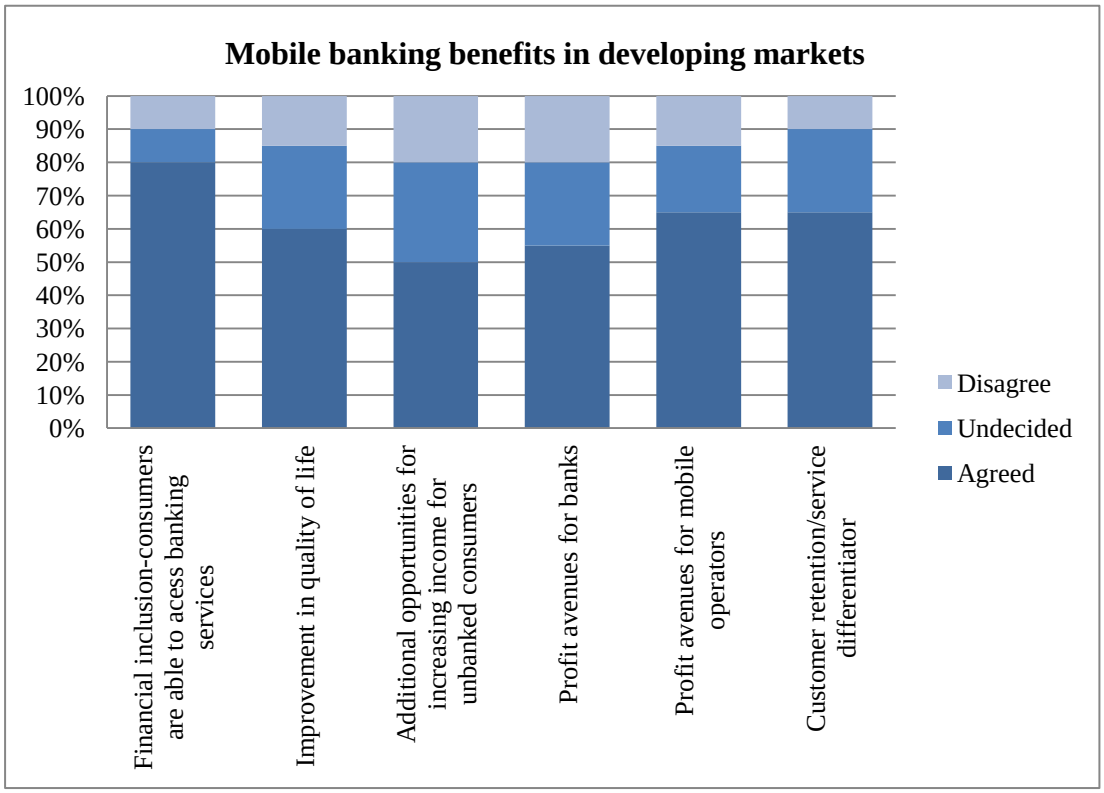
Source: (Mobile Payments World, 2009, p. 10)

Figure 4. 13 Mobile banking in developing markets

- For example, as the *M-Pesa* system in Kenya shows, it is possible for a person to hold a mobile phone even in most remote areas of Kenya even if such person is hardly exposed or accustomed to banks and making transactions through a bank.
- Unlike in developed economies, the question here is about infrastructure, capital available for investment and technological expertise which these economies lack. Therefore, what is essential is to find an alternative that is both cost-effective and convenient.
- As developing countries do not exist in a vacuum, cut-away from rest of the developed world, it is necessary that they also mimic the emerging market trends which they cannot stay oblivious of for long.
- One such trend is self-service technology and the move towards a cashless society. When the world around them is fast moving towards cashless self-service technologies, it becomes important to keep up with such trends.
- With globalisation as developing countries continue to deal with developed countries economically and trade-wise, it becomes necessary to be able to facilitate the sophisticated means of handling transactions, such as e-money facilities and so on.
- Moreover, as countries continue to deal with each other across the internet, such as sending invoices, online tracking of shipments, making cross-border delivers

and purchases, the demand for advanced self-service technology solutions become vital.

- Since most countries lack the capacity to establish such facilities due to capital constraints, mobile solutions provide the best alternative, as they require only investment in producing the required applications.
- There are no ancillary costs related to establishing banks or other service locations physically in order to provide access to such services. However as many people tend to own a mobile phone, which has become a tool of necessity even in developing countries, the question of access will not arise if the customer is provided with services which he can use through his mobile phone.
- Studies shows that access to financial and banking services is the main driving factor in mobile money technologies in developing markets.
- It is not a question of retaining customer base, however a question of how to expand the customer base in amidst capital constraints.
- Therefore, mobile solutions provide the best alternative as the means of access is already being accrued by the customer.
- The following graph provides evidence to this effect.

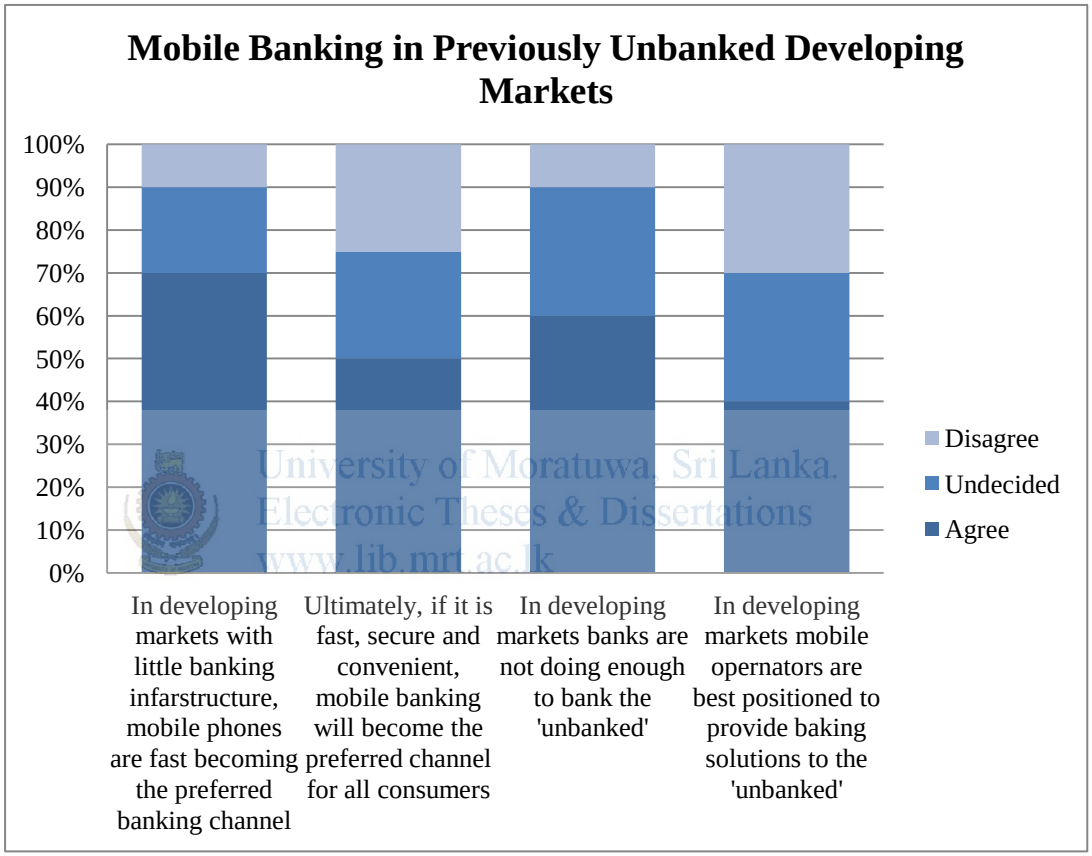


Source: (Mobile Payments World, 2009, p. 26)

Figure 4. 14 Mobile banking benefits in developing markets

- Hence, what remains is investment on the relevant application that is user friendly and secure in order to expand banking practice.
- This understanding will provide future investments by banks and financial institutions to rethink their investment strategies.
- For example, an institution may save up millions in investing in mobile solutions instead of trying to take the bank in the form of a branch to remote geographies.
- What such institutions should try to understand is that, if the aim is to get closer to the customers, and then there is nothing more closely than a mobile phone which is with a customer anytime anywhere.
- As the access-infrastructure is already being provided by the customer himself, the need for branched-banking does not arise.
- This can be further extended to facilitate the idea of branch-less banking, which is often regarded as the optimum level of self-service technology in the banking sector.

– Although this may lead to a social cost in terms of restricting labour market which a developing economy is not quite ready to sustain yet as in a developed market, however, it comes with the benefit of increasing banking practices which can benefit the entire economy as a whole as increased monetary flow is essential for economies to advance.
– The following graph by PaymentsCM Research – Advanced Payments Report 2009, captures statistics to this effect. (Mobile Payments World, 2009)



Source: (Mobile Payments World, 2009, p. 25)

Figure 4. 15 Mobile Banking in Previously Unbanked Developing Markets

4.3 Projection as to the Inception of a Cashless Society

The respondents in three economies namely Sri Lanka, India and Australia, answered the following as to their personal opinion with respect to the creation of completely cashless society in the near future.

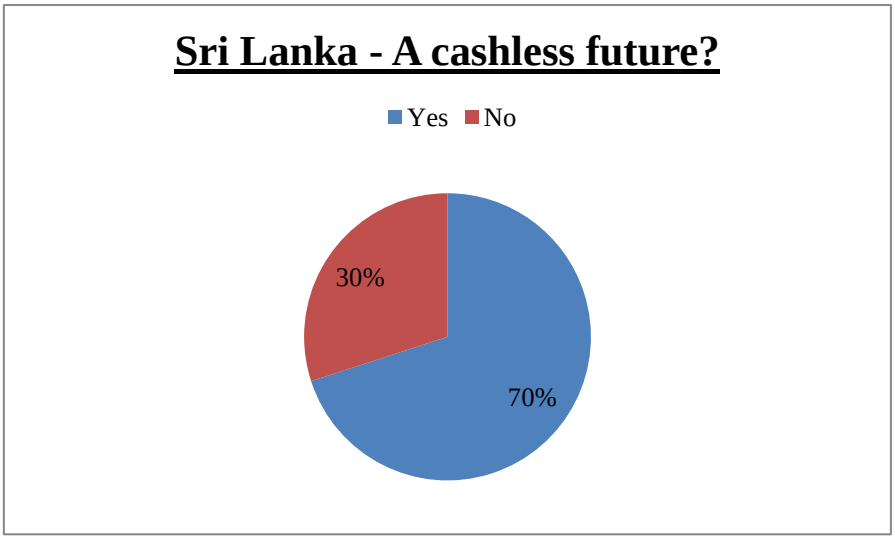


Figure 4. 16 Sri Lanka- a cashless future?

In Sri Lanka the greater portion of respondents believed that with influence from developed economies, the inception of a cashless society would be inevitable.

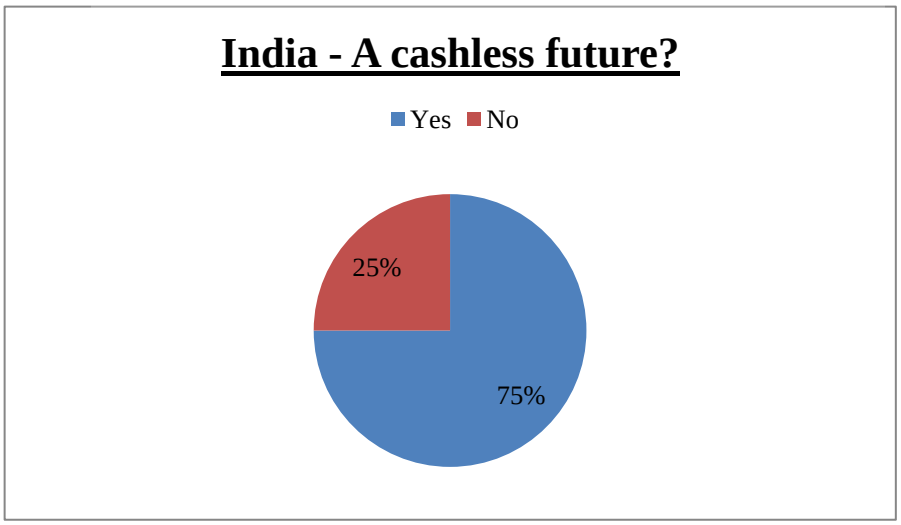


Figure 4. 17 India- a cashless future?

In India over a three-quarter of the responded acknowledged an inevitable cashless society.

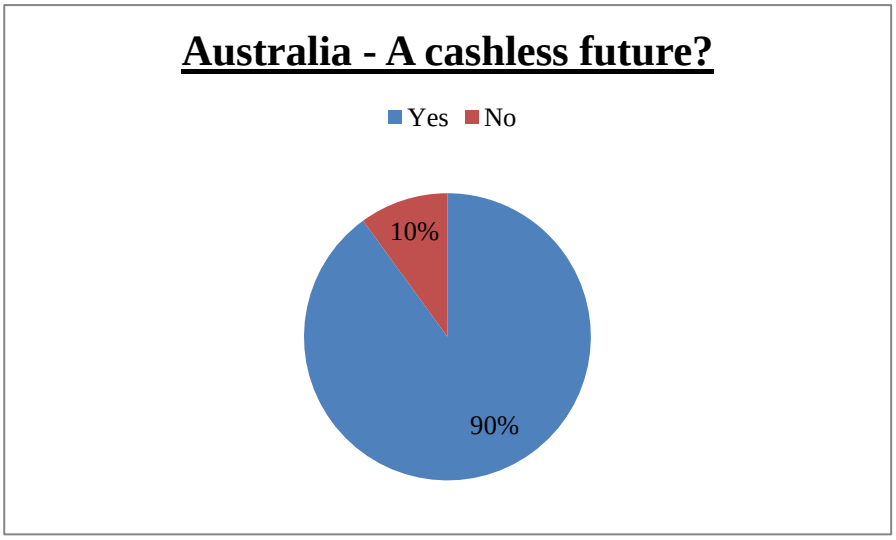


Figure 4. 18 Autralia- a cashless future?

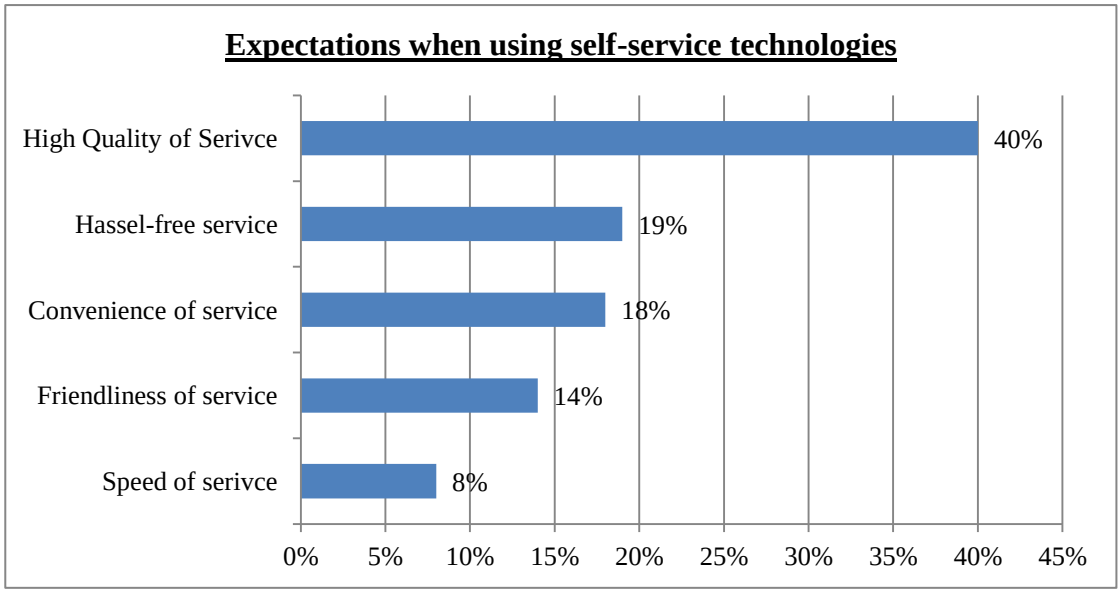
In Australia, there are already manifestations of a cashless society. Therefore many respondents were of the view that a cashless society lies in the very near future and it is only a matter of time that physical use of cash becomes obsolete.

4.4 Published Surveys in USA

For the purpose of this section the studies conducted by third parties are made use of. These include *Mobile Financial Services Study 2009* conducted by Forrester Research Inc. (Mulpuru, 2010) USA and *2009 Self-Service Consumer Survey* conducted by Self-service and Kiosk Association and Networld Alliance LLC. (NetWorld Alliance LLC, 2009)

Expectations when using self-service technology

It is evident that despite the availability of a wide range of self-service technology consumers still value quality more than anything else. The respondents rank "quality of service received" above all other attributes. This indicates that the self-service technology is required to provide better service than what service-personnel can provide.

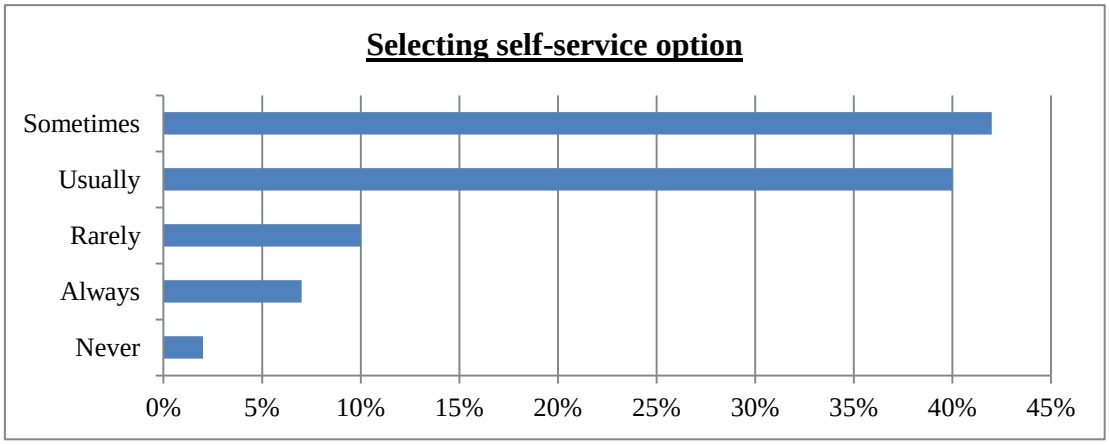


Source: (NetWorld Alliance LLC, 2009, p. 5)

Figure 4. 19 Expectations when using self-service technologies

When you have a choice between full-service provided by a person or using a self-service device, how often do you choose the self-service option?

Ten years ago, the answers to this question would have been very different. However today, the overwhelming majority almost 90 percent uses self-service "sometimes" or more often. A tiny holdout of two percent refuses to go the self-service route. This is made possible with the wide expansion in self-service technology outlets like kiosks, internet and mobile solutions across every aspect of daily lives in many developed countries. This further substantiates the writer's claim that technological developments in the area of self-service and digital-money options have infiltrated every aspect of human behaviour.

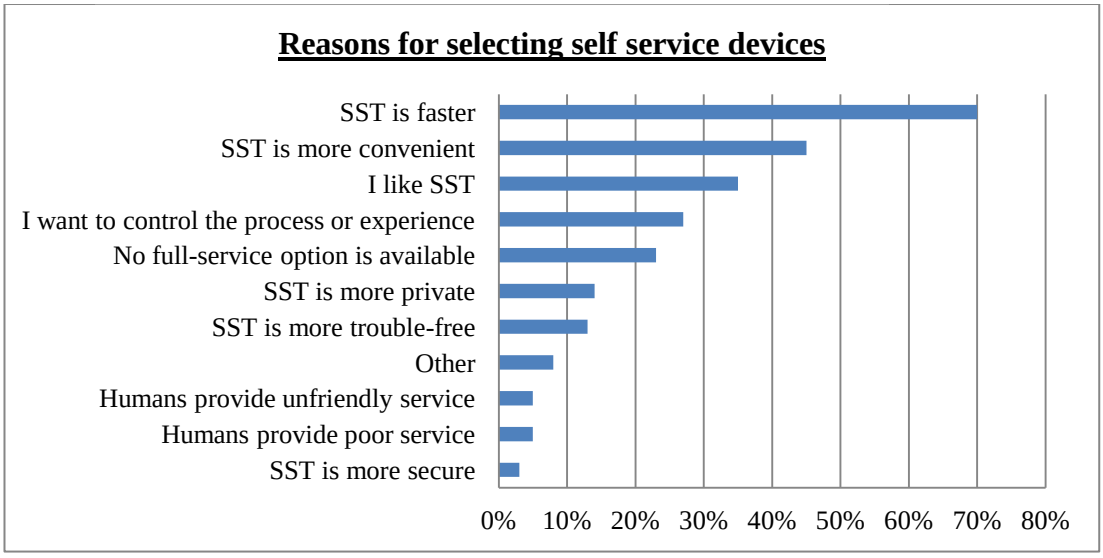


Source: (NetWorld Alliance LLC, 2009, p. 6)

Figure 4. 20 Selecting self-service option

In general, when using a self-service device, what are the top three reasons for doing so?

The main reasons as observed in both above studies was that self-service technology is faster, convenient than traditional means of conducting transactions or businesses. Moreover, young generations tend to prefer the innovative means of doing transactions as value cards and debit/credit cards provide them with much more mobility and flexibility.



Source: (Mobile Payments World, 2009, p. 9)

Figure 4. 21 Reasons for selecting self service devices

4.5 Summary

The surveys both conducted for the purpose of this study and the published surveys conclude that the societies, both developing and developed alike are moving towards the implementation of a cashless society with the help of advance self-service technological options. They further promotes the idea that they will have considerable benefits not only to developed countries as it is usually believed, but will deliver very beneficial financial services to rural developing sectors of the world.

CHAPTER 5

4.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In considering the plethora of literature and the surveys conducted with respect to this study, it is evident that advancement in self-service technology will be an inductive factor in the creation of a cashless society. In fact it is submitted that the establishment of a cashless society will begin from the expansion access to self-service technology.

It is quite obvious that there are many arguments against and favour of this dissertation. Finally, the consumer decides moving through the self service technology into a cashless society, provided the following issues are addressed by service providers.

- Technology & Innovation
- Security & Privacy
- Reliability
- Accessibility
- Convenience
- Enhanced Services

We all understand that during the last two decades we have seen several technological resolutions. The 1980's introduced the Personal Computer, in the 1990's we saw the Internet and the 2000's the iPod. The pace at which consumers adapt to new technologies is also increasing. The television took three decades to become accessible whilst the iPod took only about three months.

Today the digital generation is rapidly re-landscaping markets from music to travel to fashion to entertainment to banking, in short everything. As we see the world is run by computers in today's society, it was only a matter of time for this to be transferred into the digital economy. We can very well see that waiting in line at a

bank branch is now a thing of past, after ATMs and internet banking have entered the market shore and this has made life more convenient. Therefore, it is concluded that self-service will be a prominent factor in the future where the physical currency we know today will change its appearance to digits displayed on an interactive LCD screen.

5.2 Recommendations

This study has highlighted a major difference in attitudes to the emerging 'self-service' and 'mobile' technologies in the developed and developing worlds: while the developed world seems highly enamoured by the convenience flowing from the two technologies, the developing world, on the other hand, retains its nagging fears over security and long-term reliability being sacrificed in the quest for convenience. In the light of that reality, the following recommendations seem called for:

- A sound legal framework should be in place to address the issue of security that acts as a major constraint in the minds of the majority of consumers in the developing world. Therefore, in meeting this elementary customer-expectation, every industry will find itself also complying with the increased levels of security demanded of the providers by the regulatory authorities. This can only result in a win-win situation for both customer and the service provider alike.

- Moreover, what ideally compliments service quality is the promise of enhanced security in all self-service options. Hence we recommend that it should be standard practice for all commercial banks and financial institutions to continuously keep security policies under review and, where necessary, strengthen the security control of e-banking options they make available to their customers.

- In adapting to the changes taking place, and as was clear from the study, we recommend that self-service technology providers take all necessary steps to fully understand the relationship between customer interactions and e-banking

services to help them and the banks in concert to offer a far better service to customers. In that respect customer-responses and regular feedback-requests will provide practical and useful information which can enable institutions to improve existing e-banking operations and address without delay issues raised in the feedback. Although it may be a more challenging task to instantly respond to online enquiries and service requests from customers, it must be recognised as one area worth investing in and providing for on-going research and training to help sharpen response-time.

– As it is already obvious, the kiosk-concept has quietly taken on the role of currently being the main interface for the self-service check-in process, thus evolving into a tool for providing a whole range of customer services. It is therefore recommended that customer service developers need to review in-depth every aspect of the service experience and rid themselves of traditional beliefs that some transactions or processes can never be automated. The possibilities are endless, and it is necessary to start off in a positive frame of mind. Concurrently, web applications that are also compatible with mobile devices need to be developed to compliment the use of mobiles and iPads as they gain popularity in this area of use. Consequently, online and mobile banking, supported by the expansion of broadband communication access, is already beyond the mere mainstream. Mobile devices and similar applications, with their 'always-on' characteristic, offer a hitherto unheard of level of convenience; they also represent the biggest ever opportunity for banks to successfully reach-and-retain a mobile and global consumer-base.

– With respect to projected future trends, it is submitted that as these developments allow customers to gain greater control over their banking experience, accessing pertinent information from the location of their choice and at whatever times convenient to them, it is recommended that banks consider as vital the importance of the quality of service they continue to provide, as that will prove to be the key to attracting new customers. Moreover, Software-as-a-service (SaaS) will gain greater importance in providing organizations with cost-effective,

secure applications available round-the-clock for online and mobile channels usage via hosting. Software-as-a-service will enable banks to keep pace with the latest innovations and consumer needs while executing transactions at a fraction of a bank's earlier start-up investment cost. Additionally, Investment in Near-field communications technologies will help merge the experiences of branch banking, online banking, mobile banking and beyond, into the retail environment as a payment device to give customers a wholesome retail banking experience.

5.3 Further Research

This dissertation provides the following avenues for further research with regard to the future of self-service in a cashless society.

1. Regulation of cross-border transactions made through the use of digital-money. Particularly where more than one country is involved in a single transaction, and deciding which country's legal framework will govern such transaction.

2. The possibility of Mobile Network Operators, taking over the role of banking and/or other financial institutions as they facilitate money transfers through their networks.

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ANNEXURE 1

Survey / Questionnaire

1) Full Name

2) Permanent Address

3) Present Address

4) Date of Birth 5) Age ☐ yrs

6) Gender Male ☐ Female ☐

7) Employment Self Employment ☐ Other ☐

8) Profession Student : School (Secondary/High school) ☐
Undergaduate Studies ☐
Postgraduate ☐
Other (Please specify) ☐

9) Prefered method of settling the bills and/or making payments for all types of goods & services

(a) Via Self service Technology* (SST) ☐ Swipe On-line ☐

(b) Via Physical Cash ☐

* SST includes: use of internet/ mobile / smart cards / kiosks etc.

10) If your answer is for SST in respect of question No.9, please give the additional information as your concern for

Privacy ☐
Security ☐
Convenience ☐
Reliability ☐

11) Finally, do you think a cashless society can come into place as a result of further developments in the area of SST?

Agreed ☐ Not Agreed ☐

Date of survey carried out ☐

Thank you for taking your time to fill-in this survey.

The information you have provided will strictly be used for academic purposes and publication of such information will only be related to the same.

For the purpose of: MBA Thesis Survey on Project Management - University of Moratuwa, Sri Lanka