FACTORS AFFECTING THE EFFICIENCY OF IT GOVERNANCE IN SRI LANKAN PAYMENT CARD INDUSTRY

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the Masters Dissertation under my supervision.

Signature of supervisor: Date:

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ABSTRACT

The role of money as the major medium of exchange has been rapidly changing over time and customers value the ease, flexibility, security, and convenience that cashless payment methods provide.

Today payment card industry (PCI) is highly technical and information oriented. IT plays a major role in this industry with the main objectives of secure payments with customer satisfaction. On the other hand, IT is a key strategic weapon of the player that can be used to increase the overall organization strategic business objective. However, use of IT is not sufficient to face the challenges, problems, and competition. IT should be properly and carefully governed to align people, processes, and technology to meet the overall organizational strategic objectives. This will enable the PCI players to become the top of the industry gaining the competitive advantage over the other rivals. There is a global expansion and a demand for IT governance in PCI. Sri Lanka is also in the early stage of adapting to IT governance; therefore, this is an important research area at this time.

The purpose of this research is to identify the main factors which affect to the efficiency of IT Governance usage in PCI and to analyze how they contribute to making the industry more attractive, efficient and effective. In this research, a conceptual framework is proposed to capture the impact on the perceived user satisfaction and overall organization performance in the aspect of IT Governance adaptation in Technology, Organization, and Environmental Context. Finally, research analysis and findings show that effective IT governance is essential in Sri Lankan payment card business to increase the user satisfaction and overall organization performance. More attention needs to be paid for domain expert's availability, compliance of rules and regulations, technology adaptation and obtaining support from 3rd party vendors. Research findings show that there is a big potential and an opportunity to effective IT governance in Sri Lankan payment card industry. It also discusses the identified recommendations to improve IT Governance to increase the PCI user satisfaction and overall organization performances.

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LIST OF ABBREVIATIONS

Abbreviation	Description
ACH	Automated Clearinghouse
AML	Anti-Money Laundering
ATM	Automated Teller Machine
BOC	Bank of Ceylon
CAS	Common Automated Teller Machine Switch
CBSL	Central Bank of Sri Lanka
CCAPS	Common Card and Payment Switch
CEO	Chief Executive Officer
CIO	Chief Information Officer
COM	Commercial Bank of Ceylon PLC
DOI	The Diffusion on Innovation Framework
EDI	Electronic Data Interchange
EFT	Electronic Fund Transfer
EMV	Europay, MasterCard, and Visa Stand
GDP	Gross Domestic Product
GRC	Governance, Risk Management, and Compliance
HNB	Hatton National Bank PL
HR	Human Resource
HSBC	The Hongkong and Shanghai Banking Corporation Ltd.
ICT	Information Communication Technology
ISO	International Organization for Standardization
IS	Information System
IT	Information Technology
ITDBS	Information Technology Driven Banking Services
ITIL	Information Technology Infrastructure Library
JCB	Japan Credit Bureau
KPI	Key Performance Indicator
LCB	Licensed Commercial Bank

LCPL	The LankaClear (Pvt) Ltd
LSB	Licensed Specialized Bank
MC	MasterCard
MIT	Management of Information Technology
NFC	Near Field Communication
NTB	Nations Trust Bank PLC
PB	People's Bank
PC	Payment Card
PCI	The Payment Card Industry
PCI DSS	Payment Card Industry Data Security Standard
PCS	The Payment Card System
PMP	Project Management Professional
POS	Point of Sales
QoS	Quality of Service
ROA	Return on Assets
SLA	Service Level Agreement
SAM	Sampath Bank PLC
SEY	Seylan Bank PLC
SMS	Short Message Service
TOE	Technology, organization, and environment

LIST OF APPENDICES

CHAPTER 1 - INTRODUCTION

1.1 Chapter Overview

Debit and credit cards have become indispensable to consumers around the world. Customers value the ease, flexibility, and convenience that cashless payment methods provide. Presenting the customers with various payment options does not only help increase their satisfaction, it also offers invaluable benefits to the merchant which are critical to enabling success. Reasons to attract using payment cards are higher customer satisfaction, large customer base, image boost, competitive edge, easy handling and transparent transactions, increased service levels, guaranteed payments, time efficient, improved security and protection. Today payment card industry is highly technical and information oriented industry. Information Technology plays a major role in this industry with the main objectives of secure payments with customer satisfaction. To accomplish these objectives Information Technology involvements is comprehensively high. However, in the solicitation of IT there are many operational and management issues. This chapter describes brief introduction, motivations, and objectives of the research topic and how the research is going to be conducted.

1.2 The Board Research Area and Where the Research Topic Fits

Although to the untrained eye the processing of debit and credit card payments can seem like a straightforward transaction, there is actually a lot of unseen work that goes on. It is, in fact, a surprisingly convoluted, but reassuringly thorough, process. However, given the amounts of money that change hands every day through card payment schemes, this should not really come as a major surprise.
The number of transactions made using plastic has grown markedly in the last few years and most experts feel that this trend is set to continue [1].

Card Process background: The role of money as the major medium of exchange has been rapidly changing over time within the knowledge economy, where needs are greatly complicated, and people largely consider security and convenience in

fulfilling them. Plastic credit cards have now replaced notes, coins and become a widely used source of convenient credit for restaurants, hotels, online shopping, gasoline stations, grocery stores and medical care etc. Basically, payment card industry (PCI) denotes the debit, credit, prepaid, e-purse, ATM, POS cards and associated businesses [1]. The five leaders in the today's industry are Visa International, MasterCard, American Express, Discover, and Diner's Club [1]**.** With the current economic context, every financial institute gives high priority to payment card products and services.

Payment cards provide an alternative method to cash and checks for making transactions. In many cases, they also provide lines of credit and some other services or benefits. The research paper mainly focuses on four major payment card providers, namely Visa, MasterCard, Discover and American Express. Visa and MasterCard represent cooperate banks set up in the payment card industry as refer to the associations. Member banks issue cards to consumers and acquire merchants who are willing to accept the association's payment card services [44]. In any given exchange, the associate offered payment card product and especially services go from merchant to consumers where the consumer bill to receive products, service from the issuing bank. The amount the consumer pay is transferred to the acquiring bank and then transfer to the merchant. This process involves a merchant discount payment process to the acquiring bank and a payment process of interchange fee from acquiring bank to the issuing bank. With the define business model, the card associations collect clearing fee for each of these transactions and an additional transaction fee from both involved sides (issuer, acquire). The card associations responsible for setting the interchange fees. Member banks set their terms and conditions for consumers, merchant discounts and other value additions such as reward programs [44]. Adding the business process complexity and reliance on a technical orient processes makes payment card industry crucial to carry out in more effective and efficient manner. The standard business process and business rules can slightly differ by the region, products or services, the nature of the business etc.

Payment Card Industry Key Participants

A simple card transaction between a cardholder and a merchant involves several players as shown in Figure 1.1

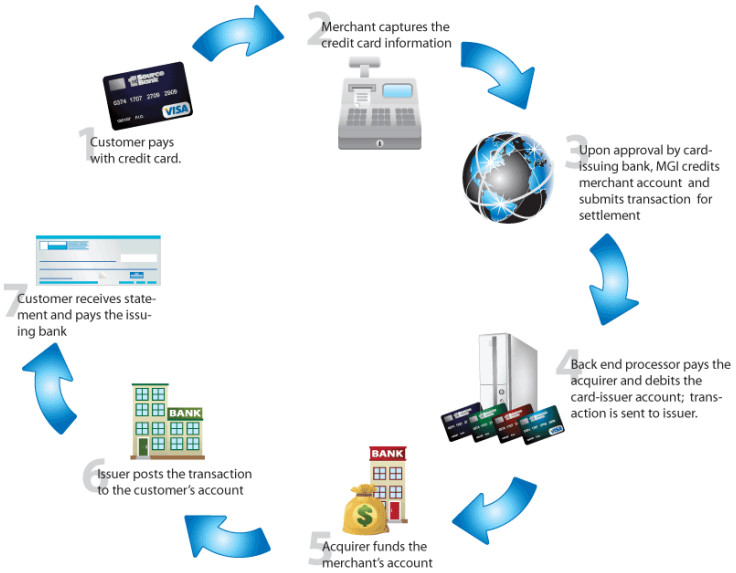

Figure 1.1: Key Participants of Payment Card Industry

Source: Capgemini Analysis [44]

- Card acquirers: The Merchant's Bank
- Card processors: Third party organization that aids in card authorization and settlement process
- Card issuers: The cardholder's bank who issues the card and maintains the customer's accounts

Information technology is a key strategic weapon that can be used in the payment card industry. However, use of Information technology is not sufficient to face the challenges, problems, and competition. Information technology should be properly and carefully governed to position a business at the top of the industry gaining a competitive advantage over the other rivals.

Most organizations use IT governance to execute their corporate strategy in efficiently and effectively. Therefore, there is a global expansion and demand for IT governance. Sri Lanka is also in the early stage of adapting to IT governance, therefore this is an important research area at this time. To improve IT governance of Sri Lankan PCI, it is very important to identify weak areas or unavailable aspects of IT governance. After identifying these weak areas, it is possible to propose IT governance mechanisms to improve them.

What is IT Governance?

Information technology plays a major role in current organizations. Information technology should be efficiently and effectively governed to achieve strategic goals of an organization delivering the business value [9]. IT Governance has several definitions. There are few related definitions have been discussed in Chapter 2. But most significant definition was "IT Governance is structure to help align IT strategy with business strategy by considering the Strategic alignment, Value delivery, Resource management, Risk management, Performance measures" [8].

IT governance concept has been defined by many experts and institutes in different ways. Different IT governance perspectives, frameworks, and standards have been introduced [45]. Hence, payment card industry along with IT governance is the best areas for new researches to conduct their research. They can provide better solutions specific to the problem areas. In the Sri Lankan context, the lack of studies was conducted specifically in these areas.

1.3 Motivation

Presently payment card products, services, and related facilities are moving towards the non-cash transaction platform. As a result, there is a considerable attraction on payment card usage within the last few decades including Sri Lankan market. Even though industry pays more attention to prevent vulnerabilities and security in terms of business process and technology; but there are certain areas which have given minimum attention to operational and management controls where it generates gaps.

Even with these gaps, Payment Card Industry plays a significant role to control the damages and minimize or prevent losses.

In the context of Sri Lankan payment card industry, mainly these gaps exist in effective Information Technology governance in the mission of aligning people, process, and technology to achieve the defined organizational strategic business objectives. In terms of governance of Information Technology in the payment card industry that can make an impact are lack of proper procurement standards getting IT services and products, adaptation of rapidly changing technology, lack of in-house domain experts.

Meeting the industry accepted functional requirements of payment card business is another aspect of information technology management. This includes identification, mitigation of risk, implementing and maintaining security standards, 365×24 availability etc.

IT governance is another helping hand to align the payment card business with the overall organization strategy. Effective IT governance enables the organization to emphasize new market opportunities while introducing novel methods to grab the competitive market. IT Governance in Sri Lankan payment card industry comprises of a number of challenges. In order to overcome these challenges, it is crucial to identify the main factors that are affecting the governance of information technology and ways to overcome the identified challenges.

By addressing these factors Sri Lankan payment card industry can meet the world-class standard by offering better products, services and meeting the client satisfaction.

1.4 Problem Statement

Sri Lankan payment card industry is comparatively growing and emerging industry. Many financial institutions are engaged in this industry by providing new services, products to their customers as acquirers, issuers or both acquiring and issuing. The advanced technology and IT play a major role in the industry in terms of current

business and business expansion. Effective IT governance is a critical tool for leaders of the payment card industry to align their organizations and efforts to support business strategy and create shareholder value. Given the rapidly changing and evolving technology options that confront CIOs and business leaders, making sure the right decisions are being made about investments in IT is an essential priority. But “Leaders of the payment card industry do not seem to have a proper address the inefficiency of IT Governance in Sri Lankan Payment Card Industry”.

1.5 Research Question

In order to solve above issue, it is necessary to identify the factors that affect the efficiency of Information Technology governance in Sri Lankan payment card industry. Therefore, the research question is formulated as “What are the factors that affect the efficiency of information technology governance in Sri Lankan payment card Industry?”

1.6 Objectives of the Research

The foremost purpose of this research study is to analyze, the most contributing factors that affect the efficiency of information technology governance in Sri Lankan payment card Industry. This will be harvested by analyzing the existing business process and identify possible applicable IT Governance measurements. Therefore this research is mainly focused on to:

- Identify the technological, organizational and environmental contexts vise main factors that affecting efficient IT governance in Sri Lankan payment card industry
- Identify main areas which measure the efficiency of IT Governance in the Sri Lankan payment card industry
- Analyze the existing behaviors of the selected factors and identify their impact on the efficacy of IT governance

- Analyze ways of obtaining a competitive advantage in the payment card industry with the efficiency of IT governance to meet the organization's strategic business objectives

1.7 Literature Review

Chapter 2 contains a literature review which was carried out for collating, reviewing and evaluation of existing knowledge, academic literature on IT Governance in Payment Card Industry. This review was done using literatures that are written around last 15 years. In order to address the Research Question and Objectives, various literatures were discussed around different themes. Different ideas, knowledge were compared and contrasted in order to identify both critical issues and gaps that need to be addressed through the define Research Question. Most of the reviewed literature focus more on the Payment Card Industry in the aspect of implementing security standard use of information technology and maintain the required security compliances. In terms of information technology governance, most of the literature are generally discussed on IT Governance in the common institutions' context, not from the aspect of Payment Card Industry.

1.8 Research Methodology and Design

Chapter 3 discuss overall Research Methodology that was conducted to address the Research Question. The industry overview is included in Section 3.5. Rationales and justifications are mentioned for selecting the frameworks, data collection tools for primary and secondary research, the limitation that faced and plan of data analysis, etc. Interview questions were designed as semi-structured interview questions, while face to face, telephony, and focus group interviews were carried out**.**

1.9 Research Findings

Chapter 4 discuss the findings that are drawn from data collected during the data collection methods. These data were collected using both quantitative and qualitative

methods. Analysis's of the findings are organized around a set of themes that are designed around themes of Literature Review, Research Question and along with Research Objectives. The expected outcome of the research is to identify the gaps in IT Governance in Sri Lankan Payment Card Industry, identify the areas in the PCI which can effectively manage with the help of information technology, propose possible applicable IT Governance strategies to improve the Sri Lankan payment card business and help of information technology to identify the source of competitive advantages.

1.10 Conclusion

Chapter 6 builds on the findings analyzed in Chapter 5 with the view of themes that are discussed in Chapter 2 and 3 to address the Research Question and its Objectives mention above.

IT Governance is not a new concept to the world, it is considered one of the strategic element in today's business world. But as mentioned in Section 2.1 there is a limited analysis regarding the application of IT Governance in Payment Card Industry as well as in local payment card business. Chapter 6 outlines the final conclusions that are drawn from analysis of the findings and discuss the possible recommendation with the help of academic reviews in Chapter 2.

Finally, in conclusion, there is a big potential/ opportunity to effective IT governance in Sri Lankan payment card industry. This will provide various ways to gain user satisfaction, overall organization performance, and competitive advantages in terms of innovation, profitability, and effectiveness.

It also highlights main challenges that face to achieve effective IT governance as knowledge gap and domain expertise availability both in technical and management capacity, adaption of best practices and frameworks in IT governance, procurement, due diligence of 3rd party vendors and consultants and their support levels, legal and regulatory framework in Sri Lanka and gaps in handling the payment card incidents and technology adaptation processes with defined policies, procedures and guidelines.

Finally, it discusses some gaps between academic review and the research, unanswered research areas due to limitations in Section 3.9 and future research opportunities.

CHAPTER 2 - LITERATURE REVIEW

2.1 Introduction

The role of money as the major medium of exchange has been rapidly changing over time within the knowledge economy, where needs are greatly complicated and people largely consider security and convenience in fulfilling them. Plastic payment cards have now replaced notes and coins, and also become widely used source of convenient credit for in various locations such as restaurants, hotels, online shopping, gasoline stations, grocery stores and medical care etc. Although cash is still dominant across many global/local markets, payment cards continue to play an important role in individual's banking. The five leaders in the credit card industry today, are Visa International, MasterCard, American Express, Discover, and Diner's Club.

Payment card industry is highly technical and business oriented. Hence it must go in parallel and equally balance because these are the most important aspects in there. It is not sustainable to focus on technology without strategically considering the progress on the business side. It is vital to incorporate technology into the operations/business aspect of payment card industry to sustain in the competitive environment.

The purpose of this section is to analyze how information technology governance in payment card industry in order to make the industry more attractive, efficient and effective. The main aim of reviewing these literature is to access the current understanding of themes related to addressing the research question "Factors affecting the efficiency of IT governance in Sri Lankan payment card industry". There are a number of literature that are published related to IT applications and management in various business areas. And also there are many research discussions around payment card business and its possible strategies, even though the limited number of literature are available around the governance of IT in payment card industry. This analysis is discussed about literature that published around last 15 years.

This literature review will provide the reader the main components of payment card industry that needs effective governance of information technology, ways and issues in governing IT in payment card industry, practicing and ways of gain competitive advantage while governing information technology.

This literature review will focus around following main themes which will discuss IT governance in payment card industry in detail by definitions, practical applications of knowledge and limitations, gaps around them. The main themes are as follows

1. Understanding payment card industry global and local context.
2. Credit and Debit card business models and local business context.
3. Understanding IT Governance concept and identify the main focusing areas for efficient governance.
4. Role of Information technology and information technology governance in payment card industry.
5. Study the frameworks related to information technology governance in payment card industry to identify the affected factors.

2.2 Payment Card Industry

The payment card industry comprises all organizational entities which store, process and transmit cardholders data mainly debit and credit cards. Payment Card Industry Security Standards Council guides the industry to maintain the industry standards. Recognize brands in the industry include American Express, Discover Financial Services, Japan Credit Bureau, MasterCard Worldwide and Visa International. Most of the companies use member banks that connect, accept transactions from the card brands.

Debit and credit card systems those run by Visa and MasterCard have increased controversy in numerous countries. Both merchants and public authorities have initiated regulatory and legal proceedings, with varying success. Many research papers explain that since the 1980s, Visa and MasterCard, the bank-controlled credit card associations that together account for approximately 70 percent of today's credit card market, have been able to control the use of and access to their networks to the

advantage of their bank member [1]. Discussion also mentions that credit card industry has been changing in the ways of some local authorities are now large enough to exert their own leverage, legal defeats have impeded the ability of credit card associations to control the market, and some participants have developed new arrangements and alliances that may be an initiation point to further changes in the industry.

In [2], P. Sushma discusses different types of payment cards namely as credit cards, smart cards, charge cards, Amex cards, debit cards, Master and Visa cards, ATM cards. The paper defines credit card as a plastic card issued to a cardholder with a credit limit that can be used to purchase goods and services on credit or obtain cash advances. It also highlights the main differences between a debit and credit card as credit cards provide overdraft facility and the customer can purchase over and above the amount available in his account and thus regarded as the authentic payment tool.

2.2.1 Competition in Payment Card Industry

In [3], T. Rochet discussed the recent development in debit card industry as the price of the product is extracted directly from the consumer bank account. It also highlights that many banks now branding their automated teller machine (ATM) cards with the Visa or MasterCard logo, in which case the consumer can use the card to make purchases at all accepting merchants. In many cases, banks replaced ATM cards with debit cards without an explicit choice on the part of the consumer. The paper highlights main aspect that Merchants' consideration is accepting a payment card is that acceptance may attract more consumers but it means consumers may choose a payment method that is expensive for the merchant.

The role of a consumer in the debit card market the terms they receive can vary widely within card networks and play a major role in their choice. The market is very competitive with annual service fees, their introductory and long-term interest rate, whether they are credit or charge cards, their spending limit additional benefits such as rental car insurance and in various' rewards 'given for usage etc. [3]. It also highlights in order to gain the competitive advantage the business need to identify the personalize customer situation and offer products and services.

With the above mention elements in the payment card industry, it is important to discuss the competition in the payment card industry. In [4], highlights that credit cards have become the Universal in society, credit as of 2011 [4], seventy-seven percent of US adults owned at least one credit card, with a total of 1.4 billion cards in circulation. The average cardholder owned 7.7 cards and uses a credit card 119 times a year charging an average of $88 per transaction or $10,500 annually [4]. By the end of 2011, with the unfolding of America's economic crisis, the average household credit card debt reached $16,420 [4].

With more exposure of credit cards and their ease of access have given consumers increased opportunities for making credit purchases. And it also highlights while many consumers are able to use credit cards wisely, others seem to be unable to control their spending habits. Use of credit card become social concerns, the use of credit cards in society has affected not only traditional consumers, but also vulnerable groups, such as college students, senior citizens, and disabled citizens. Along with technology and the expansion of the Internet, they became an appealing demographic group for credit card companies and financial institutions for a variety of reasons.

In [5], Daniel discusses a different aspect of credit card competition by highlighting changes in the industry as lower prices and smaller profits, increased price response, consolidation, dynamics, and risk-based pricing. Lower markups, decreased profitability, and greater price response point to an increase in the competitiveness of credit card lending.

With the Sri Lankan new development era, payment card industry plays an important role. This responsibility is in terms of attractive transaction methods and new technology- enabled payment card infrastructure. In [6], N. Wijeratne highlights that introduction of payment card to the country was done around 1986 by Sampath Bank, the first experience of Electronic payment system to Sri Lankans by introducing Automated Teller Machine (ATMs) in 1986, whereby Sampath Bank proprietary ATM cardholders were able to withdraw cash from ATMs at any time of the day without visiting the bank by using cards at ATM machines.

Introduction of electronic fund transfer of POS (EFTPOS) to Sri Lankan context happened in 1994 [6], payment cardholders were able to use their cards at POS machines installed at the merchant outlets, which enable the merchant to obtain authorizations electronically doing away with the manual authorization process which was cumbersome for the merchant and time consuming for the cardholders.

All the major card brands are in circulation in the country i.e. Visa, Master and Amex and almost all the major global payment card brands are also accepted in the country through the Electronic data capture machine/point of sales machines, which are connected to all major global payment card brand system through the respective networks of these organizations for the purpose of authorization, clearing and settlement processes [6].

In[6], the paper also highlights the payment card volume growth in the country, which was dipped during global economic downturn shows increase especially due to demand of credit cards by bank customers in North and East provinces with the dawn of peace in these areas and card volumes have reached 80,0000 as at June 2011 ,which augurs well for the credit card issuers.

2.2.2 Credit Cards in Sri Lanka

Credit cards were first introduced to Sri Lanka in 1989 and since then the use of credit cards has increased gradually due to the promotional activities of card issuers and the features that have been introduced to credit cards to meet various payment requirements of cardholders. Figure 2.1 illustrated how its increase during the consecutive three years from 2012. During the fourth quarter of 2014[7], for the first time, a nonbank financial institution was issued with a license for credit card business. Accordingly, 13 credit card issuers licensed by CBSL were engaged in the credit card business at the end of the quarter. The total number of credit cards in use exceeded 1 million and recorded an increase of 8.5 percent at end of the fourth quarter of 2014 in comparison to the same quarter of 2013 [7]. According to the Figure 2.2, volume and value of credit card transactions recorded an increase of 8.4 percent and 11.8 percent, respectively, during the fourth quarter of 2014 [7] in comparison to the same quarter of 2013 reflecting the popularity of the usage of

credit cards as a mode of payment. Figure 2.3 illustrated that the average number of transactions per credit card was at 6.1 in the fourth quarter of 2014 continuing the increasing trend prevailed during the fourth quarter of 2014 [7].

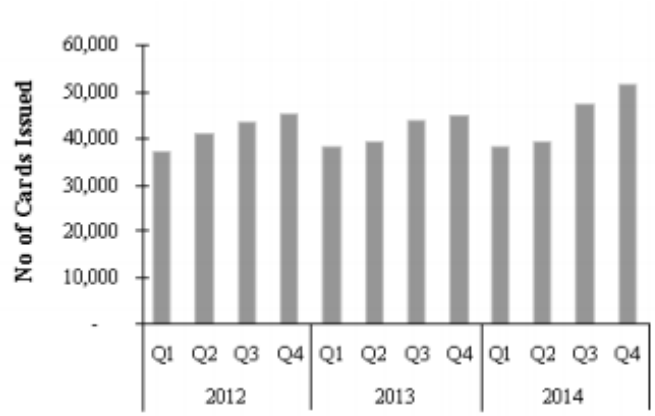

Figure 2.1: Total number of new credit cards issued (during the period) [7]

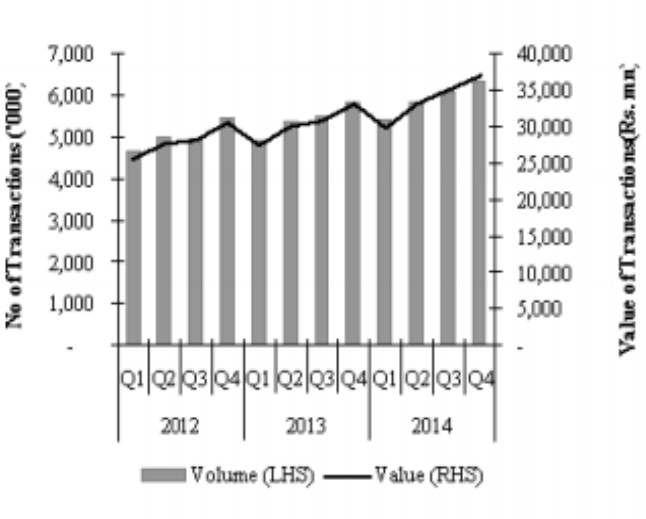

Figure 2.2: Total volume and value of transactions effected through credit cards (during the quarter) [7]

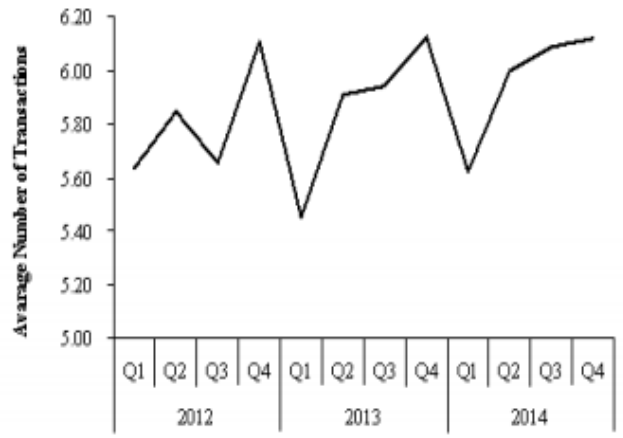

Figure 2.3: Average number of transactions per credit card during the quarter [7]

2.2.3 Debit Cards in Sri Lanka

Debit cards were introduced in Sri Lanka in 1997, facilitating the purchase of goods and services by making payments with funds held in the cardholders' bank accounts. As at end of the fourth quarter of 2014, there were 28 debit card issuers licensed by CBSL. The total number of debit cards in use was 13.6 million at end of the period. The majority of debit cards had the facility to use for both domestic and international transactions. Reflecting the increasing popularity of card transaction as a means of payments, total volume and value of debit card transactions as per the Figure 2.4 recorded significant increases of 37.4 percent and 36.4 percent, respectively, during the fourth quarter of 2014 in comparison to the same quarter of 2013 [7].In [6], N. Wijeratne emphasizes that Sri Lankan payment card market is competitive in attracting and retaining their debit cardholders by launching promotional campaigns and introducing new loyalty program to attract in recent times and this trend has pushed most of the registered finance companies also to join hands with local card issuers to issue debit cards.

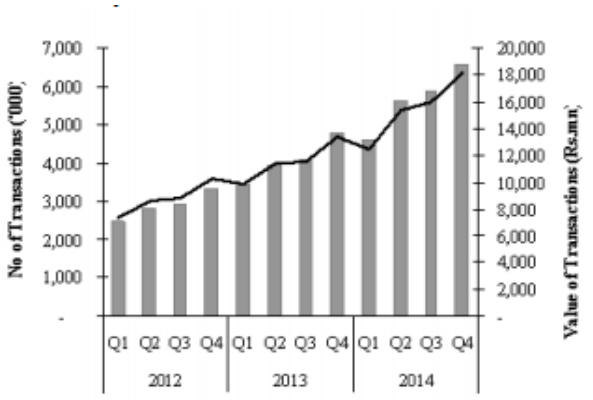

Figure 2.4: Total volume and value of transactions effected through debit cards during the quarter [9]

2.2.4 Common Card and Payment Switch (CCAPS)

CCAPS is a project undertaken by LCPL based on a recommendation of CBSL, in order to establish a national platform for the electronic retail payments in the country. The Common ATM Switch (CAS), which is the first phase of CCAPS, was launched on 23rd July 2013. As at end of the fourth quarter of 2014, there were nine commercial banks facilitating their customers to operate ATM transactions through CAS. Transactions carried out through CAS recorded a significant increase from its commencement. The volume of transactions increased to 3.5 million and value of such transaction was over 15.3 billion, in the fourth quarter of 2014 [7].

2.3 IT Governance

IT is an essential component and it plays a major role in current organizations. IT should be efficiently and effectively governed to achieve strategic goals of an organization delivering the business value. Payment card industry is also IT-oriented field and required to govern towards to achieve organizational strategy alone with business value. In the track of previous literature, IT governance has been evolved over the years. IT governance concept has been defined by many experts and institutes in different ways. Different IT governance perspectives, frameworks, and standards have been introduced.

Few of the definitions:

“IT governance is the responsibility of the board of directors and executive management. It is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure that the organization’s IT sustains and extends the organization’s strategies and objectives.” [8]

“IT governance is the organizational capacity exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT.” [9]

In Sri Lanka, IT governance is not a familiar concept to many organizations. Some believe that the IT governance is an area that is theory and standard to have. Nowadays, organizations need to have IT governance to effectively implement their corporate strategies.

IT governance should be originated from the top level of a business. Corporate governors, such as the board of directors and executive management have a major role to play as it is an essential part of enterprise governance. IT governance institute has mentioned IT governance as a responsibility of Board of directors and executive management. [10] Has mentioned it as a duty of the board, executive management, and IT management.

As said by, [8] IT governance consists of leadership, organizational structures, and processes. It implies that IT governance may include several structural changes and process changes. There should be good direction and control for IT governance. [9]Mentioned IT governance as controlling the planning and implementation of IT strategy. To control the planning and implementation of IT strategy, responsibilities and decision rights should be granted to different layers.

The relationship between the IT Governance and organization set objectives can be shown in Figure 2.5.

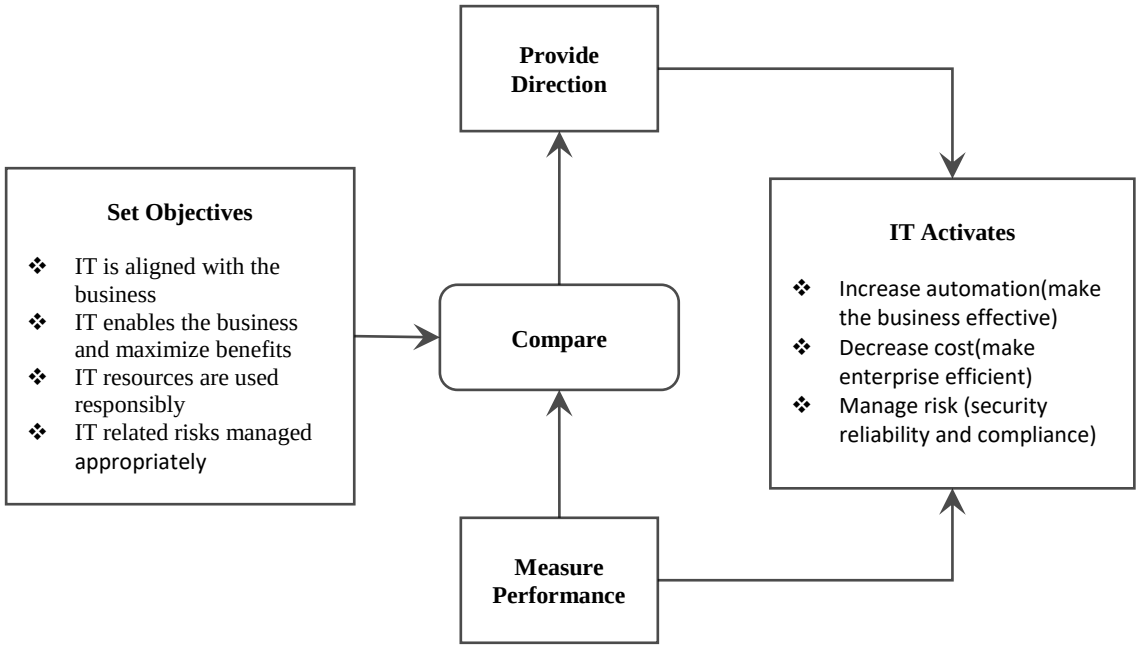

Figure 2.5: Relationship between the IT Governance and organization set objectives [10]

Main focus areas for IT governance:

According to Figure 2.6, there are five focus areas for IT governance. Strategic alignment, Value delivery, Resource management, Risk management, Performance measures [8].

Figure 2.6: Main focus areas of IT Governance [10]

2.3.1 Strategic alignment

According to [8] IT must deliver the values expected from the business. All IT investments should help to meet organization's strategic goals. They should build the capabilities necessary to deliver business value. It implies that IT strategy should be planned and implements in order to achieve corporate business goals. IT capabilities must be used to implement strategically most important areas. If there is such a harmony between business and IT in any organization, there is a business IT strategic alignment.

2.3.2 Value delivery

In [8] describes that the value delivery focuses on optimizing IT expenses and providing the value of IT. Nowadays, IT investments are comparatively high, but they gain more benefits. Organizations should very carefully make IT investments to take optimum benefits. In accordance with the [8], there are four basic principles for value delivery. Delivering IT projects on-time is very important. Important project delays for several periods of time will adversely affect any organization.

IT investments should deliver within the budget. Budget overruns are usual in IT projects. If they exceed unexpectedly, organizations cannot tolerate them. IT project must be delivered in proper quality. They should deliver expected benefits. As said by [11] any business case should consider four important aspects of value delivery. They are strategic alignment analysis, financial benefit analysis, Non - financial benefit analysis and risk assessment. According to [9], there should be processes and practices to ensure value delivery.

2.3.3 Risk management

Risk management is a very important aspect to any organization, its shareholders, and customers. Risks come in various ways. According to [8], Risk Management covers protecting IT assets, disaster recovery and continuous IT operations. The risk

management process has four major components. They are risk identification, analysis, risk-reducing measures and monitoring.

People, applications, technology, facilities, and data are considered as main IT resources. IT resource management is the optimal investment, use and allocation of IT resource to get better performance. In [8], describes the resource management as optimizing knowledge and infrastructure. IT human resources management has a direct relationship with knowledge optimization. Effective recruitments, employee retention, employee training and identification of required core competencies are very important in IT human resource management, Acquiring IT resources cost - effectively, organize available IT resources proper manner, maintenance and monitoring IT resources, effective management of life cycle of hardware, software contracts, and service contracts are an Infrastructure optimization are very vital in infrastructure optimization.

2.3.4 Performance measurement

As mentioned in [8], the performance measurement includes tracking project delivery and monitoring IT services. IT balanced scorecard is a tool used to measure the performance of IT. It uses four types of measures. Enterprise contribution is the way business executives view the IT department. User orientation is the way that users view the IT department. Effectiveness and efficiency of IT processes are measured under operational excellence. Future orientation is a measure of the way IT is planned to meet the future needs

2.4 Main Aspects of IT Governance in Payment Card Industry

In [12], S. K. Dangolania defines Information Technology in the payment card and banking industry with the wherewithal to deal with the challenges the new economy poses. It also highlights that IT has been the cornerstone of recent financial sector reforms aimed at increasing the speed and reliability of financial operations and of initiatives to strengthen the banking sector. [12], Saeid defines the 3 aspects that IT

importance to the payment card industry as Technology is influencing, competition and the degree of contestability in banking and payment card industry, Technology influence Economy of scale, Technology influence the economics of delivery.

IT has basically been used under two different avenues in payment card industry. One is communication and connectivity and other is business process re-engineering. IT enables sophisticated product development, better market infrastructure, implementation of reliable techniques for control of risks and helps the financial intermediaries to reach geographically distant and diversified markets. But focusing on both threats and opportunities of IT [13].

With the above mention factors and changes in the market highlights the need of IT as a key player in the industry. During recent years there is a large shift in the way lenders interact with their potential customers. In [5], highlights that much of that shift has been driven by an increase in the quantity and quality of information available on these potential credit card customers.IT has made the revolution in made possible and economical the development of more sophisticated risk scoring technologies and has allowed firms to more effectively target consumers. Innovations in payment card reporting, resulting from a major wave of IT adoption of financial institutes, which has played a crucial role in advancement in the business as well as industry. In [14], M. A. Adesola et al. highlight the importance of IT as it has become the global tool for the banking industry to reach global markets. In order to compete with the global competitiveness environment. The paper highlights more that the banking industry has moved into an era of menu-driven ultra- robust specialized software programs called banking applications and these applications can carry out virtually all banking functions relying heavily on information collection, storage, and transfer, processing. [14] Discussion advice banks to re-examine their service and delivery systems in order to properly position them within the framework of the dictates of the variety of information and communication technology. The advancement in Technology has played an important role in improving service delivery standards in the Banking industry. In its simplest form, Automated Teller Machines (ATMs) and deposit machines now allow consumers to carry out banking transactions beyond banking hours. With online banking, individuals can check their

account balances and make payments without having to go to the bank hall. This is gradually creating a cashless society where consumers no longer have to pay for all their purchases with hard cash. [15], T. Suraweera et al. describe an another aspect of the IT application in banking and payment card industry as IT-driven banking services (ITDBS) as Automated Teller Machines (ATM), online banking, mobile banking, telephone banking and internet payment gateway are such IT-driven baking service etc. The paper more discussion the advantages as saving their personal time from the consumer perspective and financial institutes can save time, cost and human effort. In [16], K. Rupinder, observes the role of IT managing customer services. The paper highlights the uses of IT will reduce the cost of global fund transfer. The IT revolution has the stage for the unprecedented increase in financial activities across the globe. The advancements in technology have also led to improvements in the ways in which banks process information. Technology has opened up new markets, new products, new services and efficient delivery channels for the banking and payment card industry. It is information technology which enables banks in meeting such high expectations of the customers who are more demanding and are also more techno-savvy compared to pass. Customers demand is instant, anytime and anywhere banking facilities. Banks are increasingly interconnecting their computer systems not only across the branches in a city but also to other geographic locations with high-speed network infrastructure, and setting up local area and wide area networks and connecting them to the Internet. Technology has brought various products like net banking, credit card online, mobile banking, online payment of excise and service tax, phone banking, bill payment, shopping, ticket booking, railway ticket booking through SMS, smart money order, card to card funds transfer, funds transfer (e-cheques), anywhere banking, internet banking, mobile banking etc. In [17], O. K. Agboola categorizes the IT products in the payment as Automated Teller Machine, Smart Cards, Telephone Banking, MICR, Electronic Funds Transfer, Electronic Data Interchange, Electronic Home and Office Banking.

In [18], J. Devos and I. Pipan describe the role of IT responding payment card frauds in the industry. The account data, cardholder data and transaction data for further reference and for the actual fund transfer between the banks. This data is vulnerable

and if stolen the data can be used to conduct fraudulent transactions or to produce fake cards. Prevention and detection are the two types of frauds that industry can face. Fraud reductions efforts based on prevention are mostly IT/IS solutions combined with organizational measurements. Fraud reduction IT/IS are 3-D secure technology and chip card technology. Organizational measurements are based and inspired by PCI security standards. Paper discusses another aspect of the use of IT as detection of fraud is organized in a risk monitoring system, mostly supported by IT. Nowadays most the banks are focusing on outsourcing this process. During the process, institutes face some challenging situations such as compliance with industry standards, technology adaptation with legacy systems, investments justification etc. In [19], W. K. Wilhelm explains eight dimensions in fraud management lifecycle Deterrence, Prevention, Detection, Mitigation, Analysis, Policy, Investigation, and Prosecution and for an effective fraud management requires a balance in the competing and complementary actions within the fraud management lifecycle. It shows that main reasons for credit card frauds is that failed in the integration of fraud management lifecycle successfully, and do not integrate new technologies into each of the lifecycle's stages, they expose the companies they represent to unnecessary fraud losses and/or excessive expenses and create a negative externality effect on society. A more realistic representation of the Fraud Management Lifecycle includes not only the flow of activities from the front end (deterrence and prevention) to the backend (investigation and prosecution), but the interactions and interrelationships between each of the various lifecycle stages. The linear front end to back end process is facilitated by the flow of information around the exterior of the network, while the interactions and interrelationships between the stages are represented by the connections through the center of the network.

In [20], S. W. Frame and J. Lawrence discuss another aspect of IT as technology changes and adaptation. Frame highlights that banking has changed dramatically over the past 25 years, due in large part to technological change. Advances in telecommunications, IT, and financial theory and practice have jointly transformed many of the relationship-focused intermediaries of yesteryear into data-intensive risk management operations of today. He highlights the financial innovations which have

the direct contribution of IT as Automated teller machines (ATMs), debit card, credit card, online banking, Automated Clearinghouse (ACH) etc. In [14], it is described that adaptation of IT will increase effectiveness and efficiency of the service provided to customers, and also the productivity of the employees involves in the process. And it also highlights in order to get the best use of IT institutes need to do proper high - quality procurement, regular training to the employee to enhance their skills, knowledge, and satisfaction. This was supported by [17], O. K. Agbolade stating that banks should incorporate ICT into their strategic plans for an effective performance in payment and delivery systems. This calls for proper analysis to determine the type, nature, and extent of ICT products required for effectiveness and efficiency. It is imperative for bank management to intensify investment in ICT product to facilitate speed convenience and accurate service. With the new era adaptation of IT become one of the success factors and due to this dependency most of the legal and regulations structure also be more technologically dependent and better focused rather than focusing on conceptual guidelines. ICT revolution both in terms of innovation rate, speedy operation, and cost per unit (portraying reduction in average total and marginal costs) has made a good number of banks embrace the use of ICT infrastructure in their operations. And it also emphasizes the other side of the use of IT with an example of little interruptions at times due to network failures, which may make customers unable to carry out transactions at a particular point in time. But this is ignorable to the days when banking halls were characterized by long queues mainly as a result of delays in the traditional banking operations.

However, latest studies seem to find a positive relationship between ICT and profitability. Most of the literature supported this view when he stated that modernization of IT has set the stage for extraordinary improvement in banking procedure throughout the world. In [17], O. K. Agbolade revealed that IT brings down the operational costs of the banks and that Internet technology facilitates and speed up banks procedures to accomplished standardized and low value - added transactions. Past studies in developing countries did not reflect any significant empirical relationship between ICT investment and banks profitability [17]. Previous studies in Nigeria don't depict any significant empirical relationship between ICT

investments and the profitability of banks in Nigeria [17]. In [17], suggests that IT expenditure has a negative relationship with banks profitability due to the fact that investment in IT increases expenditure as well as increases assets thereby reducing operating profits as well as return on assets (ROA).

In [21], E. Steffes et al. discusses the importance of information to attract and retain customers in the payment card industry. The world is fast entering the information age. Transactions and information may be packaged through data. There is a disintegration of the concrete to give way to what is abstract and digital. The digital and information for that matter are equally shaping and determining the contemporary world. The paper [21], more highlights that Banks rely heavily on gathering, processing, analyzing, and providing information in order to meet the needs of customers. This is supported by [22], Z. Yan-li and Z. Jia state Commercial banks have already accumulated a lot of credit card transaction data and customer's basic data after years of information construction How to withdraw useful information and knowledge from the potential value data has become an important topic in the industry. It can provide the policy-making support for customer segmentation and marketing, to ensure the security of credit card customers. With the advanced technologies of data mining payment card data can convert in to improve the learning speed of the neural network and the accuracy of prediction, data need to be zoomed in proportion.

2.4.1Management of Information Technology

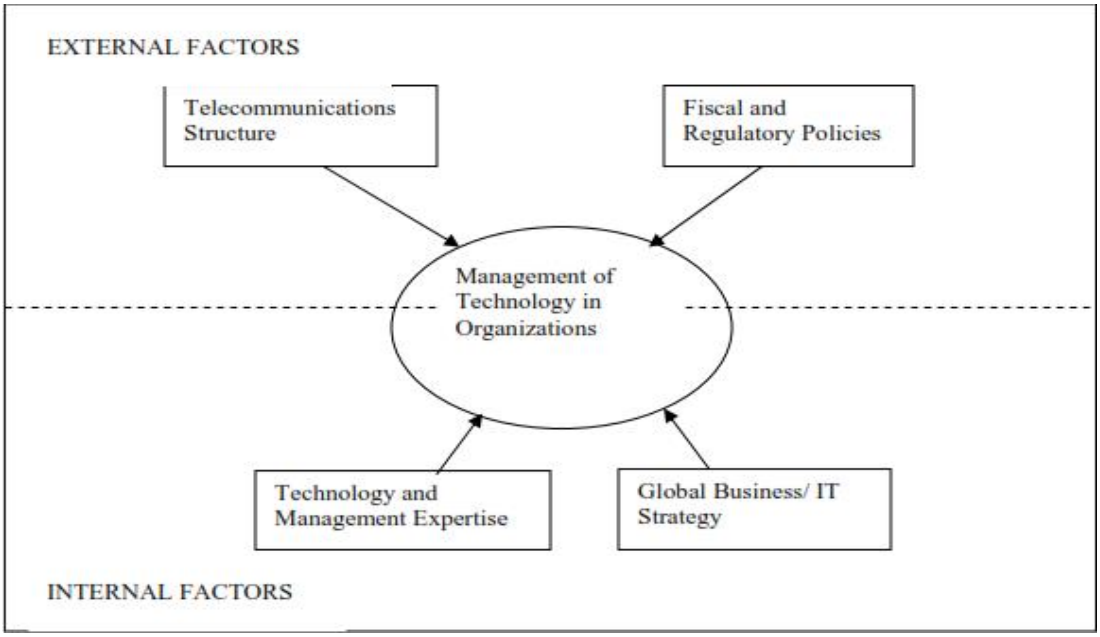

Figure 2.7: Factors affecting Management of Technology in organizations [23]

Information Technology Management defines the concept of IT as a goal of management is to provide the right tools for staff to effortlessly access and store the information required to manage or provide a service. Information Technology (IT) is a term, which generally covers the harnessing of electronic technology for the information needs of business at all levels. It is a computer- based system as well as telecommunication technology for storage, processing, and dissemination of information. According to IT is a body of tools, with the convergence of communication and computers. Paper describes IT as series of machines, which can execute sequences of instructions. The sequence of instructions is a programmed made particularly flexible and not rigid and can be charged depending on the information being processed.[23], Pauline highlights that IT has changed the way that individuals and organizations interact with each other. New technological innovations have resulted in greater demands on IT to meet the needs of their internal and external customers and stakeholders. It also emphasizes that for every organization ultimate goal of using IT is to become more productive by using IT to

make management decisions. Decisions are made in the aspects of solving business problems, increase personal productivity, improve customer relationship etc.

Past research attempts try to define a different framework for IT management. These frameworks have defined by considering factors that affecting the management of IT in different organizational/ business context. [23], Pauline defines a theoretical framework as shown in Figure 2.7 to identify, examine and analyze the factors that affecting the effective management of IT within developing countries. Paper further discusses telecommunication structure and financial regulation policies as the external factors for an organization in terms of managing IT. On the other hand technology management expertise and global business strategies / IT, strategies are the considered internal factors.

In [23], paper more highlights on fiscal and regulatory policies that IT managers need to pay attention to regulatory policies at both the country and industry levels. Decision makers should have to therefore, familiarize themselves with and play by the rules of the specific countries. Differences in languages and time zones further add to the complexities of this new environment.

In the case of foreign investments, changes in the foreign exchange rates can also have an impact in investment on quality IT applications and infrastructure [23]. Paper more highlights that this has an impact in linking and effective participation in global environment and the amount of investment in technology education and training can also be affected. Policies of government, the exchange rate of the local currency, inflation as well as tax incentives and special discounts to public and private sectors can all have an impact on the implementation and management of technology in developing countries [23].

The global business environment is another aspect [23], Pauline defines in the management of information system. With the massive changes over last two decades in the global business environment, IT has begun to play increasingly important roles in assisting organizations to achieve short and long-term goals. The focus is on the ability of the organization to use information systems planning to obtain some kind of competitive advantage. The concept of IT as a value-adding the component to the

business has therefore, become extremely important in recent times. [24]W. H. Al-Mamary et al. in their paper discuss another framework which is illustrated in Figure 2.8, with the perspective of management information system to enhance the organizational performances.

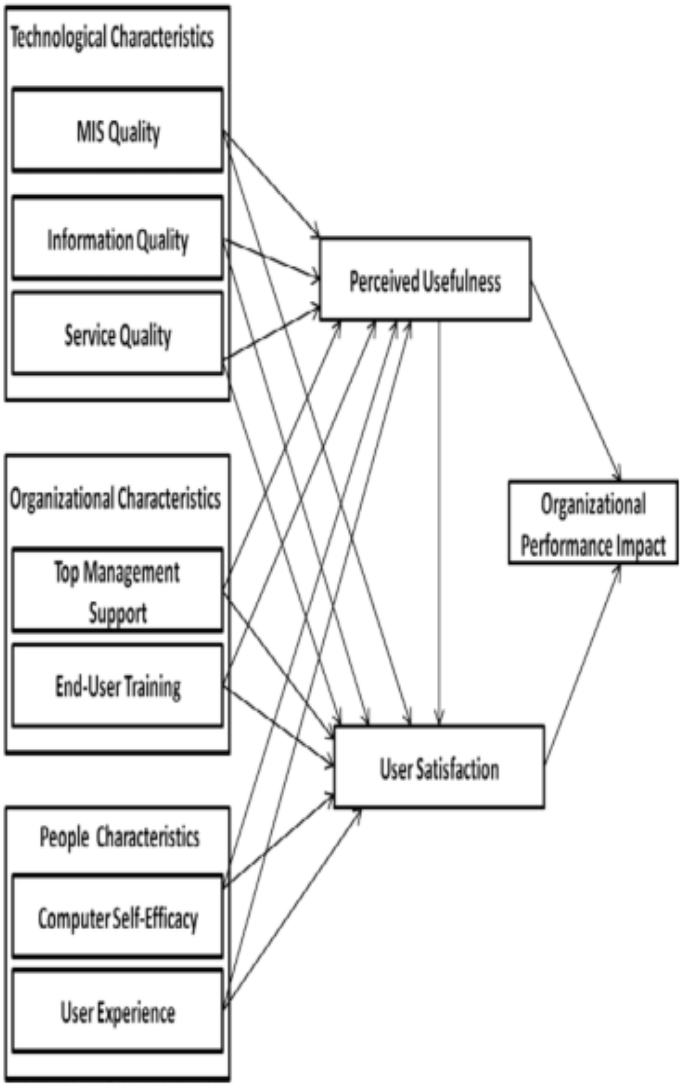

Figure 2.8: Framework of Management Information Systems & Organization Performances [24]

The paper discusses the three main factors with the aspects of perceiving usefulness and user satisfaction. Even [23]Pauline discussed the internal and external factors

that effect in IT management, it is essential to consider the use of quality appropriate management information systems to support this goal. Technological characteristics of appropriate MIS are to have system quality, information quality, and service quality. In [24], W. H. Al-Mamary et al. stress that the quality of the system and quality of the information are considered as a key factor affecting IS acceptance and improve the organizational performance. This is more supported by [25]system quality is the desirable characteristics of the information system. For example ease of use, system flexibility, system reliability, and ease of learning, as well as system features of intuitiveness, sophistication, flexibility, and response times. The paper discussed organizational dimensions as top management support and end-user training. R. F. Chen and J. L. Hsiao in their paper [26] supported that top management support positively influences perceived usefulness. In addition [27]supported that top management support strongly, directly and positively affects perceived usefulness. The paper more highlights the [27], user training refers to the amount of training provided by computer specialists in the company, friends, consultants, or educational institutions external to the company. In [28]discussed people Factors paper discussed two variables, computer self-efficacy, and user experience. Computer self-efficacy refers to an individual's belief that he or she has the skills and abilities to accomplish a specific task successfully. The point is supported by [29] that user satisfaction has positive effects on the organization net benefits. In addition [29]supported that user satisfaction has a positive influence on organizational benefit. But when it comes to people factor in managing payment card information system computer self - efficacy has the only little impact.

In [30], T. Oliveira and M. F. Martins discussed another 2 models IT adaptation for an organization. The Diffusion on Innovation (DOI) found that individual characteristics, internal characteristics of the organizational structure, and external characteristics of the organization are important antecedents to organizational innovativeness.

More the paper discussed DOI is a theory of how, why, and at what rate new ideas and technology spread through cultures, operating at the individual and firm level. Individuals are seen as possessing different degrees of willingness to adopt

innovations, and thus it is generally observed that the portion of the population adopting an innovation is approximately normally distributed over time (Rogers 1995). Breaking this normal distribution into segments leads to the segregation of individuals into the following five categories of individual innovativeness (from earliest to latest adopters): innovators, early adopters, early majority, late majority, laggards [32].

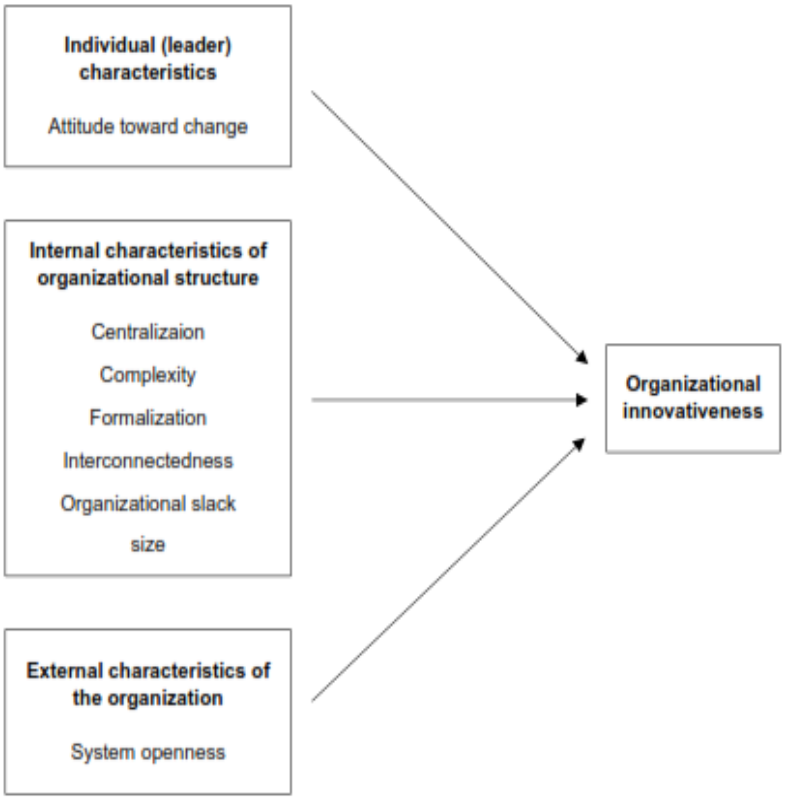

Figure 2.9: The Diffusion on Innovation (DOI) Framework [32]

Based on DOI theory at the firm level, innovativeness is related to such independent variables as individual (leader) characteristics, internal organizational structural characteristics, and external characteristics of the organization as illustrated in Figure 2.9. Individual characteristics describe the leader attitude toward change, Internal characteristics of organizational structure includes centralization is the degree to which power and control in a system are concentrated in the hands of a relatively few

individuals"; "complexity is the degree to which an organization's members possess a relatively high level of knowledge and expertise"; "formalization is the degree to which an organization emphasizes its members' following rules and procedures"; "interconnectedness is the degree to which the units in a social system are linked by interpersonal networks"; "organizational slack is the degree to which uncommitted resources are available to an organization"; "size is the number of employees of the organization". External characteristics of organizational refer to system openness.

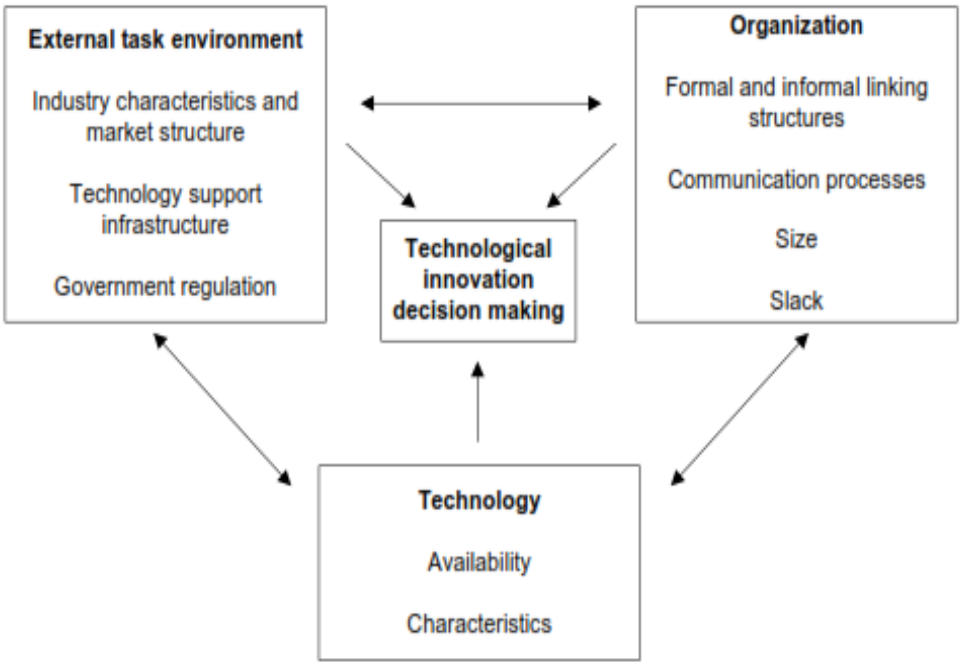

Figure 2.10: Technology, organization and environment framework [32]

Technology, organization, and environment (TOE) framework which is illustrated in In Figure 2.10is consistent with the DOI theory, in which Rogers (1995) emphasized individual characteristics, and both the internal and external characteristics of the organization, as drivers for organizational innovativeness. The authors highlights that TOE and DOI frameworks are identical with factors considered but TOE framework also includes a new and important component, environment context. The environment context presents both constraints and opportunities for technological innovation. The TOE framework makes Rogers' innovation diffusion theory better able to explain intra firm innovation diffusion.

2.4.2 Fiscal and Regulatory Policies

In the process of managing the IT and related services, banks and financial institutes need to adhere to the fiscal and financial regulatory policies important. Sometimes these factors will be an opportunity or threat for the particular institute or set of institutes in the payment card industry. In a transition towards an electronic-based or paperless financial system, doubts and legal uncertainty may prevail in connection with the validity of the services provided through electronic means and whether such transactions could be admissible in courts. In addition questions may be raised in connection with the validity of technological measures, such as electronic signatures, which are used to ensure greater integrity, authenticity, and security to the banking and financial transactions, effected through the electronic channel and what remedies are available to effectively deal with offenders who try to abuse systems as well as the security measures.

In [31], J. Fernando discussed some of these fundamental issues, with specific reference to Sri Lankan legislation, most notably the Electronic Transactions Act No. 19 of 2006. The paper more discussed 3 fundamental policies in perspective of electronics transaction act in Sri Lanka as technology neutrality, functional equivalence, and party autonomy its highlights the main gap as even technology neutrality covered under the act but not specifically dictating the technologies that cover under the act.

The author [31] pay attention to the technology abuse is another aspect of legal and fiscal side author discussed that Computer Crimes Act No. 24 of 2007, has some gaps in defining the scope of offenses such as THEFT, Cheating and Criminal Misappropriation (and the definition of property) in the Penal Codes. It was found that those definitions were formulated on the assumption that an identifiable human offender and victim are in existence and envisaged the commission of an act in a specified manner by the offender against the victim. Even though during the formation of act [31], it has considered the computer crime as such the term “computer crime” is not defined in the act and legislators felt that it was synonymous

with “Cyber Crime”, although the latter tends to be focused towards criminal activity resulting from the use of the internet.

With the identified gaps highlighted in the paper author drive the reader’s attention to some practical aspect of enforcement of law and investigations in payment card industry. With the growth of network-based crime has raised difficult issues in respect of the appropriate balance between the needs of those investigating and prosecuting such crime, and the rights of users of such networks as well as network providers, the intermediaries that build, operate the networks and services, through which data is communicated. Further, it highlights the problems faced by the absence of enforcement process, namely investigators, prosecutors and judges to work in a coordinated manner.

Data protection policies all over the world have defined in a quite strong in payment card and financial industry. Paper [31], more highlights that data protection regulation reflects domestic concerns or is reactive to the legal situation in other countries; consideration obviously needs to be given to the most appropriate regulatory approach.

The properly defined legal, regulation structure and policies is an essential factor in the process of investing and managing IT in terms of infrastructure, personal job roles and responsibilities, ethical factors etc. In [32], Beaumaster defines some management aspects legal issues as Elimination of Paperwork Act, Need nonspecific, flexible, fuzzy legislation, Federal Records Act, Electronic FOIA etc.

2.4.3 Risk

In the process of governing IT in payment card industry management of risks factors is another aspect that needs to consider. W. Al-Ahmad and B. Mohammad in [10], discuss the challenges facing in the efforts to properly manage information security risks when adopting international standards and frameworks. Main challenges that paper discusses are systems vulnerabilities, information systems integrity, confidentiality, and availability. This was support more by [33]J. S. Cheney et al. with the risk of data bleaches and as an after effect consumers shifting for non-

efficient payment methods. The author named this as ‘Tailed Risk’ in payment card industry. Information on accounts and transaction details sharing among the networks need to access and audit frequently by qualified security auditors. But it also highlights by carefully analyzing the data and transaction patterns there is an opportunity in early identify any data bleaches or security threats. In the process of information security risk management, paper emphasizes that risk should be identified, evaluate, analyze, manage by adopting appropriate risk framework and report the risk properly. Other aspects of risk are technology adaptation and usage, people use and manage technology and environment that technology operates. Author classified challenges for of managing information security as Absence of senior management commitment and support, Absence of appropriate policies for information security risk management, Disintegrated GRC efforts (the increasingly popular term GRC refers to three critical areas, Governance, Risk Management, and Compliance), improper security risk assessments management),assets ownership is either undefined or unpracticed, Limitations of existing automated solutions, lack existence of several IT risk assessment frameworks.

2.4.4 Security

Physical and information security is another main area that needs to consider in the management of IT. Security of IT infrastructure and information are crucial factors in payment card industry. PCI Security Standards Council is an important institution in managing security standards in payment card industry. The PCI Security Standards Council is composed of representatives from its five founding global payment card networks American Express, Discover Financial Services, JCB (Japan Credit Bureau) International, MasterCard Worldwide, and Visa Inc. These companies have agreed to incorporate the PCI Data Security Standard in their respective data security compliance programs. In [34], discuss that mainly need to take decisions on what tools, technologies to use, to prevent harm to information assets, the security levels in accessing infrastructure and information. And it also highlights some reasons for fail ineffectiveness of the security approach as monitory investment when developing IT security strategies but much depends on how, when and where it is used, by whom and with what level of effort and skill, Integrating adopted technologies with current

and future practices is the lion's share then just that of selecting it, and peoples' troubles in understanding the adopted technologies. Soft IT interventions (e.g. organization, Cultural aspects, awareness program, training programs, policies, executive attention etc.) to produce a secured environment for the business is another aspect of the need to consider and paper highlights that advantages as simplicity, evaluation all the spatial properties of Information security etc. Based on the use of the technological and cultural aspects authors [34]have suggested four major approaches as the model shown in Figure 2.11

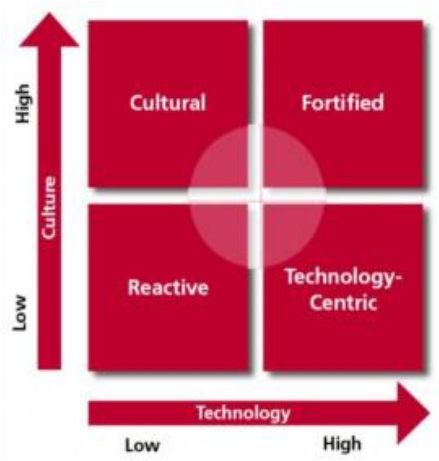

Figure 2.11: IT Security Approach [36]

When managing IT from the aspect security author highlights a couple of challenges as robust technology selection, poor defined IT security organizational structure, senior management's involvement in policy development, awareness and security planning. It also discusses possible IT security practices as risk assessments and audits, updating and maintaining systems, access control procedure, and detection-monitoring process, incident response scheme etc.

Another Information security aspects include confidentiality, integrity, and availability of the information (ISO 17799:2009) [34]. Confidentiality explains in the term used to prevent the disclosure of information to unauthorized individuals or systems. Integrity means that data cannot be modified undetectably. Availability supposes that the information must be accessible when and where it is needed for the authorized users. And the paper also discusses a couple of security incidents as the

security incidents are, for example, loss of service, device or equipment, system malfunctions, human error, breaches of physical security requirements, uncontrolled system changes access violation, etc. The author also discusses the importance of identification of information assets as databases, data files, operational and support procedures, application software, system software, physical assets, and services. Best applicable security control procedures and principles as define the objective, scope and mechanisms of information security in organization, Recognize the necessary security resources, Determine clear responsibilities and accountabilities for information security, Provide a methodology for risk management, including risk analysis and risk assessment methods and tools, Ensure continuous monitoring and control of security incidents, Application of security standards, audit and certification of ISMS, encourage management and employees to strictly follow security policy in organization.

2.4.5 Technology Adaptations

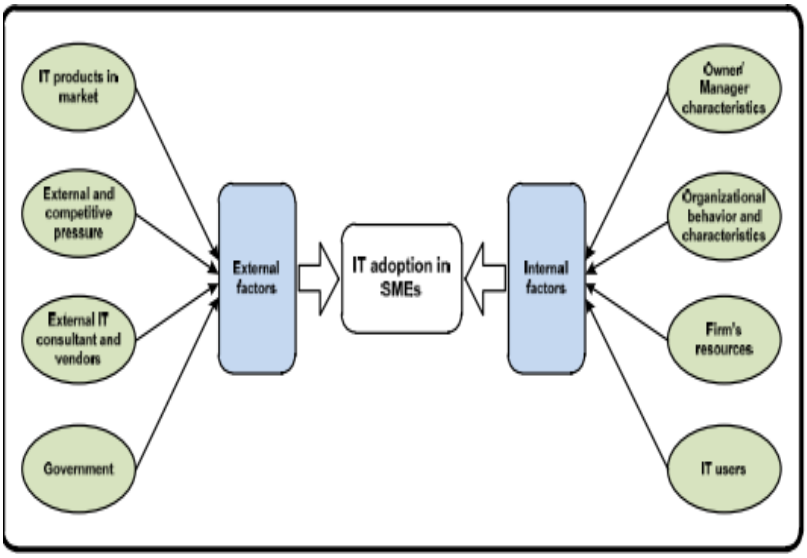

Figure 2.12: IT Adaptation in SMEs Framework [21]

IT is areas that rapidly change every day. With this changes, payment card industry which is highly depending on the IT also has a big challenge. This is explained in Figure 2.12[20], by S. W. Frame and J. W. Lawrence role of the financial institutes in the process of the environment of technology changing. Advances in

telecommunications, IT, and financial theory and practice have jointly transformed many of the relationship-focused intermediaries of yesteryear into data-intensive risk management operations. The paper also highlights good side of this as financial innovations, where payment card industry and other banking operations can come up with new products and services which add values for their customer [20].In [35], H. Gheysari1 et al. explain that IT infrastructure can define as resource and capability which enables information sharing through the interaction between technology and people in the organization who share the different elements. Information infrastructure also involves technological tools and various means used for managing and exchanging knowledge in today's huge flow of information, such as computers, software, and telecommunication. In order to achieve a range of goals, managers make IT investments to positively influence performance by: providing a competitive advantage, responding to rapidly changing market needs, providing resourceful information for better decision making, reducing business costs by automating some transactions, allowing competition in specific technology market areas (e.g. ATMs for banks, EDI for parts suppliers), facilitating flexibility to fulfill more customers' needs without incurring extra cost, and providing technological platform for producing other business. The Economic Effects of Technological Progress: Evidence from the Banking Industry highlights three type of aspects that IT adaptation can affect internet banking, electronic payments technologies, information exchanges. And also its highlights some challenges in adopting new technology for the industry as difficult to quantify, and so must be inferred from changes in productivity ratios or firm performance over time, difficult to account for the effects of technological progress in improving the quality and variety of goods and services. Technological progress does not necessarily accrue to the firm or industry where they occur, making them difficult to measure. To the extent that markets are competitive, the associated rents may be competed away and passed through to customers or factors of production, provided there are no barriers to the adoption of the technology or in the product or factor markets. For example, if banking was perfectly competitive, and all technological improvements were successfully copied by other banks or nonbank competitors, any abnormal returns would be competed away through more favorable prices to customers (e.g., lower rates on loans, higher

rates on deposits), improved quality and variety of services provided (e.g., ATMs, Internet banking), rents to the providers of the improved hardware/software (e.g., Intel, Microsoft), key employees that know how to use the technology, etc. In [13], M. Ghobakhloo et al., describe a framework for adopting IT describe in Figure 2.13 [21].

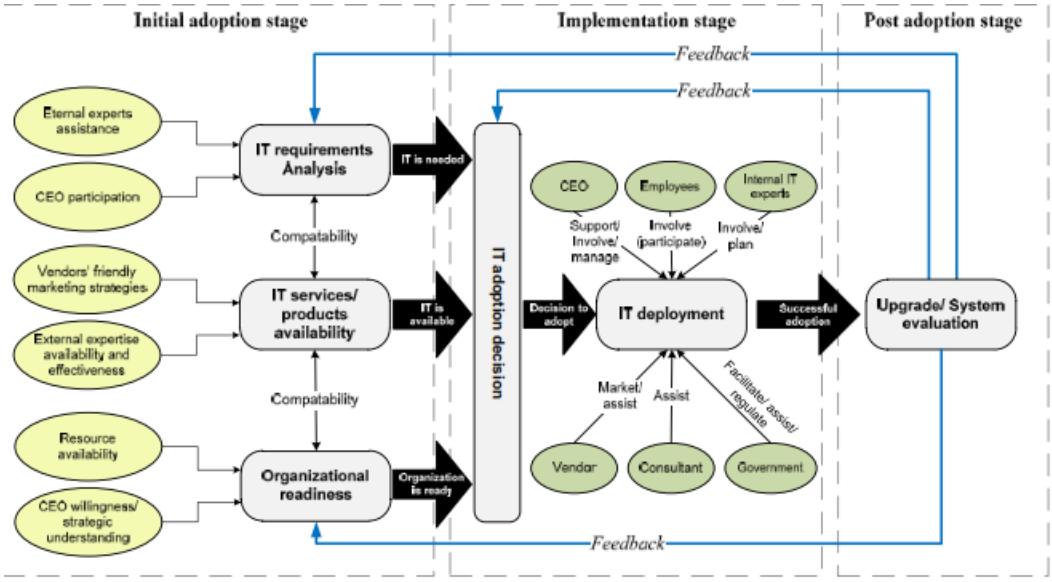

Figure 2.13: IT Adaptation Framework [21]

With related to framework paper highlights IT adoption process is directly affected by top management where all decisions from daily functions to future investments are made by them. CEO's demographic characteristics and personality traits of openness and extraversion are the significant determinants of IT usage behavior and performance within businesses.IT adoption literature has provided evidence that top management support and commitment towards IS/IT adoption is one of the key cornerstones of higher levels of success and satisfaction with IS/IT adoption. The author also discusses a conceptual framework for IT adaptation for an organization. With the analysis of the process it's highlights couple of failure reasons for IT adaptation failures such as inappropriate connection between adopted IT and enterprise strategies, Inadequate realization of organizational issues, Inadequate realization of end user necessities, Lack of manager and employee involvement in different stages of IT adoption, Lack of required resources (knowledge, skills,

finance, management), Inadequate teaching and preparation of end users, Business size and fund limitations to employ IT specialists, Unqualified management in highly centralized CEO structures, Inappropriate government assistance role and supportive regulation, Dissatisfaction with IT-created competitive advantages due to improper interactions with competitors, suppliers and customers, and The particular characteristics of organizations, their culture and family involvement in the business.

In [36], S. A. Raza and C. Standing discuss another aspect of challenges in adapting IT for organizations as outsourcing systems. Main factors highlighted are lack of internal staff with problems due to imperfections in contractual writing, information asymmetry, lack of structural controls, vendor lock, and lack of commitment etc. Problems of system integration such as lack of expertise, lack of training and support, privacy issues, lack of provisions in system integration are critical in new technology adaptations.

2.4.6 Procurement Process

Procurement of IT is another important aspect that needs to consider in management IT regardless of any industry. Procurement of information systems (IS) and related services is challenging compared to the acquisition of more standardized goods and services. Information systems often need to be customized to the needs of the procurement institute. Procurement decisions are made early in the procurement process when requirements are still uncertain. The buyer may have to compare between competing, complex system options. Information systems can support this process. Enterprises spend huge sums of money for acquisition of information systems. It is the main reason of permanent interest in the evaluation of IS efficiency and benefits. The main problem is to define what is to be evaluated, how to evaluate, and when to evaluate [37].

The authors more highlights challenge of information asymmetry when procuring services from IS consultants. Agency theory suggests contracts and monitoring of the work to limit opportunism from a vendor, but this may not be sufficient to cope with the problem as consultants have more knowledge of the problem area than the procurement entity [37]. The challenge of consultant opportunism comes in addition

to the challenge of competing interests from internal stakeholders and may necessitate a complex set of strategies.

Findings from public sector IS procurement indicate that regulations and contract arrangements are protective of the government customer, through particular payment models and use of standard government contracts [37]. This may limit vendors' interest in participating in public tenders, and less competition may lead to buyers having little choice and less bargaining power.

In [38], Erik and Paivarinta, discuss the set of challenges that procurement managers, CIO and vendors that face during a process of IT procurement. The research findings highlight the most important factor during procurement as a change of work processes and benefits realization and clear requirement specification. "Finding and using good assessment criteria" "Integration, compatibility" received challenges from the CIO´ side and vendor representatives "Too much focus on costs" as the most important challenge [38]. The importance of the assessment criteria is supported by [37], Vasilecas et al. provide information about two types Goal-driven evaluation ensures the widest viewpoint, but not in all situations it is applicable. When goals are not clearly formulated, tasks replace goals in the chain of generalized processes. Tasks define necessary IS, and the evaluation must show a degree in which that tasks are fulfilled. Task driven evaluation can be performed in all situations because IS tasks are always reflected in the procurement documentation. It also highlights that Goal-driven approach is the most universal. It enables to use logically well founded evaluation criteria of wide scope. Task-driven evaluation can be used as well, but its viewpoint is narrower. To achieve well founded results, entire IS acquisition process must be taken into account, and separate stages of it should be evaluated. Evaluation of each stage let's find a reason of unachieved primary goals or can show a way to achieve the goals more efficiently. Timely evaluation of a stage let's use feedback and improves the results, contributing quality control of the acquisition process. The efficiency of a feedback is the highest during initial stages of the acquisition process.

The paper compares actual comparisons of provided literature reviews challenges and finding of the research and highlights that change of work processes starts after a contract is signed and the responsibilities of the procurement personnel are finished. The challenge of technological integration and system compatibility highlights the importance of involving IT expertise in the procurement process. In small countries, some vendors may have reached a “monopoly-like” position in some niche areas. On the other hand, due to the regulations and a strong focus on defining ex-ante requirements, vendors may have few opportunities to show their unique qualities, if the customers do not request these qualities specifically [37].

2.4.7 Human Resource

In order to manage IT in an organization, alignment of human resources of the organization is critical to success. It is important that acquiring organizations display HR capability to support alignment process, especially in the pre-acquisition stage to minimize the post-acquisition shocks. In [39], M. Harekrishna discusses different human resource classifications involvement in IT alignment as Operational non-IT Resource, Operational IT Resource, Functional non-IT Resource, Functional IT Resource, Strategic non-IT Resource, Strategic IT resource. D. A. Major et al. in [40], highlights the best practices in the management of human resources in IT context. Paper classified the identified challenges as complexities of IT Work including, challenges due to IT skill requirements, challenges due to the role of IT in the organization. In [35], H. Gheysari1 et al. discuss another aspect of human resources in information infrastructure management as Human ITIC, the functions made available by human ITI, including choices on IT staff requisite knowledge and management skills needed for effective IT resource handling within an organization. The paper underlines the elements in human ITIC as experience, capability, commitment, values and norms of IT staff who provide IT products and services, functional efficiency and flexibility of human ITI components.

In [40], its disused more about challengers due to IT skill requirement as IT professionals must engage in continuous learning to prevent technical obsolescence. This is especially important in the payment card industry as it is highly technical

oriented and business specific industry. The high-performing IT supervisor generally manages the need for skill development through performance management practices, training and development, and mentoring. The need for continuous technical skill updating also is addressed experientially through employee involvement. The need for adaptability and coordination requires IT workers to simultaneously update their interpersonal skills along with their technical skills in order to adapt to the organization business and relevant systems.

Training and development is the main aspect of managing human resources related to information management. Possible training and development methods are such as challenging job assignments, on the job training, encourage employees to participate on computer list servers and to attend vendor presentations and lunches with subject matter experts to improve technical skills.

Finally in [40], D. A. Major et al. highlights it is important to pay attention in relationship building and work family life balance perspective of the IT employee.

2.4.8 Project Management Practices

Information technology (IT) operations are comprised of complex, multifaceted business processes. These can range from managing Help desks and responding to troubleshooting requests to managing a portfolio of strategic applications. Keeping these IT operations running smoothly requires significant coordination and communication. In response to this growing capacity demand, more discussion is needed to develop effective IT project management processes and approaches. Despite the importance of information management in business operations, many companies experience difficulty in executing IT projects within the pre-determined time or budget constraints. Many IT designs are canceled before completion and never implemented. Researchers have indicated that most IT projects fail because of poor project management skills. In these failed projects, estimation mistakes, lack of clarity, and unstable goal and objectives were cited as core problem areas.

In [43], by Rahim. E, Dawson. M, discuss IT project failing due to poor planning, Unclear Goals, and Objectives, Misalignment, Quality of Interaction, Changing

Objectives during Project, Unrealistic Resource Estimates, Human Capital. In [44], classifies the information technology project management challenges as managing distributed and matrix managed teams, issue tracking, resource management, prioritization, synchronization. And also Dan Sullivan highlights more as the inability to address any one of these challenges can potentially hamper IT operations and mismanagement of several of these needs can lead to increased operation and development costs, delays in service and product delivery, and an inability to respond to changing business conditions and demands.

Both others highlight the use of appropriate project management tools is an essential factor for IT project. Project management tools must support communication across organizational boundaries, all managers must have insight into the project's process and progress. Papers highlights poor project management plans are results of IT managers often lack the time to appropriately plan because of the pressure from senior management and as a result, the project is performed before the plan is appropriately defined. This is supported by[44], Nelson R.R, explains poor project planning will result in clear roles and responsibilities were never established, resource battles became common, negatively impacting schedule, and kickoff was delayed due to other projects that were wrapping up, project policies, plans, and procedures were never fully developed.

Changing objectives during project inside the realm of project management, the judgment must be made as to whether to remain loyal to the initial requirements and objectives or to make changes. Sometimes project managers cannot handle trade-off decisions and make decisions without the basis of rational insights.

Unrealistic Resource Estimates can fail to differentiate between time, scope and duration. Time on task generally means the time required to complete a task without interruptions. Duration is the time actually required to finish a task, taking into account problems and interruptions. The scope is the process of determining and documenting specific project goals, deliverables, tasks, and deadlines. Defining scope is typically a problem area for many project managers since most are linear thinkers, making decisions without considering other factors that might disrupt the

harmony of the project. Ryan Nelson highlights the benefits of accurate project estimates include fewer mistakes; less overtime, schedule pressure, and staff turnover; better coordination non-development tasks; better budgeting; and, course, more credibility for the project team.

The quality of the interaction between the Information System (IS) project team and the end-users in development projects are not always clearly linked to the success of projects in terms of meeting budgets and product goals. This is due to the lack of collaboration across business units that prevent proper program status updates that optimize operational reviews. Another issue relates to internal and external team conflicts that affecting communication, and this reflects negatively on the project as a whole. Attention to both internal and external conflict is necessary to accomplish project goals successfully. Main influencing factors to this challenge are avoiding insufficient project sponsorship including top management and avoiding ineffective stakeholder management. Ryan Nelson highlights that appropriate stakeholder management tools can avoid this kind of challenges by using stakeholder assessments graphs etc.

2.5 Strategic Alignment of Information Technology, Governance and PC Business

In order to achieve the best effectiveness of IT, it is essential to align IT governance with the business strategies of the organization. In [41], Chebrolu and Ness highlights that Alignment between information technology (IT) and business stakeholders on their strategies has traditionally been viewed as the means to achieve greater IT delivery capabilities, but there is lack of empirical evidence as to how strategic alignment impacts individual aspects of IT effectiveness via its governance (e.g., quality of service [QoS], user satisfaction, and IT helpfulness to users); there is also a lack of empirical evidence surrounding how each individual element of strategic alignment impacts overall IT effectiveness. The paper discusses a couple of important concepts about strategic alignment, IT effectiveness by the use of IT governance. Strategic alignment process makes sure that business strategy, IT strategy, organizational, infrastructure and processes, and IT infrastructure and

processes are all in alignment. Strategic alignment of IT exists when a business organization's goals and activities are in harmony with the information systems that support them. Chief information officers (CIOs) have consistently considered IT alignment with business strategy a top priority. In [42], Gottschalk and Taylor support this as the strategic role of the CIO is becoming ever more complex, requiring an expansion of the organizational and structural possibilities for filling that role.IT strategic alignment is the combined engagement of all IT units' strategies, plans processes, investments, and decisions to support the overall functionality and purpose of the organization goals and objectives.

Further, the paper recognized that achieving a strategic business–IT alignment contributes immensely to ensuring that IT investments result in improved organizational performance [42]. Authors argued that strategic alignment between IT and business is required to use IT assets effectively to assist business management and practices and to functionally integrate with internal and external variables. IT investment and its effectiveness is related to the degree of strategic integration with business and the performance improvement of business because IT takes place in very different ways and at different levels.

B. Chebrolu and L. Nessmore discuss a conceptual model in the alignment of IT and business strategy. Many authors have researched the constructs of strategic alignment and IT effectiveness for large, for-profit IT organizations—either as a singled or as paired factors—to determine business value through competitive advantage. In [43], discussed that linking IT flexibility with strategic alignment within main areas as IT architecture, IT infrastructure, IT human resources, IT relationship resource which can be used as another framework.

2.6 Literature Review Summary

As mentioned in the introduction it is quite challenging to find out literatures that have discussions around the proposed research question. Because of that by writing this review, it will add knowledge around a number of key items in the research area to be examined.

As for the written Literature Review, it has been able to identify key features of the payment card industry. Mainly PCI is highly technical oriented industry and it is dynamic and rapidly changing due to the innovation of the technology, development of infrastructure and the changes of the new concepts or the environment. Whence, it is necessary high investment to meet those requirements to gain the competitive advantage by considering PCI high competition.

This industry is mainly identified as a high risk business as a result of the highly sensitive data, related to the customers' payment. Therefore, high security involvement is required to mitigate or avoid the risk and prevent the security beaters. Payment association such as VISA/MC, central bank, local and global (PCI DSS) association related to payment cards industry and internal compliance teams are strict to the compliance requirement to govern the industry without any liability issues. This will be associated to keep the industry up to the certain standard.

As a summary of IT governance most reviews are organized on main, five aspects; those are Strategic Alignment, Value Delivery, Risk Management, Resource Management and Performance Measurement.

When it comes to IT governance in PCI the review discusses the main factors as fiscal and regulatory policies, human resource, security, risk, project management, procurement and information technology management and adaptation. Throughout the review, it discusses various aspects of issues challenges' related application of IT Governance in the process of increasing the user satisfaction and overall organization performance. Main challengers are to find out unique business values while increasing user satisfaction and overall organization performance but reducing the overall cost. For achieving these objectives it is essential to have IT governance processes with quality, accurate decisions while responding quicker manner to the internal and external business environment changes.

It was identified that few significant factors that directly affect to the efficiency of IT governance. They are categorized as domain knowledge experts who are having good managerial capabilities, legal acceptance and regulatory policies of the PCI

related IT, dynamic changes of the payment card industry, defensive and competitive players among the PC industry, Technology adaptation of the PCI, third party serviced for PCI related IT and some of the perceive industry measures like acquirer or issuer position in the market, level of PCI DSS implementation etc.

By proposed research question main objectives are to identify the main factors that affecting efficient IT Governance in Sri Lankan Payment Card Industry and how they can be used to obtain the competitive advantage. This literature review will act as a good framework to analyze and propose recommendations above mention res earch objectives.

CHAPTER 3 - RESEARCH METHODOLOGY

3.1 Introduction

This Chapter discusses the overall process that was carried out to collect data, information that needed to analyze the defined Research problem and Research Objectives. This will be a detailed description of how the research conducting and the methodology that is going to be applied. This includes the research approach, research framework, conceptual model, and a detailed description of questionnaire development for qualitative, quantitative data analysis.

In Chapter 2 it's discussed current understanding about the Research problem and in this Chapter, it will discuss used research strategy and design. Mainly research framework is designed based on the concepts and frameworks discussed in Chapter 2. It also includes data collection methods used to collect primary and secondary data related to research, provide rationales for selected methods and justification of sample selection and information about participated parties etc.

3.2 Research Methodology

Research process comprises a series of steps or actions required for effectively conducting research and for sequencing of these steps. The following illustrated steps provided a useful procedural guideline regarding conducting research.

Figure 3.1: High-level research process

3.3 Research Question and Objectives

Research methodology illustrates how the research topic was investigated along with the collected data. This research question is about finding out the factors affecting to the efficiency of IT Governance in Sri Lankan Payment card industry, for that, both qualitative and qualitative approaches were equally appropriate. The suitable research approach was selected based on required data and the participants who provided data for the research.

To address this Research Question, Research Objectives mention in Section 1.5 are covered as the Research Scope, where define Research Methodology will help to find out solutions for the problem.

3.4 Research Approach

Research approach will give an overview perception about how the research is going process and types of statistical measures involved throughout the research. Research approach which discussed the research strategy and design illustrate how the Research topic was investigated along with the collected data. For the selected Research as the research strategy use of both qualitative and qualitative approaches were equally appropriate.

The research design is the conceptual structure within which the research is conducted; it constitutes the blueprint for the collection, measurement, and analysis of data. As such the design includes an outline of what the researcher will do from defining the research framework and its operational implications for the final analysis of data. So the research design can be defined as a plan, structure, and strategy of a research to find out alternative tools to solve the problems and to minimize the variances.

For this research also a conceptual model will be derived from the research framework. A research framework will be identified based on the literature review

discussed in Chapter 2.Thereafter, relevant data collection tools and mechanisms will be developed to align with the research objectives. Issues related to validity and reliability will be discussed at the end of the chapter to ensure the quality standards of the research.

Statistical methods used in research approaches claimed to be either quantitative, qualitative or a combination of both approaches [49]. A quantitative research is one in which the investigator primarily uses post positivist claims for developing knowledge. In other words, cause and effect thinking, hypotheses, use of instruments, questions, observations and testing existing theories are used in a quantitative approach. It employs instruments like questionnaires that yield statistical data output [49].

On the other hand, a qualitative research is one in which the researcher often makes knowledge based on constructivist perspectives like multiple meaning of individual experiences, meaning constructed socially and historically with an intent of developing a theory or a pattern. It further considers advocacy or participatory perspectives like political, issue oriented, collaborative, change oriented, etc. The researcher collects open-ended, emerging data with the primary intent of developing themes from the data [49].

Predefine categories of the card center users have been used for the research qualitative analysis and mainly focus to extract the data for their experience, opinion, feelings, knowledge, and input. Qualitative data that have been collected in some form of explanation, understanding or interpretation of the different level of user categories and situation has been investigated. The idea is to examine the meaningful and symbolic content of qualitative data.

For this research analysis, both deductive and inductive approaches [49] are used. To identify the research framework inductive approach has been used and to analyse the relationships in between the selected factors affected and the measurement of the IT governance has been used deductive approach.

The collected data is organized and sorted into the identified framework. Then use the framework for descriptive analysis. After identifying recurrent themes and notice patterns in the data, build the sequence of events and search data to answer the research question. Finally, find the relationships between the build frameworks.

3.5 Industry Overview

Sri Lankan payment card industry is a one of the main components which the significantly contributes to country's development through financial institutes. It has been an integral part in the lives of many. It is one of the key components in the commercial world as well as the finical industry in the country. Sri Lankan payment card industry is a fast growing industry where a huge amount of operators engages in the business while creating high competition between them as well as within the industry. Because of this high competition, a new entrance to the market is also increasing day by day. In order to sustain in market existing operators need to respond to dynamic market changes including the high completion, new entrance and retention and attracting new customers to their customer bases.

Even though cash remains the most preferred payment mode in executing retail payments in Sri Lanka and account for more than 90 percent of all retail payments [9]. But nowadays in Sri Lanka, there is a significant trend for utilization of payment cards instead of the money utilization. And also county financial sector inspires their customers to use payment cards for the transactions.

By considering the types of financial institutes that are permitted under the Banking Act and the Finance Companies Act to operate in Sri Lanka [9], by the Central Bank of Sri Lanka are Licensed Commercial Banks (LCBs), Registered Finance Companies, Licensed Specialized Banks (LSBs)

To address this Research Question, among these financial institutes Licensed Commercial Banks (LCBs) were selected as a sample to represent payment card

industry in Sri Lanka. The selected sample consists of Bank of Ceylon, Sampath Bank PLC, Commercial Bank of Ceylon PLC, Hatton National Bank PLC, Seylan Bank PLC, Nations Trust Bank PLC and People's Bank. The main reasons for selecting these sample size were

- Main key players in Sri Lankan financial industry and payment card industry
- Main key players among the pavement card users in Sri Lankan context
- Represent both public and private sectors of payment card industry
- The considerable payment card customer base belongs to the selected sample

The Sri Lankan banking sector accounted for 55% of financial system assets at the end of 2014; comprising Licensed Commercial Banks (LCBs) and Licensed Specialized Banks (LSBs). The distinction between LCBs and LSBs lies in the scope of activities they can undertake. LSBs are licensed to conduct specialized banking business and are not authorized to accept demand deposits and deal in foreign currency. LSBs include specialized savings banks and development banks, while LCBs have a broader scope [9].

At the end of 2014, there were 33 licensed banks, including 24 LCBs and nine LSBs. Half of the LCBs were foreign bank branches, four of which were branches of Indian banks. The number of LSB had fallen from 14 to 9 due to the vesting of the six state-owned regional development banks with another newly incorporated state owned bank during 2010 [9],[51].

The number of LCBs increased to 24 in 2011 with the granting of licenses to Amana Bank Ltd and Axis Bank (of India). Fitch rates 19 banks in Sri Lanka: all 11 local LCBs (at end of 2010), three foreign bank branches, and five LSBs. Together, these rated banks accounted for about 96% of total banking sector assets at end 2010. The Sri Lankan banking sector remains concentrated. The six largest local LCBs identified as being systemically important – Bank of Ceylon (BOC), People's Bank (PB), Commercial Bank of Ceylon PLC (COM), Hatton National Bank PLC (HNB), Sampath Bank PLC (SAM) and Seylan Bank PLC (SEY) accounted for 64% of

sector assets, 74% of sector loans and 68% of sector deposits at end-2010. Just over half the assets of the banking sector are with the public sector, with the two largest LCBs and the largest LSB being state-owned. Foreign ownership is relatively low at 12%, although the largest foreign bank branch (HSBC Sri Lanka) accounted for 5% of sector assets at end-2010 [9], [51].

Customer reach is still largely through the traditional "brick and mortar" model, through branches and outlets - as the use of alternate delivery channels remains limited. The geographical dispersion of branches indicates a concentration in the Western Province. After the cessation of the civil war, most banks also established a presence in the Northern and Eastern Provinces. The level of banking sector assets relative to GDP was 69% from 2000-2009, although the ratio was well below this at 63% in 2010 [9], [51].

3.6 Data Collection

To collect data to analyze the research problems, both primary and secondary data collection methods were used. And various tools and techniques were used to collect these data. Reason for this was to collect all required data by using an appropriate method which suits for appropriate participant base on the intending data from the participant. Data collection process design and execution was given special attention to how to acquire required data components and while not interrupting day to day operations of selected samples. The primary data collection process was consisted of collecting both qualitative and quantitative data.

Interviews were selected as the most preferable method for conducting primary research to collect qualitative data /information from the key person in banks. Interviews can be described as where the interviewer has the full control over the discussion and data /information that collected. There are various advantages in interviews over other data collection methods. The interviewer has the opportunity to get accurate responses from Interviewee by aggregating their inputs. And processing of collected data is easy as responses were collected on predefined set of questions which are constructed using predefine coding framework. This will help the

interviewer to get the access to areas that were not considered previously but have an impact to the research problem.

Face to face interviews as well as telephony interviews was preferred by participants of the research. Some incidents face to face interview sessions were rescheduled due to unavailability of interviewees. A couple of telephone interviews were conducted due to limited access to selected samples, lack of time and busy schedules of interviewees. As this research is about information technology governance and payment card industry some interviewees preferred to use their technology rather than using traditional techniques. But there are some disadvantages in conducting a telephonic interview as sometime interviewer cannot see the expressions of interviewee when responding to questions, length of the discussion is limited as it cannot build a rapport with interviewee etc.

Considering questions that presented to interviewees, mostly they were semi - structured interview questions. That acted as a guide to conduct the interviews. All interview questions were prepared around research objectives and some themes from the literature review, but flexibility was maintained to get the complete information as much as possible. To confirm the accuracy of responses interview transcripts were done.

Interview sessions were carried out with relevant management representatives from information technology, human resource, procurement, legal, risk, security, compliance and card operations from the selected institutes were interviewed from the selected samples. Purpose of interviewing these managers was, as they have an overall idea about the operation of their payment card business, managerial and decision issues they face and strategic business ideas that can achieve /overcome by application of IT governance in their organization.

The second set of interview sessions were carried out to card center supervisors/ operational in charge officers. Due to their busy schedules, these interview sessions were rescheduled again and again. The main purpose of interviewing these supervisors was to get the real-time issues, challenges they face in managing

customer base and related queries. And to get an idea about how IT governance can help them to perform their tasks and responsibilities to get competitive advantages.

Telephone interviews were done to IT department engineers related to payment card as well. The main objectives for these interview sessions were to get the idea about the application of technology to payment card products/services to satisfy the institution's business requirements.

In order to get quantitative ideas related to the research problem one questionnaire was carried out to different segments of payment card business and bank communities. Purposes of these questionnaire were to get related data to test the hypothesis developed and analyze data aligning with the research objectives. Special attention was given to the themes which were discussed in Chapter 2. Type of questions that were included such as single answers, multiple answers, open commenting, rating questions etc. Special considerations were paid in designing the structure of the questionnaire where answering methods as the participant to select their ideas, the minimum number of questions to provide feedbacks in words etc. All questions were provided in an interactive way with the participant, use of simple language and fewer jargons.

Both email and online free survey tools were used to distribute and collect the feedbacks to these questionnaires. Reason for use of both channels was for some target participants internet access is prohibited to certain levels of personnel. Additional effort was needed to consolidate inputs from both channels in the process of data analysis. Sample sizes for the questionnaire from each site were selected by applying judgment sampling [52] technique with the help of managers of relevant banks. This technique was used to select samples who represent a fair amount of personnel from each research site. The carried out interviews, questionnaire, main objectives and sample participants of each are described in table 3.1.

Table 3.1: Sample Selection

Organization Level	**Objectives**	**Sample participants**
Top Level Managers	Get an information about the strategic level concerns, identified challenges and issues when dealing with information technologies related to the payment card business.	Card center business/IT
Technical Engineers	Get the information about providing information technology services to payment card business users challengers/issues faced.	IT Engineers
Operational Staff - Payment Card	Internal staff who use the payment card related information technology systems and tools for carryout payment card operations and business in the selected sample.	Internal card center operational and IT staff

The secondary research data collection was mainly focused on collecting and analyzing existing reports, policy documents and standard documents, formats that are used to carry IT, business operations in payment card business and documents related to payment card system IT projects. Purpose of analyzing these data was to understand the current IT role in the business and set standards and procedures in delivering the IT as a service to the payment card business. Cooperate websites and annual reports were analyzed to get an overview of banks, but less information was there considering about IT application for payment card business and their performances.

Regression analysis is one of the most important and widely used statistical techniques and has many applications in business and economics. A regression model has several possible uses. One is to understand the relationship between

independent variables and the dependent variable [48]. Understanding a relationship between two variables in regression does not imply that one variable causes the other

3.7 Research Framework

While existing literature on IT governance by considering internal and external environment different theoretical frameworks discussed the importance in user behavioral factors, fiscal and regulatory policies, technology and management expertise, global business, IT strategies' etc. Since this study focuses more on the factors affecting IT governance is payment card industry in Sri Lanka, below research frameworks, were selected to conduct this research.

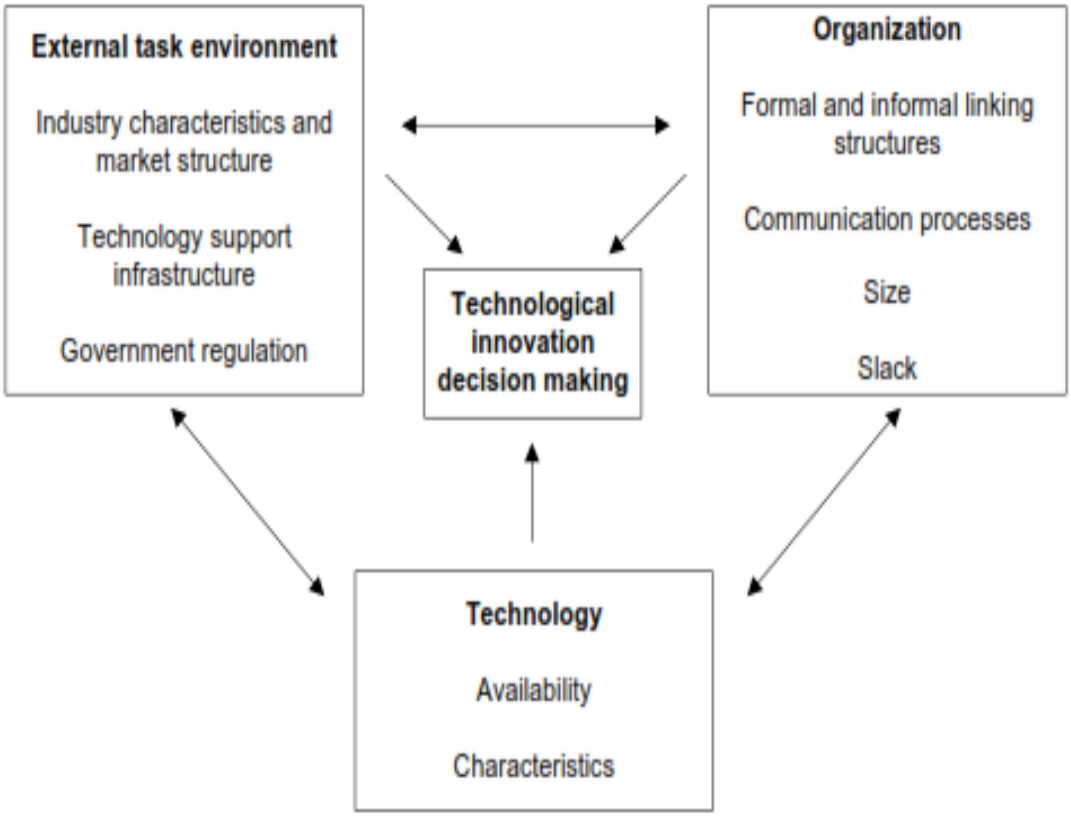

Figure 3.2: Technology, Organization and Environment Framework [32]

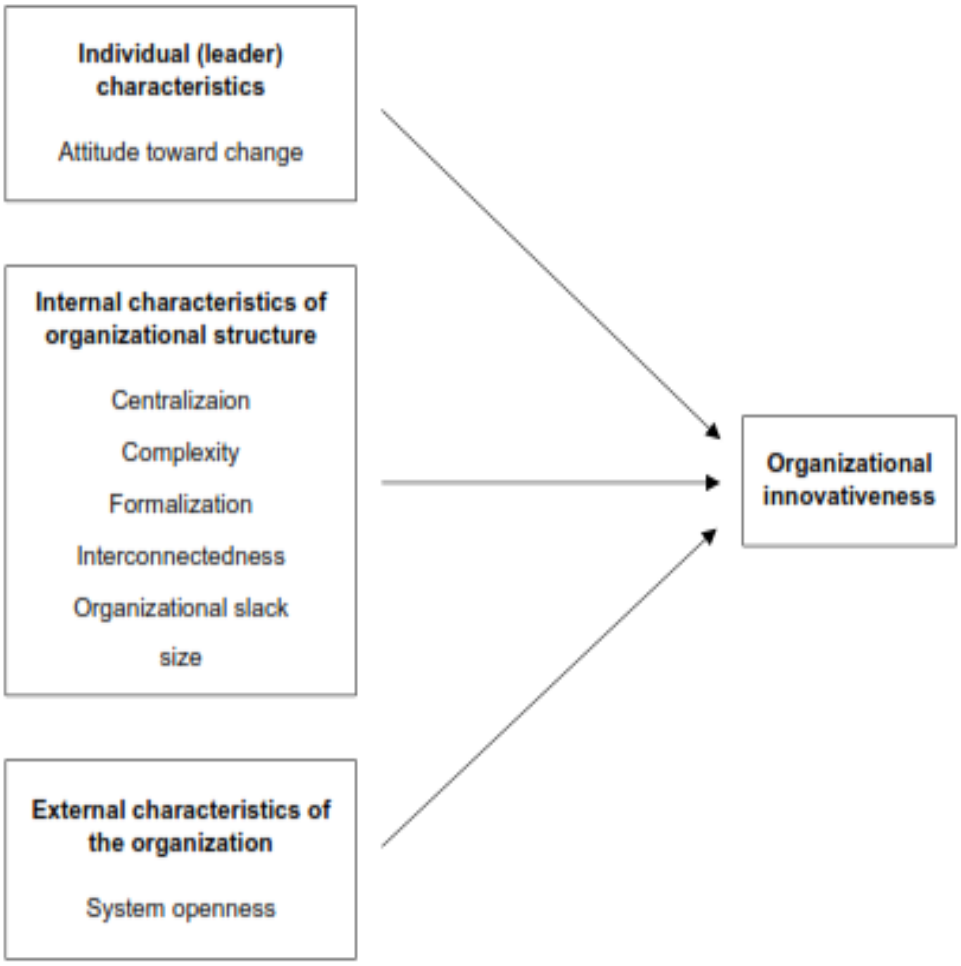

Figure 3.3: The Diffusion on Innovation (DOI) Framework [32]

The Diffusion on Innovation (DOI) Framework [32] is a theory of how, why, and at what rate new ideas and technology spread through cultures, operating at the individual and firm level. Technology, Organization, and Environment context (TOE) [32] identifies three aspects of an enterprise context that influence the process by which it adopts and implements a technological innovation: technological context, organizational context, and environmental context. The entire research including development of the conceptual model and hypotheses was built using the proposed framework.

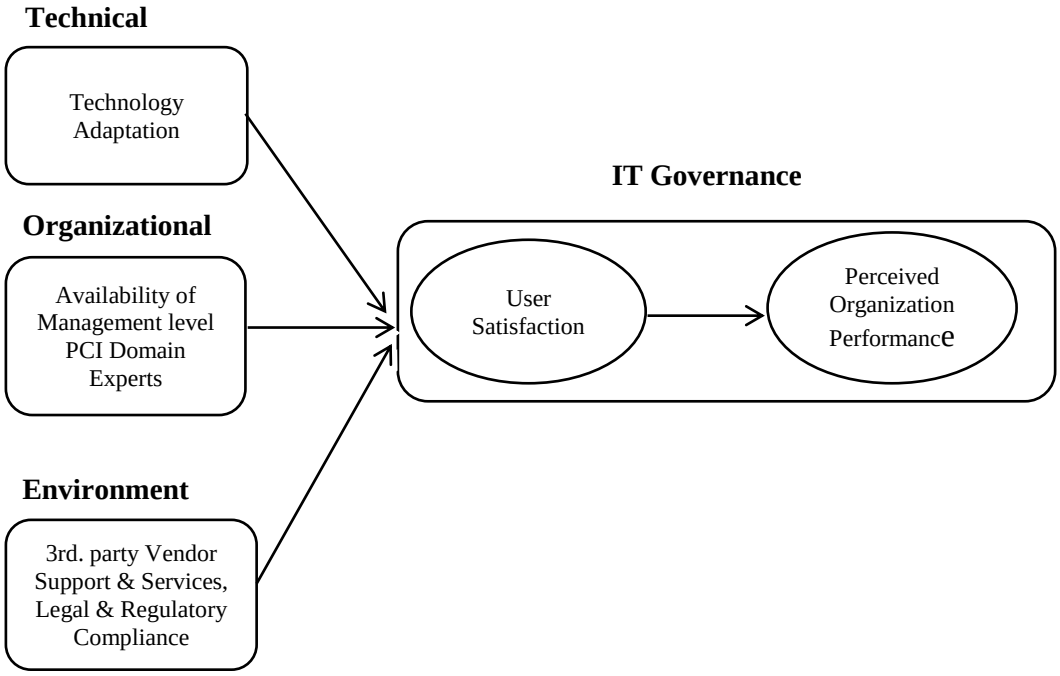

Figure 3.4: Conceptual Research Framework

3.7.1 Technological context: Compatibility of technology adaptation

Organizations introducing the technology need to determine the percentage of their users who are willing and able to use the technology and develop a strategy for how to manage the later adopters. Getting the largest possible number of the potential user base those people who are less willing or less able to adapt is critical for organizations trying to keep up with their competitors. Technology adaptation compatibility can therefore, be viewed as "the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of the potential technology adopter"[45]. Similarly, if the Payment card organization perceives technology adaptation between an IT governance framework and its work

environment, this may lead to success in IT governance framework adoption. The following hypotheses are therefore inferred:

H1a: Payment card organizations that perceive a compatible technology adaptation between an IT governance framework and their work environment are likely to have high user satisfaction.
H1b: Payment card organizations that perceive a compatible technology adaptation between an IT governance framework and their work environment are likely to have a high perception of organizational performance.

3.7.2 Organizational context: Availability of management level PCI domain experts

Availability of management level PCI domain expertise refers to the existence of card center's personnel with relevant skills and experience to implement a selected technological innovation. Literature review studies point out that a higher availability of IT expertise correlates with a positive attitude and satisfaction in technology adoption [45]. Card centers with in-house IT expertise tend to have greater control over the implementation and operation of systems, which may lead to relatively higher organizational performance. Thus, study hypothesizes that:

H2a: Payment card organizations with the internal expertise to support IT governance framework adoption is likely to have positive user satisfaction.

H2b: Payment card organizations with the internal expertise to support IT governance framework adoption is likely to have positive perceived organizational performance.

3.7.3 Environmental context: Third party vendor support and services

The availability of external expertise to expedite the implementation process and help organizations to recognize the industry best practice is deemed critical to innovation implementation success [45]. External support refers to the availability of expert support from vendors and consultants. Such support can contribute to implementation and post-implementation success by providing continuous assistance, such as system maintenance, system updates, to maintain system efficiency and effectiveness, and thus sustain the benefits of innovation adoption [32] consequently, this study hypothesizes:

H3a: Payment card organizations with accessible external support from vendors and consultants are likely to have positive user satisfaction in their IT governance framework adoption.

H3b: Payment card organizations with accessible external support from vendors and consultants are likely to have positive perceived organizational performance due to their IT governance framework adoption.

3.7.4 Environmental context: Availability of defined legal and compliance frameworks

There are some signs of a trend towards the merger of the management of legal and compliance related risks. The key regulatory imperative is to ensure that senior management are engaged in the management of all risks. Although it is increasingly difficult to draw clear distinctions between legal and compliance risk, the question remains whether it is appropriate to use operational risk management tools to attempt to manage legal risks. As the discussion in literature review shows, there is a demonstrably wide range of different approaches and cultures in the identification, logging, and measuring of legal risk. This makes it difficult to draw conclusions about which structures, skills, and tools are optimized for managing legal risk [46].

As per the lecturer review analysis there are pitfalls in working out what laws and regulations are in operation for a particular context especially in IT governance [46]; similarly, if the payment card organization with a well-defined set of legal and

compline framework, this may lead to address in IT governance framework related issues. This study hypothesis is inferred:

H4a: Payment card organizations which are having well defined set of legal and compliance framework to support IT governance framework adoption is likely to have positive user satisfaction.
H4b: Payment card organizations which are having well defined set of legal and compliance framework to support IT governance framework adoption is likely to have positive perceived organizational performance.

3.7.5 User satisfaction and organizational performance

As proposed by [47], user satisfaction in technology adoption may have a direct influence on perceived organizational performance. Similarly, we posit that:
H5: Payment card organizations with overall user satisfaction due to IT governance framework adoption are likely to have positive perceived organizational performance.

3.8 Data Analysis

In terms of Data Analysis, both qualitative and quantitative data that were collected were analyzed and interpret. 'More than reporting two distinct "standards" of quantitative and qualitative research; these studies must also integrate, link, or connect these "standards"' in some way' state [49]. Collected data in both ways analyzed and converted to information which answers the research problem and objectives as well as theory arose in the literature review. For analysis of qualitative data from conducted interviews, a coding framework was used. Coding refers to the process of identifying and breaking down the data into key themes which are given names and an associated code [49]. Quantitative data which collected using questionnaire were analyzed in more visualize the way under themes which was drawn from research objectives and literature review. Finally, these analyses were merged to draw up the final conclusions for research problem.

3.9 Limitations

A number of limitations, constraints were faced when conducting the literature review as well as in data collection method. Conducting Literature review within a limited time frame, limited available literature related to IT Governance into Payment Card Industry (PCI) was one constraint.

In primary research main limitation was the time constraint in conducting interviews in different site premises, issues related accessing the interviewees, selecting participants for focus groups etc. Designation and role conflict is another limitation, some personal in card center might have dual roles (e.g. card center operations, system analyst) in the process of selecting interviewees these problems were specially handled with effort. Conducting interviews within different sites with a minimum number of interviewees were done in order to minimize waving ideas as outputs of interviews.

Considering conducted questionnaire sample size selection was the main limitation faced, based on the cultures of institutes sometimes participants were reluctant to provide exact information because of the risk of damaging the built perceptions and standards. Participants of the questionnaire were reluctant to provide their names and designations, although it was mentioned all details will be handled in a confidential manner. Getting responses from target group was another challenge, out of three sites, one site response rate was low, special reminders, and effort was carried out to increase response rate.

For questionnaire selected sample sizes were small. This was due to the accessibility of participants from institutes. Most participants were selected by card center managers randomly. This might have an effect on response rate and research findings.

As researcher is not an employee of any of these sites accessing of the company information, documents or any other secondary data (sample reports etc.) were quite challenging.

3.10 Ethics

Several ethical factors considered during the process of research. Mainly these ethics were considered in literature reviewing, primary and secondary researching, analyzing and concluding the research findings. All the materials that referred in literature review as well as other sections are included in the reference list and direct extractions were cited in IEEE reference style. When conducting data collecting processes, consent forms were given to each participant who participated in interview sessions and a questionnaire. All the participants who participated in the research participated voluntary and they were advised that they can withdraw their inputs anytime.

All participants were acknowledged that they will remain anonymous and information collected, research institutes details were treated confidentially without affecting their business process, performance in the industry.

In the process of presenting collected data, all participants were mention by using their job titles instead of their names (E.g. Card Center Manager - Research Institute 01). Due to high competition among the firms, this rule was applied to research institutes also. For all the interviewees whether it is face to face or over the phone, researcher personally assured there will not be any harm to the participants.

3.11 Others

With alone with limitations that mention in Section 3.9, limited access and time were considered during research design. As researcher had only a professional relationship with research sites and some level of access was granted to carry out this research and data collections.

3.12 Conclusion

With the conducted literature review and research data collection along with the above mention limitations, next stage is to analyze the finding in order to understand the research problem and objectives and finding conclusion from that. By analyzing the collected data/ information research findings will be discussed in the next section.

CHAPTER 4 – RESEARCH FINDINGS AND OBSERVATIONS

4.1 Introduction

In chapter 03 it discussed the research design and carried out data collection process in related to the research question and research objectives. This Chapter discusses the findings that obtained from analyzing the collected data. All data/ information that collected from both quantitative and qualitative data collection methods are organized around defined themes. These themes were derived from the Literature review in Chapter 2 and the Research Objectives mentioned in Chapter 1.

4.2 IT Governance and how it fits in the PCI in Sri Lanka

The majority of responses interpreted IT Governance in the payment card industry; as managing related security and compliance standards while avoiding risks. Since payment card industry deals with global networks such as Visa, MasterCard it was stated IT governance has more focus on security, risk and compliance management aspects. Senior top management perspective that effective IT governance has a greater impact on user satisfaction both internal and external. And also it was emphasized that the effective IT governance is important to meet the competition among the players in the payment card industry. The majority of interviewees stated IT Governance is an essential tool for their business as it's a global business dealing with no geographical boundaries while closely attached to Information Technology. It was stated that current Sri Lankan payment card industry competition is high and it grows day by day. Source of competition can be in terms of lower prices and smaller profits, increased price response, consolidation, dynamics, and risk-based pricing, lower markups, decreased profitability. They also defined that IT governance can help organizations in response to dynamic market trends while aligning its people, process, and technology with industry best practices.

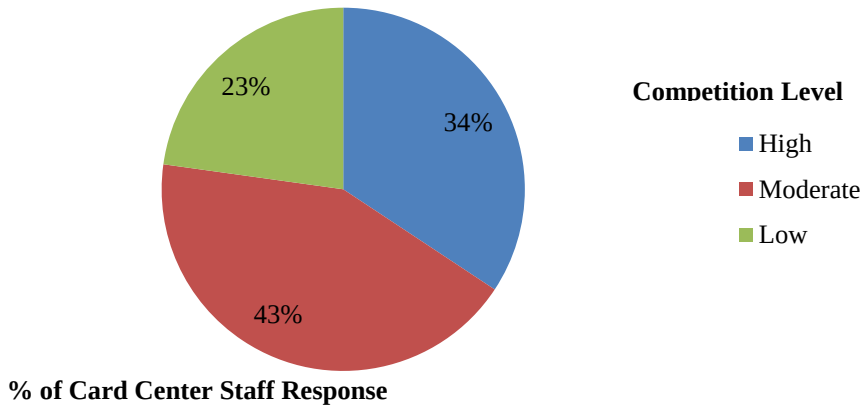

Figure 4.1: Competition among the financial institutes in Sri Lankan PCI

Figure 4.1 illustrates the competition among the financial institutes in the Sri Lankan payment card industry rated by card center staff. More than 75 % of responses are in moderate or high competition level.

Table 4. 1: Growth Rate of Payment Cards - Outstanding

Banks	2013	2014	2015	Rank
HSBC	-	-1%	-2%	8
NTB	34%	21%	16%	2
SAM	30%	21%	18%	1
COM	45%	5%	15%	4
HNB	23%	14%	16%	2
SEY	16%	23%	2%	7
BOC	13%	7%	8%	5
PB	25%	6%	7%	6
Market Growth	15%	13%	9%	

Source: Respective bank announcements, BOC Card Centre & CBSL

Table 4.1 illustrates the major players in the Sri Lankan payment card industry and their market segments. Figure 4.2 illustrates the card center staff rating to IT usage in their payment card business.

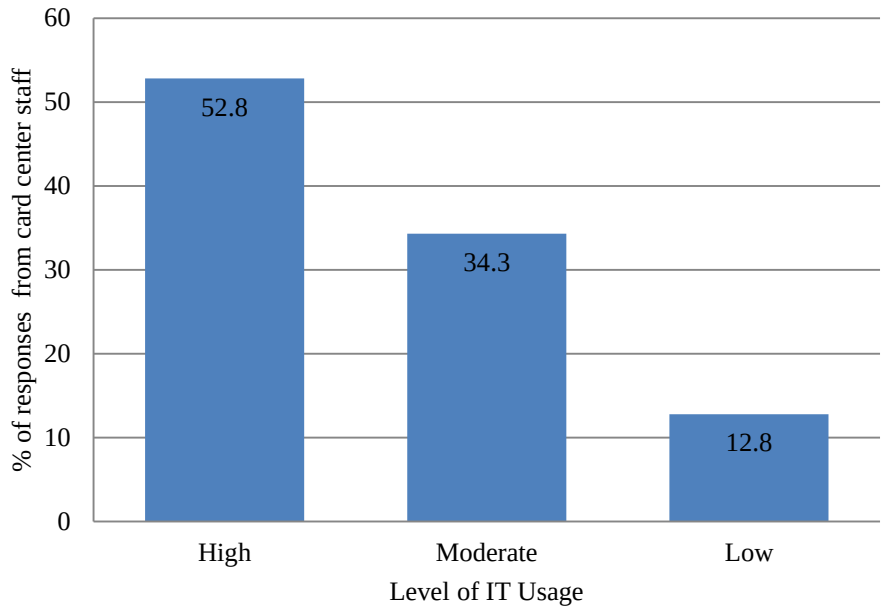

Figure 4.2: IT Usage in Sri Lankan Payment Card Business

4.2.1 IT Governance and its place in PCI

During the interview sessions held with IT senior managers it was identified that IT governance plays a major role in the global payment card industry. It was highlighted that the reason is due to the payment card industry high dependency on IT. More details were given on this from the aspects of storing customers and payment card details, card payments, related processes, and transactions. On the other hand senior managers from the card centers, the more information provided on the available products and services in payment card business in terms of global and local context.

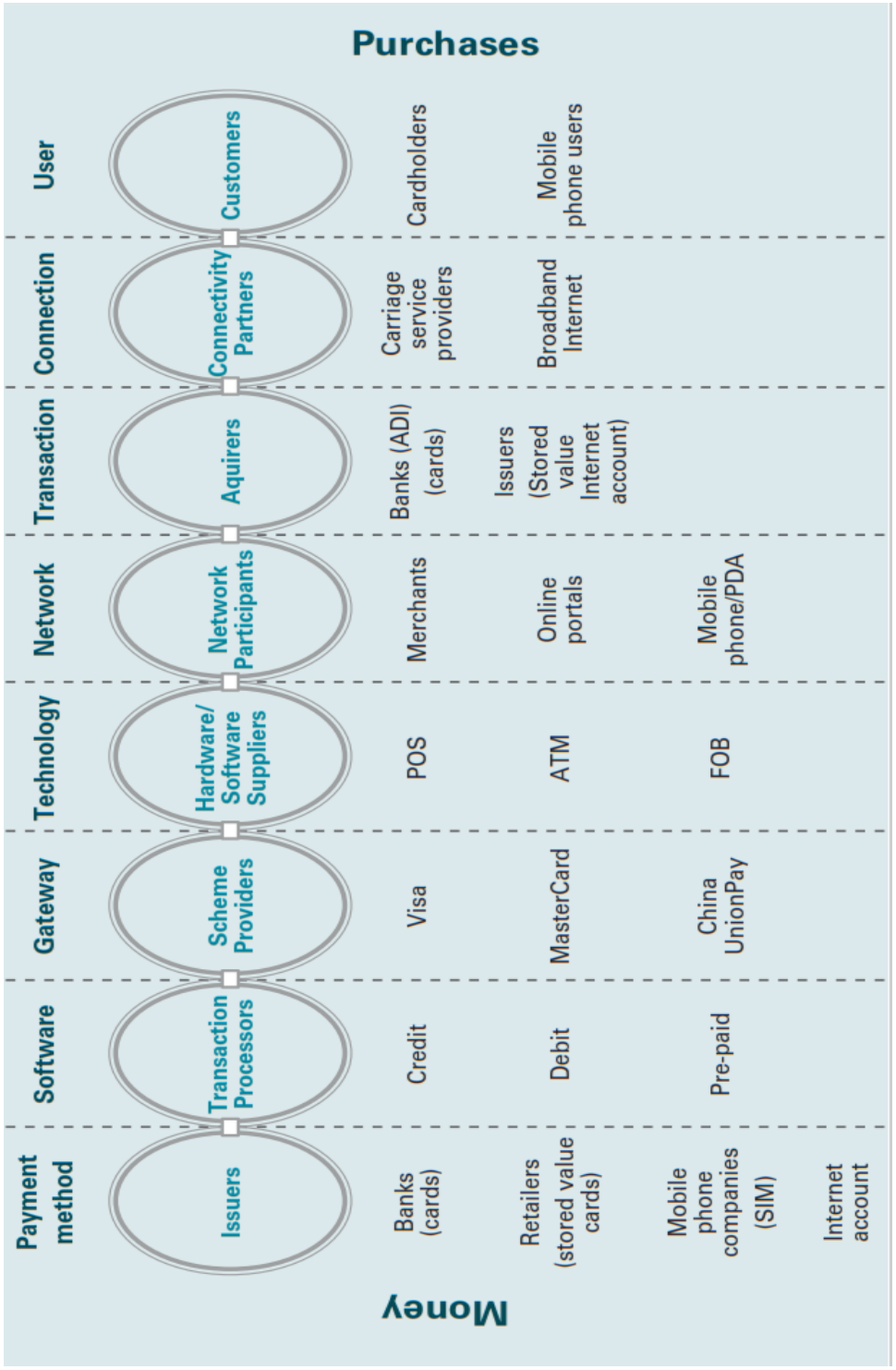

Figure 4.3: Current participants in payments card business

Source: Pisent Masons [50]

Considering the importance of IT Governance in Payment Card industry, it was highlighted that more focus needs to give on the global payment card compliances, maintenance of PCI DSS standards, avoid financial penalties and negative user satisfaction associated with a data breach, and reduce cost associated with seamless IT services in delivering payment card products and services. It was emphasized in most cases IT Governance is limited to security and compliance aspects. Responses stressed that in local context IT governance is limited to adhering to payment card compliances.

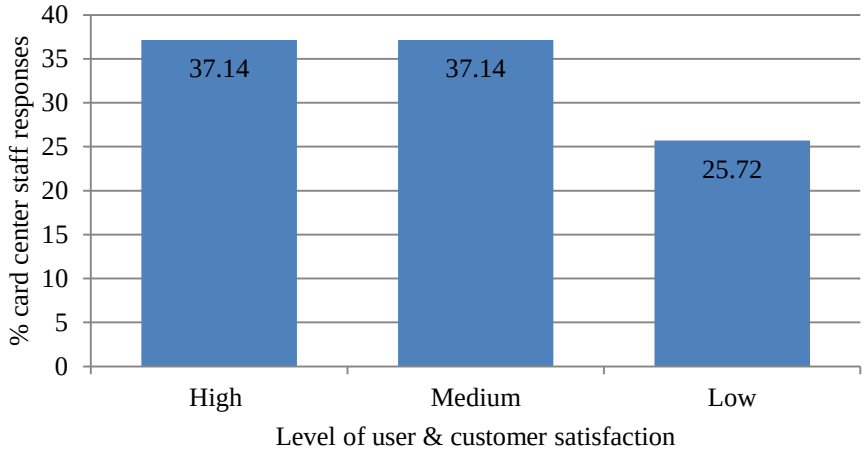

Figure 4.4: The importance of effective IT Governance in delivering user & customer satisfaction

Figure 4.4 illustrates the card center staff perspective the importance of effective IT Governance in terms of delivering higher user and customer satisfaction. Importance of IT Governance in achieving payment card related organizational strategic objective is shown in Figure 4.5.

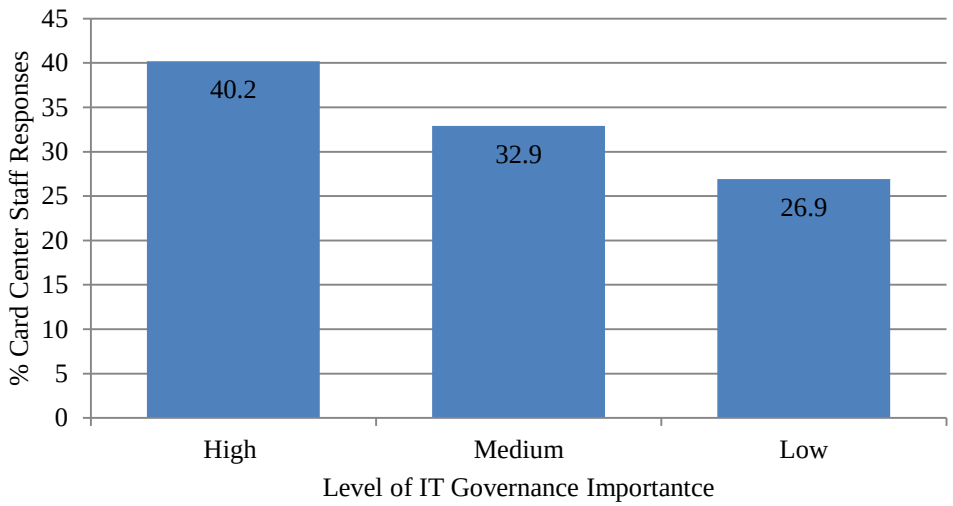

Figure 4.5: Essentialness of IT Governance to achieve PCI related organizational objectives

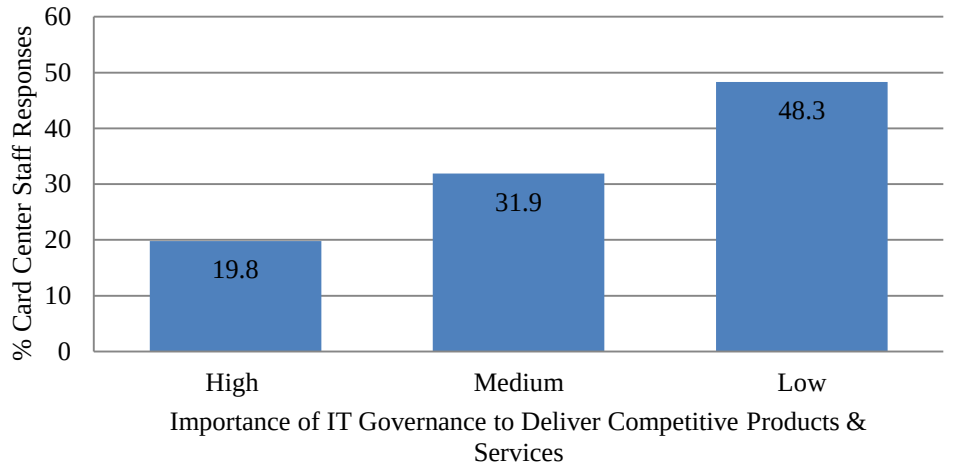

Figure 4.6: Importance of IT Governance in PCI to deliver competitive products & services

Figure 4.6 illustrates the importance of IT Governance to PCI in delivering competitive products and service

4.2.2 Sri Lankan payment card industry IT usage

Considering the types of IT usage in Sri Lankan payment card industry, it can be categorized mainly into the Information system (IS), Application Systems, Network and Communication, IT Security, PCI Compliance, PCI Risk.

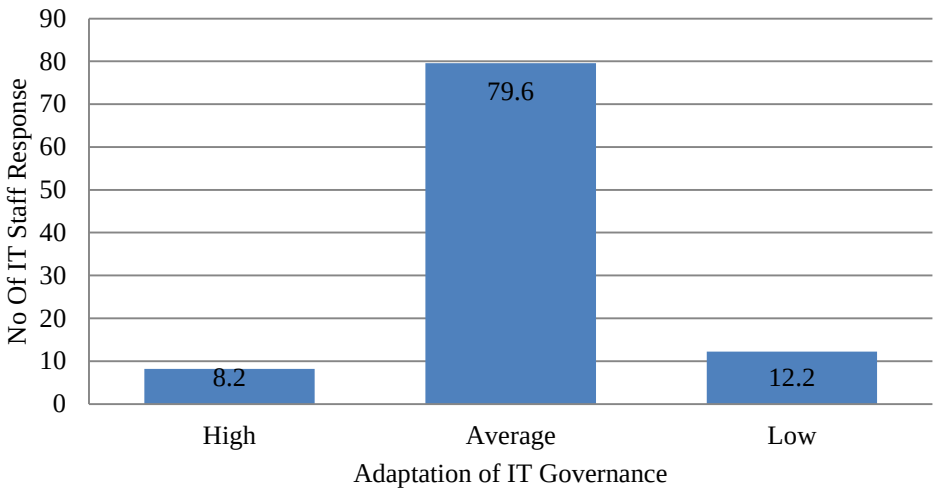

Figure 4.7: Overview of IT Governance adaptation in Organizational Context

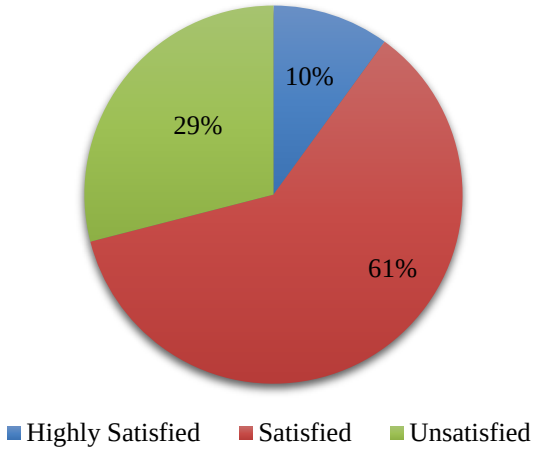

Figure 4.8: Assessment of IT governance application in Sri Lankan PCI

Source: Respective bank announcements, BOC Card Centre & CBSL)

Figure 4.7 illustrates the IT department staff ratings on the adaptation of IT governance in managing payment card related IT systems and components. Figure 4.8 shows that assessment of IT governance application in Sri Lankan payment card industry. This was supported by the senior managers (IT and Operation) by providing information on bellow categories. Based on the provided feedback, prioritize gaps are mentioned in Table 4.2.

Table 4.2: Prioritize IT Governance Gaps in Sri Lankan Payment Card Industry

Factors	Level of Impact (High, Medium, Low)
Decreasing the knowledge gap	High
Third party vendor support	
Technology Adaptation	
Effective project management	Medium
PCI information technology procurement	
Change management	Low
Business Process Re-engineering	

4.2.3 IT Governance as a strategic and operational tool

Senior Managers highlighted another aspect of IT Governance usage, as a Strategic and Operational tool. It was stated that IT governance can vary depending on the management level in the payment card business and its unit's involvement. For the overall organization perspective IT governance can be considered as a strategic tool where it can align the people, process, technology with the organization's strategic business objectives. As an operational tool, IT governance was defined as a framework to execute the policies and produces to carry out day to day operations and decision-making process. On the operational aspect, mainly it was emphasized that seamless IT services and systems will help the units to run their operations smoothly. Based on the data analysis Figure 4.9 summaries the management perception IT governance usage as a tool.

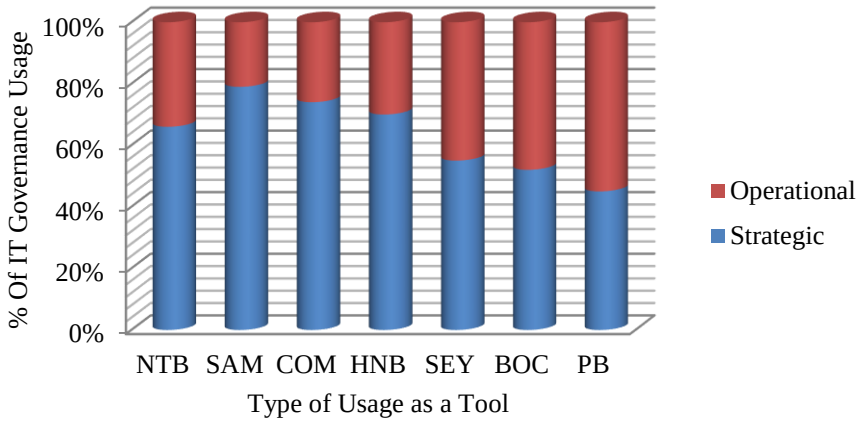

Figure 4.9: Overall usage of IT Governance as a tool-management perspective

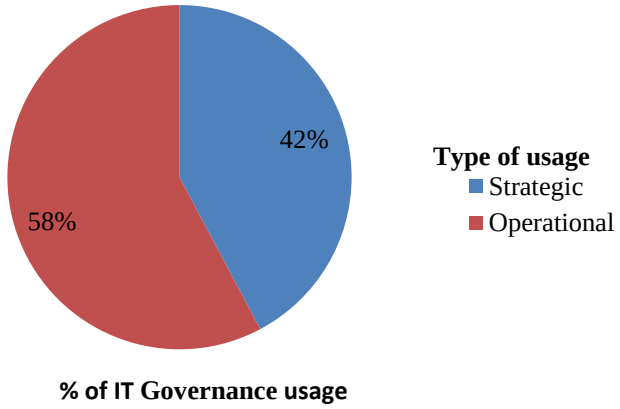

Figure 4.10: Strategic & Operational vise IT Governance usage

Figure 4.10 illustrates an average percentage of IT governance usage as an Operational tool within the institutes which helps them to carry out their day to day operations. This indicates IT governance has a considerable contribution to carry out payment card business operations in smoother way.

4.3 Factors Affecting the Efficient IT Governance in Sri Lankan PCI

This section discusses the factors and needs that effect to have an efficient IT Governance in Sri Lankan payment card industry. These aspects are drawn by considering the inputs taken from the senior IT Managers, Operational Managers, IT Department Engineers and card center staff. Senior top management highlighted that

main factors and characteristics specific to PCI as highly sensitive data, Rapid and Dynamic changes along with business and industry trends, high technology oriented, high investment, stick to compliance requirement such as payment schemes, central bank, global and local payment association have a highly specialized skill set in the PCI business domain and high competition among the financial institution who provides payment card solutions.

4.3.1 Availability of PCI domain experts with management capacity

Senior managers of IT departments and the card center highlighted that Sri Lankan payment card industry has a shortage of domain experts who have both technical and management expertise. Feedback analysis shows that the shortage of domain experts has a greater impact on IT governance in terms of delivering competitive products and services. Gaps can be more classified as delivering products and services on time, PCI IT technology related decision making, and immediate response to competition. Most of the feedback shows that high competition in the market. It also highlighted sometimes these gaps are damaging the user satisfaction and finally the overall organizational performance. This was supported by the demographic information analysis by the staff who attached to card centers and related IT units.

Demographic analysis: Figure 4.11 shows 72 % staff associated with card center managerial positions have only 1 - 5 years of experience and 20 % staff consist of PCI managerial experience of 5 -15 years; staff who have more than 15 years of PCI managerial experience are 8%. Discussing the types of job roles that involved in PCI IT; Figure 4.12 illustrates the classification of card center manager's involvement in their PCI business. Responses were given under categories as 21 % Operational non-IT Resource, 24% Operational IT Resource, 21 % Strategic non-IT Resource, 8% and Strategic IT Figure 4.13. 45 % of the operational managers rated that they have extensively participated in PCI IT decision making process while 25 % of operational managers rated as their participation is to some extent , 20% operational manager have participated only to the initial PCI IT initiated discussions and 10 % operational managers rated that zero participation on PCI IT decision making process.

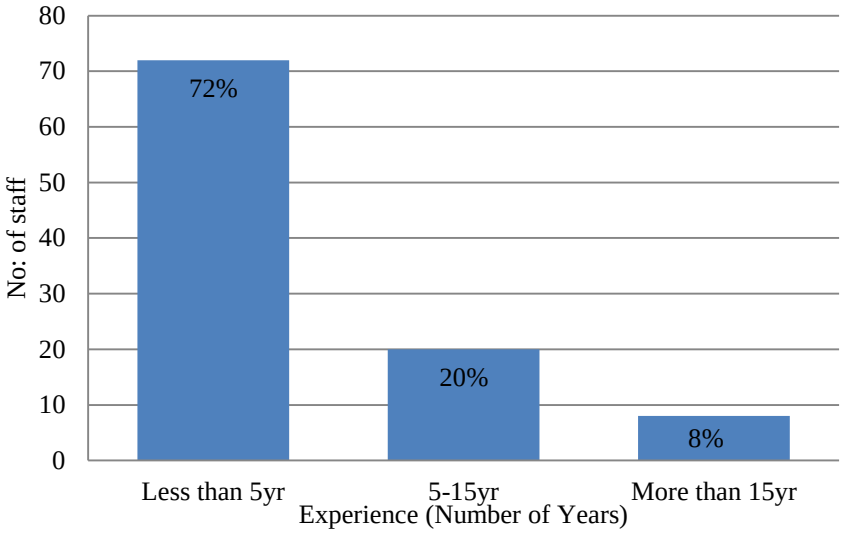

Figure 4.11: PCI domain experience in managerial position

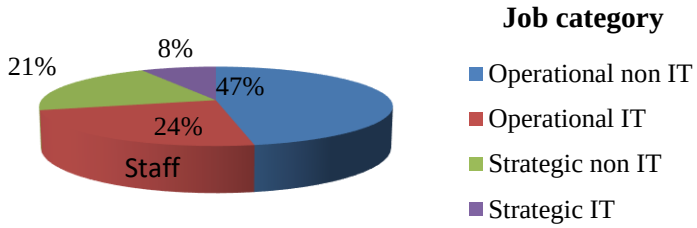

Figure 4.12: Job categorization analysis among managers

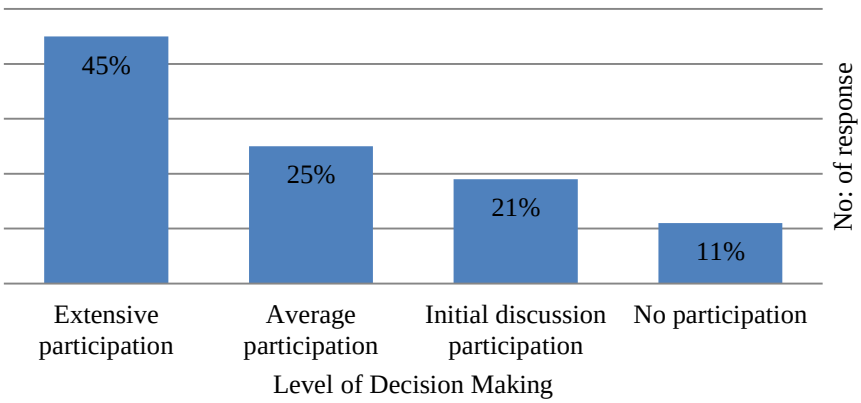

Figure 4.13: Operational manager participation on PCI decision making

PCI technical staff demographic analysis: Figure 4.14 shows technical staff attached with PCI IT solution experience can be categorized as 40% staff with less than 5 years' experience, 30 % staff with 1 - 5 years' experience. 25 % of IT staff with 5 - 15 years of experience and only 5 % technical staff with more than 15 years of experience. Technical staff participation in PCI IT related decision making is at a high level, both on strategic and operational aspect. It was highlighted that it is crucial that all IT senior manager's participation in PCI IT decision making. If this is not happening partial decisions will lead to IT governance problems. It was stressed that due to this gap there were incidents of technology compatibility issues and challenges of bringing all the IT services into a single platform.

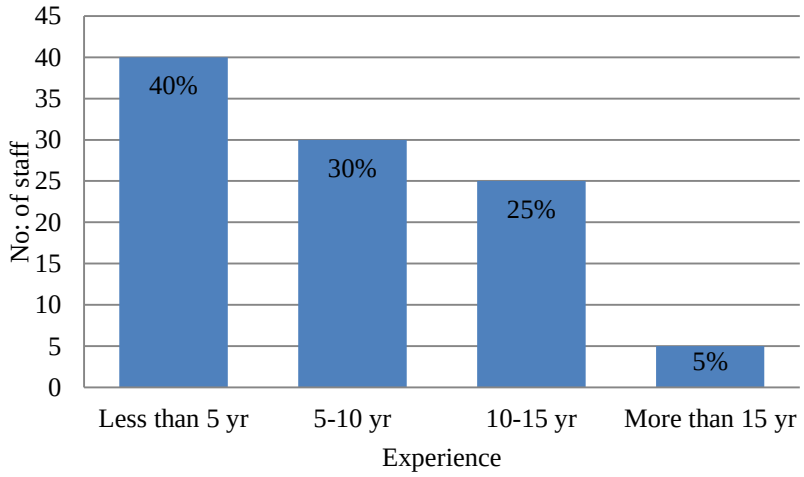

Figure 4.14: Technical staff PCI domain experience

PCI human resource capacity building: Considering the dedicated IT resource allocation in institutes Figure 4.15 illustrates; more than 50% of the institute's resource allocation is 5 -10 resources, where two institutes have the resource capacity to 10 -15 and one institute has 15 -20 staff members. Technology associated senior managers highlighted that most of the PCI related technology systems and services are outsourced to 3rd party vendors where the internal staff is associated with coordination, project management, incident management and operational management. Most of these resources focus on PCI security, compliance, PCI risk audits, Visa, MasterCard, ATM application support and vendor management.

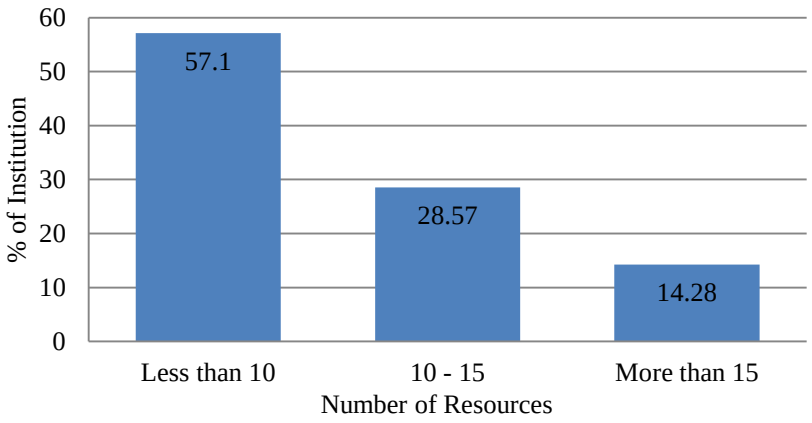

Figure 4.15: IT staff allocation of PCI business

They also emphasized PCI domain is highly technology oriented; where technology and trends rapidly change. Challenges to fill up the technical knowledge gaps related to PCI is due to various factors such as limited training programs available in local context, low number of training institutes which focus on PCI related training and capacity building. This was supported by the responses provided by IT department engineers on PCI domain training participation Figure 4.16 illustrate that 35 % of staff have participated on a PCI domain related technical training programs during the last 5 years, 65 % of IT department representatives haven't participated in any PCI related training program.

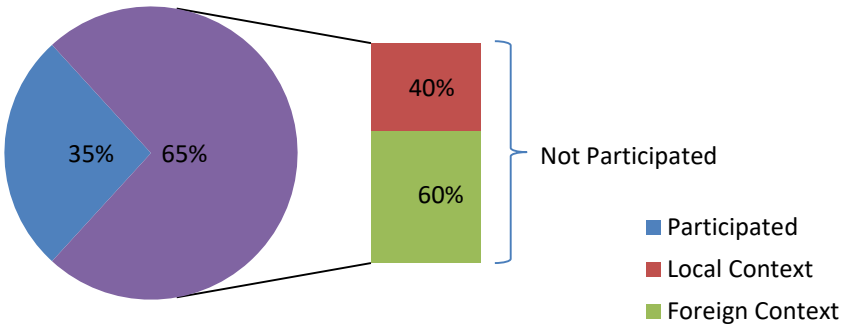

Figure 4.16: Employee's participation in PCI related training for last 5 years

IT senior managers highlighted other main challenges in building PCI IT HR capacities as flat organizational structures in the business and technology units, the

absence of defining roles and responsibilities to PCI IT related positions and job rotations of IT engineers and banking staff.

Exposure and IT Governance contribution: Feedback from senior managers; payment card business expertise areas can be categorized as risk management, compliance management, security management, card personalization process, ATM/POS and other device application handling, card systems and related applications that affect the user satisfaction and overall organization performance. Figure 4.17 illustrates the operation staff perceptions of the higher user satisfaction variation based on the PCI expertise level. Figure 4.18 shows the operational staff perception of the greater organizational performance varies based on the PCI expertise level.

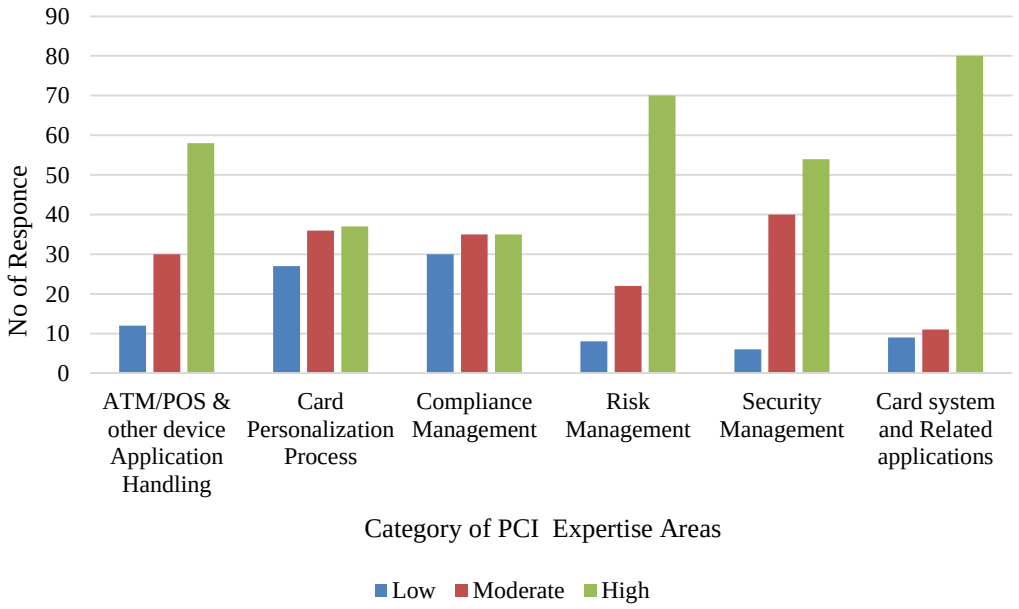

Figure 4.17: Higher user satisfaction variation based on the PCI expertise level

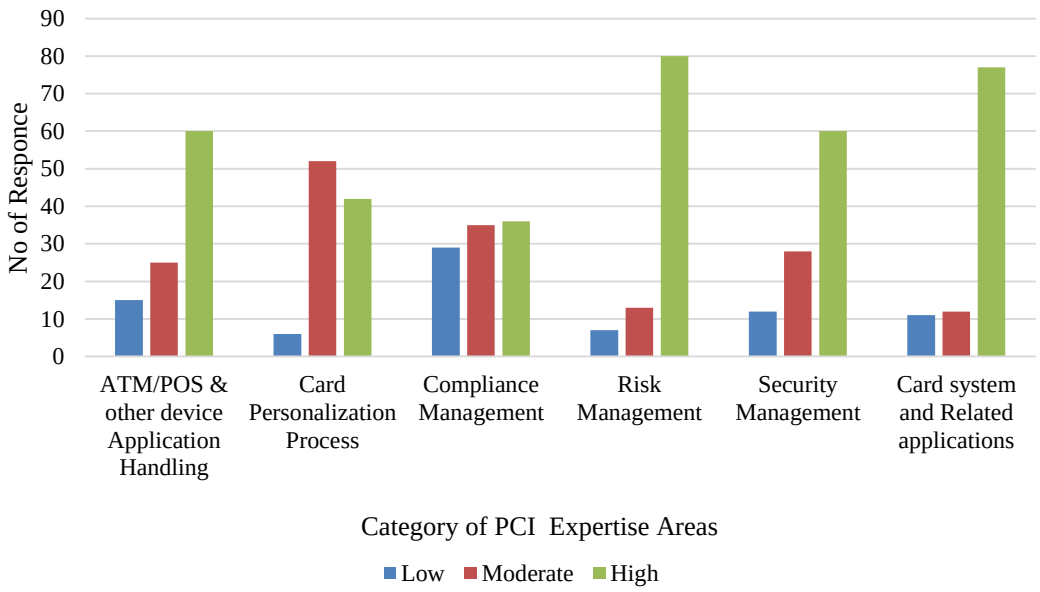

Figure 4.18: Greater organizational performance variation based on the PCI expertise level

Figure 4.19 shows the PCI IT solution implementation participation of the IT department engineers. 77% of the IT department engineers attached to PCI solutions have participated to PCI IT implementations (at least one implementation) for last 3 years.

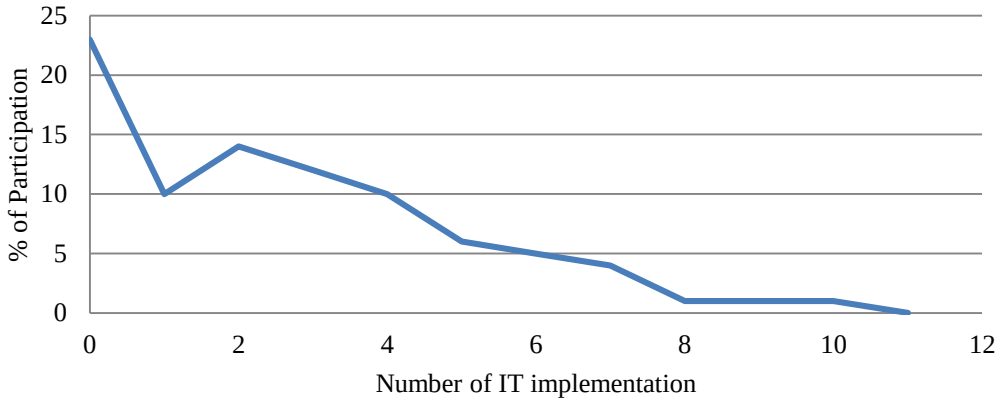

Figure 4.19: IT engineers participation on PCI IT solution implementation

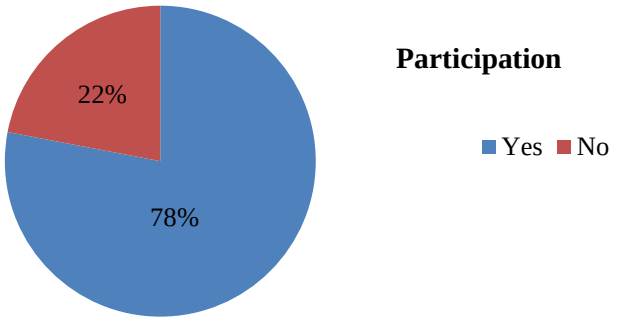

Figure 4.20: IT Engineers participation for PCI IT related decision making process

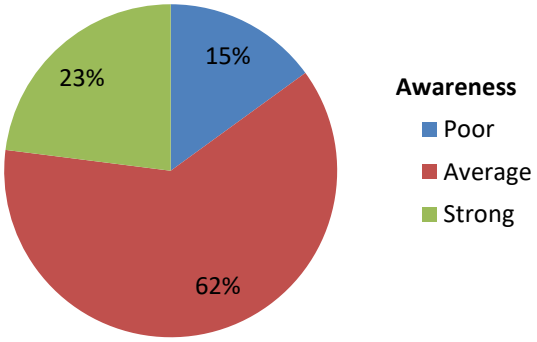

Figure 4.21: Awareness of PCI related IT standards and policies

Figure 4.20 shows that 78% of IT department engineers have participated to PCI IT related decision making process either from strategic or operational level. Figure 4.21 illustrates IT department staff awareness on PCI related IT policies, procedures, and standards. 62% of the staff has rated that they have an average level of awareness on the available policies and standards within their institutes. During the interviews, it was emphasized more experts are available on Visa /MasterCard compliance management, ATM application handling, card systems and related applications, where lower expertise levels are shown on the PCI IT system implementation, project management, PCI IT procurement management.

4.3.2 Legal acceptance and regulatory policies for PCI related IT governance

Both operational and IT senior managers highlighted that Legal and regulatory framework and policies plays a major role in delivering payment card related products and services both locally and globally. They highlighted the major categories that PCI IT governance needs deal as legal and regulatory policies are maintained compliance, security standards while adhering to the global payment card networks (Visa, MasterCard, Amex etc.). Major drivers behind the majority of the current regulations in the card industry mention in Table 4.3.

Table 4.3 Needs for legal and regulations in the payment card industry

	Factors
Need for Regulations	Consumer Protection
	Financial Data Privacy
	Standardization (Ease of Use and Convenience)
	Fraud Prevention and AML

Since the payment card business is closely associated with information technology and deals with customer data, payment transaction details it was emphasized by the top management that well defined legal and regulatory policies are essential for IT governance. Summarized feedback shows in Table 4.4, the drives of PCI with related legal and regulatory and shows each drive implication on IT governance.

Table 4.4: Legal and regulatory implication on IT governance

Consumer Protection	• Aggressive marketing practices • Higher fee burden on merchants and customers • Lack of transparency in terms and conditions
Fraud Prevention and Anti Money Laundering	• Fraudsters are using increasingly sophisticated techniques such as card cloning
Standardization	• Lack of uniform standards across different card networks and organizations can lead to limitations in card usage
Customer Data Privacy	• Personal and confidential customer information

This was supported by the internal source inputs; that number of arbitration, law suitcases are increasing day by day in payment card industry. Most of these cases are around customer data breaches, fraudulent transactions, fraudulently exhaust out credit limits that prevent legitimate cardholders from using their cards until charges are detected and reversed, denied payments when an issuer cancels a card due to a suspected breach and fails to quickly notify the cardholder, and other payment issues, the stolen data can sometimes be used in various ways to commit non-credit-card-related identity theft.

Availability of legal and regulatory framework for PCI IT Governance: From the secondary sources, it was identified that limited legal and regulatory acts are available with, related to payment card business. This was supported by the senior management inputs that PCI IT related local regulatory frameworks have gaps compare to the global context. Due to this, they face challenges when there is a law or regulatory query arise, such as PCI IT assisted crimes and PCI IT targeted crimes. Their option is that the existing framework needs to expand more to support handling PCI IT related cases.

Availability of legal support: It was emphasized by the senior managers that they are facing a lot of challenges in handling PCI IT related legal cases due to the absence of specialized legal representatives. More details provided on most of the time these card business related cases are passed to the general legal department of the particular institute. In contrast, most of the institutes consist of separate teams to handle IT audits and compliances where it was highlighted that for legal cases there are no dedicated legal teams with the domain knowledge. During the process of case handling the responses emphasized that the general legal frameworks and acts are not in a strong position to safeguard the interest of the customers, merchant, issuer, and acquirer locally. It also highlights involved payment network association has strongly defined frameworks to define the liabilities of the involved parties.

The gap between local legal and regulatory frameworks and current PCI: Another drawback that face by the payment card IT governance is that the local legal & regulatory frameworks are not updating according to the latest industry trends. IT managers highlighted that in some cases new IT technology adaptation, including the services and products are delayed in a considerable time due to delays of legal clearance.

Risk and security compliance for PCI IT governance: It has empathized that the PCI industry is high risk-oriented due to the involvement of customer and their transactions related data. This was more detailed as the risk of data breaches, the risk of accounts and transaction details sharing among the networks. It was highlighted that frequently audits by qualified security auditors is an essential factor. Implementation of prevention and mitigation activities to PCI IT and maintenance, monitoring these components where PCI IT Governance comes into the picture. Figure 4.22 shows the staff responses to the IT Governance requirement is essential to have the effective risk, security and compliance management.

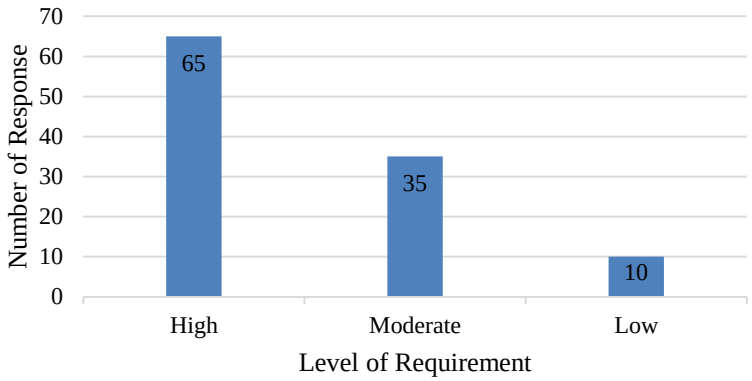

Figure 4.22: IT Governance requirement for effective risk, security and compliance management

Figure 4.23 shows the PCI Staff perception on effective risk, security compliance contribution for user satisfaction and organization overall performance.

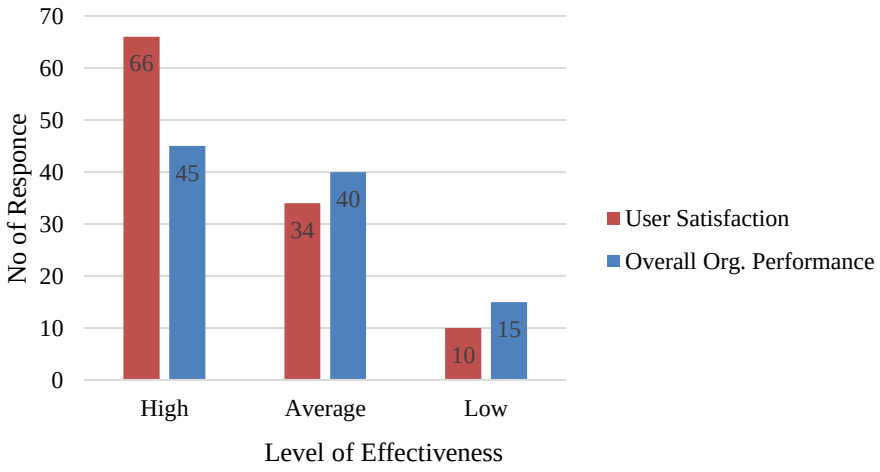

Figure 4.23: PCI user satisfaction and organization overall performance based on effective risk, security compliance contribution

Application of compliance to PCI IT has positive and negative impacts to the effective IT Governance. Table 4.5 shows the cost of compliance and its impact on IT Governance.

Table 4.5: Cost of compliance and impact to IT Governance

Cost of Compliance	Increased Infrastructure Costs
	Revenue Loss
	Reduced Flexibility
	Increase in Competition

Availability of risk and security compliance support: Feedback shows that comparing available legal and regulatory compliance, compliance support for risk and security are in a better position. It empathized that the defined risk and security compliance frameworks available in Sri Lankan PCI context are aligned well with the global trends. Drawbacks reside in the implementation and application of these frameworks. This was supported by the responses on the level of security and compliance standards implementation in Sri Lankan context. Internal sources provided that among the Sri Lankan PCI institutes 100 % complied organization a very low or zero level, where most of the companies' compliance level is in between 50 % - 60% range. Internal sources show that the average number of risk and security audits, conduct per last 3 years is at a moderate level. And it also shows that the average number of annual risk and security compliance application rate is at a lower level. From this information, it shows that annual compliance application in the payment card industry is focusing on meeting the minimum compliance requirement. Table 4.6 shows the effect on the cost of non-compliance with the overall PCI organization performance.

Table 4.6: Cost of non-compliance with the overall PCI organization performance

Cost of Non-Compliance	Heavy Penalties
	Risk of Lawsuits and Reputation Loss
	Loss of Business to Competition

Legal, regulatory compliance and PCI IT governance: Impact of introduction of new legal, regulatory and compliance for PCI business can be summarized in Table 4.7; in terms of opportunities

Table 4.7: Opportunities arising out of legal, regulatory compliance

Opportunities Arising Out of Legal Regulatory Compliance	Opportunity for New Entrants and Ancillary Industries
	Early Compliance Leading to Increased Customer Preference
	Increased Choice of Products and Services for Customers Due to Innovation and Standardization
	Long-Term Cost Reduction
	Inorganic Growth Opportunities (Mergers & Acquisitions)

Challenges in the application of risk and security compliance in Sri Lankan PCI: The biggest challenge was introduced as the absence of defined risk, security, compliance policies and procedures in a local context**.** Figure 4.24 shows that the PCI staff awareness of the above policies and procedures. It shows that average awareness is at a moderate level. Internal source's response to the availability of internal risk and the audit teams are at a lower level. Most of the time these services are taken from 3rd party firms, which highlighted that high annual cost to maintenance risk, security, and compliance in a local context.

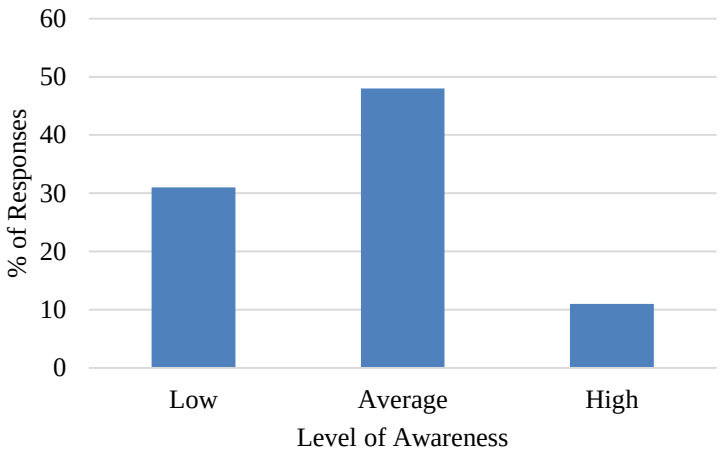

Figure 4.24: PCI staff awareness of defined risk, security, compliance policies, and procedures

4.3.3 Technology adaptation and PCI IT Governance

Interview results summarized that Payment card industry is highly technical oriented industry and it has been rapidly changing base on the technical changes and the innovations. Senior managers highly emphasized that IT governance is a crucial phenomenon to manage them efficiently.

Why payment card business needs technology adaptation: In payment card business technology plays a major role as the business is highly technical, with dynamic trends. Senior managers highlighted that technology adaptation is another vital factor for effective IT governance of the business. It also stressed that the financial institutes need to carefully assist the cost-benefit, business impact analysis prior to adaptation of new technology. It also highlighted that if financial institutes ignore the technology adaptation for their card business can cause huge financial and customer losses in terms of not complying with new regulatory frameworks, rethinking of business models, low growth on the business and services. Feedback shows organizations and institutions in the business are under relentless pressure to introduce new technologies. The pressures come from competitors, clients, new

generations of technology, reduce internal costs, increase responsiveness, and replace existing systems.

Importance of technology adaptation for payment card business: Senior management expressed most important factors in technology adaptation in the card business is meeting the competition by delivering innovative products and services, increase the ease of use both internal and external, reduce technology cost. And also the payment card business is highly enforced with regulation and compliance towards some new technologies.

Sri Lankan payment card business and technology adaptation: Operational managers explained that payment card business connects the local and global in a single platform. In order to align and be competitive Sri Lankan payment card business needs to adapt leading technology. It was explained that this will help the business to deliver new products and services, increase the user satisfaction and reduce technology operational cost. Table 2 shows categorize of possible technology adaptation to Sri Lankan Payment Card Industry.

Table 4.8: Possible technology adaptation to Sri Lankan Payment Card Industry

Technology Category	**Number of Responses**
Smarter Cards	25
Contactless Payments	30
Mobile Payments	32
Virtualization	35
Cloud Computing	17

The relationship between technology adaptation and IT Governance: Senior management explained that in order to achieve the objectives of the technology adaptation and maintain the implemented technology; proper IT governance is an essential factor. They also highlighted that the frequency of technology adaptation in the current context is high. Various reasons to initiate technology adaptations to PCI business are to obtain competitive advantage, response to rapidly changing market

needs, providing resourceful information for better decision making, reducing business costs by automating some transactions, allowing competition in specific technology market areas (e.g. ATMs for banks, EDI for parts suppliers), facilitating flexibility to fulfill more customers' needs without incurring extra cost, providing technological platform and infrastructure changes related PCI related IT applications. Based on the responses Table 4.9 illustrates the categorize reasons for technology adaptation.

Table 4.9: Reasons for technology adaptation

	Main Categories	**Derived Areas**	
Transfer to technology adaptation by user	Technology Characteristics	Cost	Technology Selection
		Profitability	
		Familiarity	
		Divisibility	
		Perceived usefulness	
	User Characteristics	Education/human capital	
		Socioeconomic system income and assets	
		Risk perceptions	
		Environmental needs	
	Social Context	Social network	
		Adaptation decision by same sector	
		Demonstrability	
		Cultural appropriateness	
	Markets	Development of technology	
		Availability of technologies(locally and domestically)	
		Access to finance	
	Transfer Mechanisms	Knowledge dissemination strategy	
		Incentives	
	Policy environment	Regulatory and investment environment	
		Sectorial development policies	
	Infrastructure changes	Communication channel changes	
		Software hardware platform changes	

Outcomes expected from IT adaptation for IT governance: Figure 4.25 shows 78 % operational managers and card center staff have rated that level of technology adaptation will increase both internal and external user satisfaction. Figure 4.26 80% of operational, card center and IT department representatives have rated that level of technology adaptation will increase overall organizational performance in Financial, Customer, Internal and Innovation perspectives.

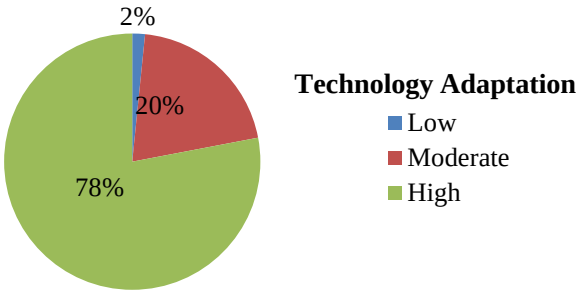

Figure 4.25: Perception of technology adaptation - User satisfaction

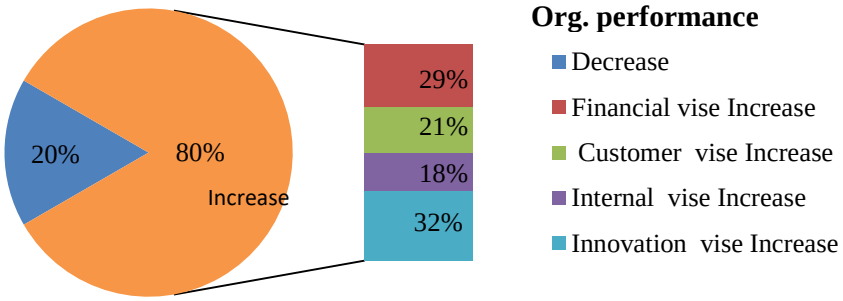

Figure 4.26: Perception of technology adaptation - Organization performance

How IT Governance create value to the payment card business through technology adaptation: Considering the aspects how IT Governance creates value to the payment card business via technology adaptation Figure 4.27 shows 68% operational staff have rated innovation capability as the biggest value while providing equal weighting of 16% for IT cost reduction and ease of use

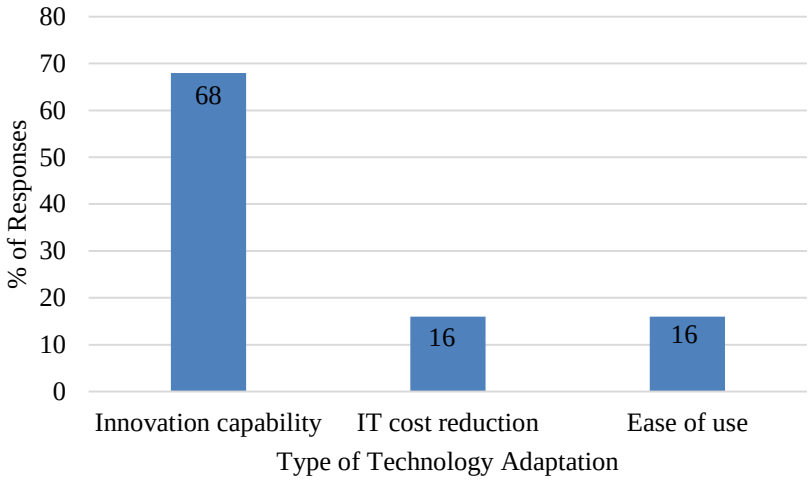

Figure 4.27: IT Governance value addition via IT adaptation

Technology adaptation readiness of Sri Lankan PCI: Senior technical and operational managers highlighted that Sri Lankan Payment Card Industry comprises of technology type such as embossing, magnetic stripe, smart card, proximity card, NFC cards, etc. Types of information technologies that are available in Sri Lankan context are explained as EMV, card personalization, 3D Secure, NFC, mobile technology. During the interview sessions, it was expressed the average institute's annual expenditure on payment card technologies are on a moderate level. Among those budget expenditures for payment card related information technology expenses are also at a moderate level.

Figure 4.28 analysis shows for the last 3 years more than 65% of institutes have an average level of new PCI related IT solutions, technology implementations. Figure 4.29 shows that 78% of the institutes have focused on existing PCI related

technology system upgrades and most of the institutes have at least upgraded one existing information system

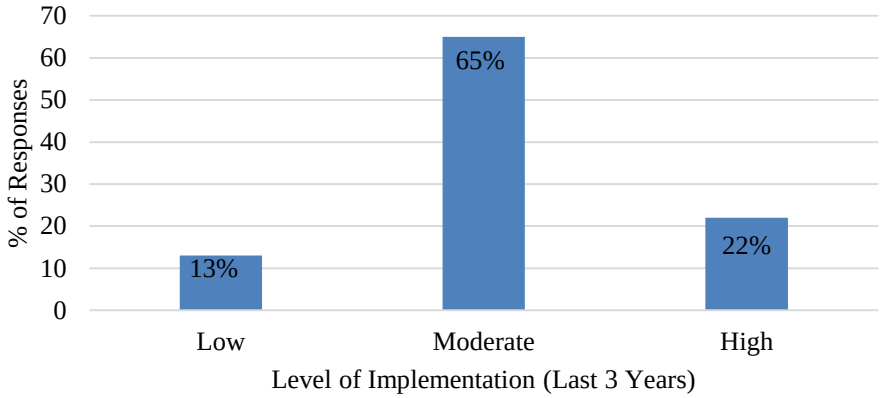

Figure 4.28: Level of PCI related IT solutions, technology implementation

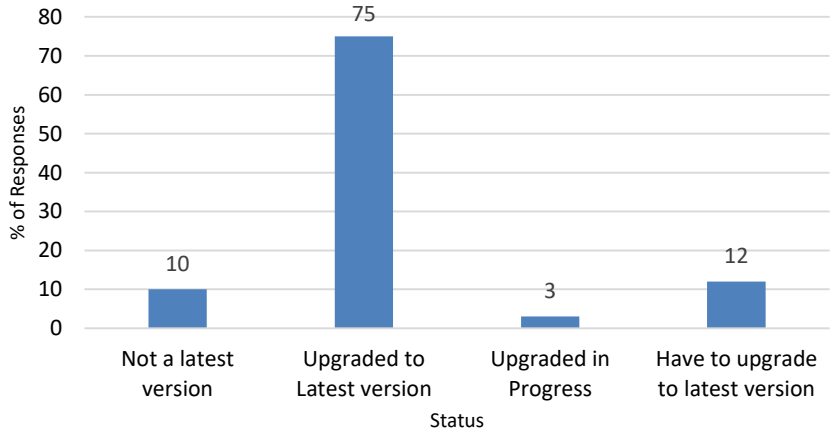

Figure 4.29: Status of existing PCI systems

During the focus group discussions that had with IT department engineers, they explained the challenges that they faced in technology adaption for their PCI business in their institutes which can be categorized as Awareness, Assessment, Acceptance, Learning, and Usage.

4.3.4 External support from vendors and consultants

As a highly technical oriented industry, all the organizations who are doing the card business, are engaging with external parties to cater the customer requirement due to the various reasons. They are now relying on external support to gain a competitive advantage while further expanding their business locally and internationally.

Why payment card needs external support from vendors and consultants: Top senior managers explained that external vendors and consultants support plays a major role in payment card business. Summarized needs can be elaborated as the business is highly technical oriented and dependent, essential services from payment card associates like Visa, MasterCard to run the business, meet the compliance requirements like PCI DSS, internal staff knowledge gaps in PCI related IT/ technology solutions implementation, cost-effectiveness, and reliability of non-core business outsourcing and finally bring industry proven knowledge to the business.

Importance of external vendors and consultants for the payment card business: It was explained the importance of the external vendors and consultants for the payment card business in two aspects. Strategic importance was explained to bring industry best practices to the business e.g. procuring new products, services, and solutions to cater to new market's needs. It was explained by using an example that if government enforce a mandate to provide POS solutions to rural areas of the country rather than implementing ATM machines financial institutes can introduce mobile POS machines. Another aspect was explained as the operational importance where business needs vendor's services to run their operation smoothly, e.g. post-implementation support for PCI solutions, manage services like printing statements, troubleshooting and maintaining ATM machine, etc. It was highlighted that if the institute wants to deliver unique products or services this cannot be done via 3rd party solution providers. But it was emphasized that 3rd party vendors will provide the space for the organizations to focus on the core business values while delivering competitive products or services.

Types of external products and services for the payment card business: Operational managers highlighted the products and services that are purchased from

the external parties to the PC business as Network associates services, PCI related IT products and services, network and communication services, project, program management and consultancy services, risk and security audit services, payment cards production-related services, recovery services etc. It also emphasized that both local and international parties are there to provide above mention services to the Sri Lankan context.

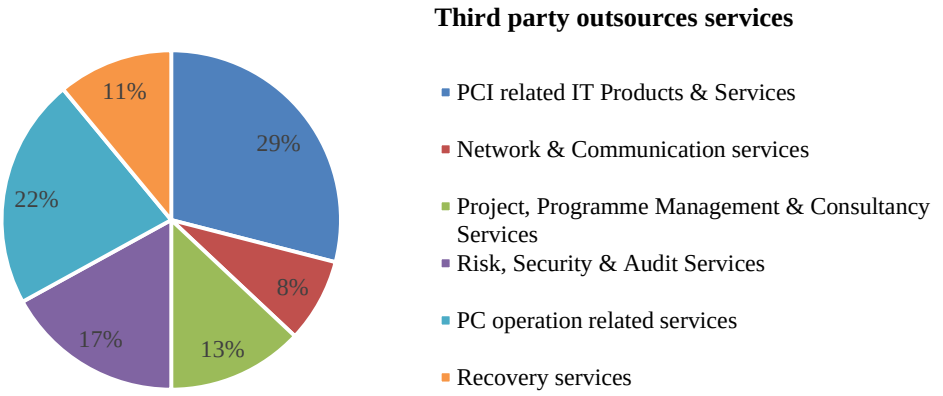

Figure 4.30: Third party outsources services

Source: Payment Bulletin 2015 Q1, BOC & CBSL

How external vendors and consultants support IT Governance in Sri Lankan PCI: Figure 4.31 illustrates the perception of 3rd party support to the PCI business where 45 % rated as an essential factor, 43 % rated as an essential but needed for some extend and 12% have rated as a zero requirement.

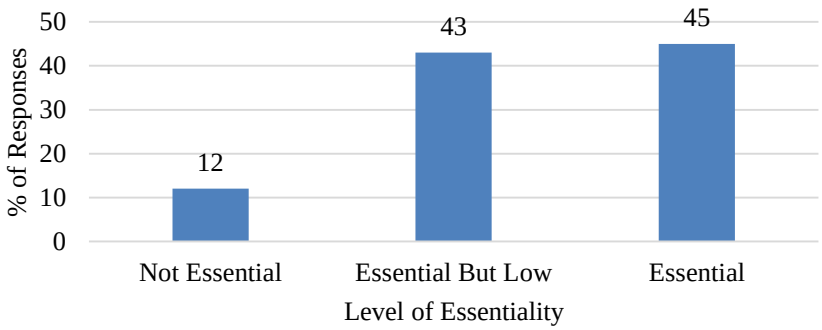

Figure 4.31: Perception on the essentiality of external vendors

It was highlighted the external vendors and consultant services are more and more vital in the technology management in the card business. Objectives of receiving 3rd party services were express as getting services from the rapidity and expertise, share the risk of technology implementation and usage, reduced operational and recruitment costs, finally the biggest advantage is for firms are able to concentrate on core business rather than focusing the supporting services.

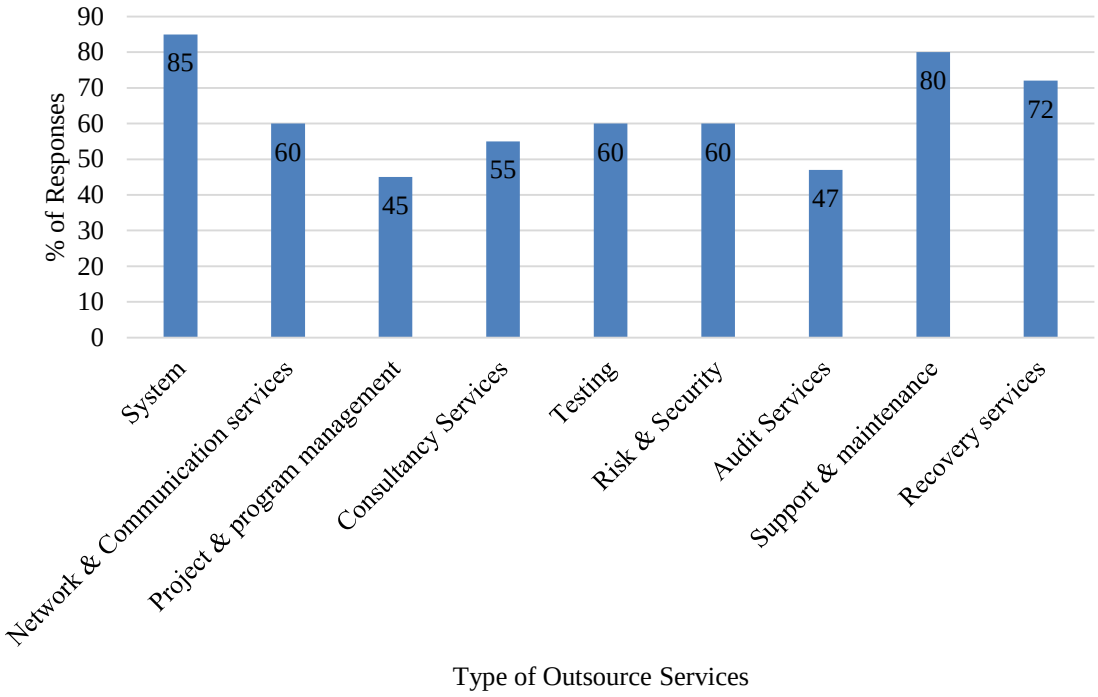

Figure 4.32: Average percentage of PCI related outsource services

Figure 4.32 illustrates the average percentage of card business-related solutions and services that are outsourced to the external vendors. Among the weighted category systems, recovery, support, and maintenance of payment card related products are at a higher rate in outsourcing.

External vendors, consultants support & services in the Sri Lankan Card Business: When analyzing the external vendors and consultants' involvements in current business; Figure 4.33 shows 77 % rated where business has involved suppliers for implementation of 5-10 solutions, where 23 % IT staff rated as involvement is between 3- 5 solutions.

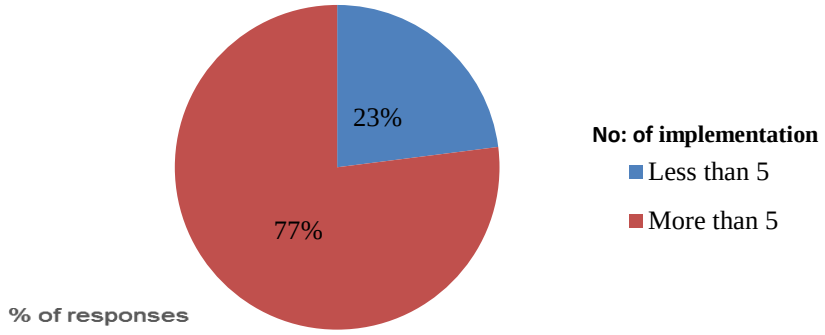

Figure 4.33: Third party vendor involvement for PCI related implementation

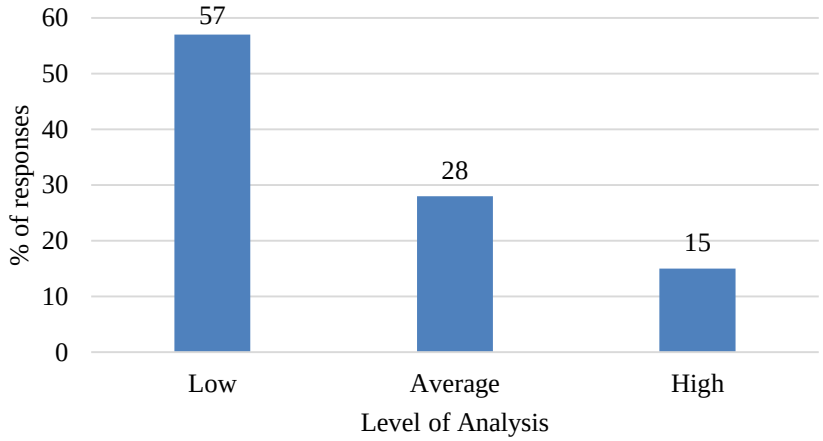

Figure 4.34: Due diligence analysis for selecting 3rd party vendors/supplier

Figure 4.32 shows the risk and 3rd party vendor due diligence analysis when selecting vendors, consultants to PCI is at a low level where 15% IT Staff and Operational Staff rated as they are doing a strong analysis, 28 % of institutes has responded as to some extent, 57% of the responses are on only the product and technology evaluation.

Figure 4.35 illustrates that availability of define PCI IT related procurement and guidelines within the organization as 53% IT staff and operational staff have responded that they don't have defined guidelines, 33 % of responses has rated they apply the organization general procurement guidelines and 14% responded that they

are considering the special compliances and standards for PCI 3rd party products and procurement services when they are purchasing.

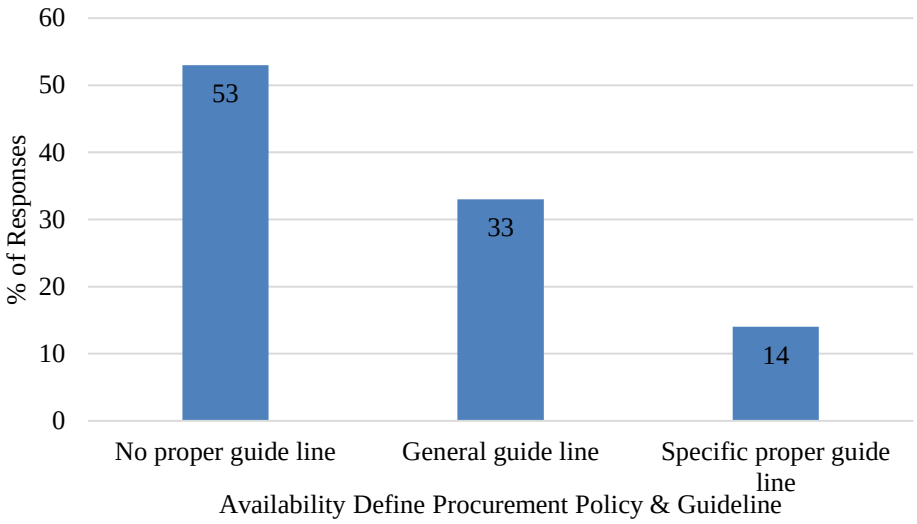

Figure 4.35: Procurement policies & guidelines - selecting third-party vendors/supplier

Considering the risk and security management procedures available within the institutes Figure 4.36 shows 48 % IT and operational staff weighted they do have strongly defined policies and procedure in risk and security management in their organizations related PCI Technology implementations where 33 % responses are on loosely coupled define policies and procedures, where 19% response on the no defined policies and procedures. But they have rated in the considerations on the 3rd party vendors and consultant's selection is in these policies and procedures are at a lower level.

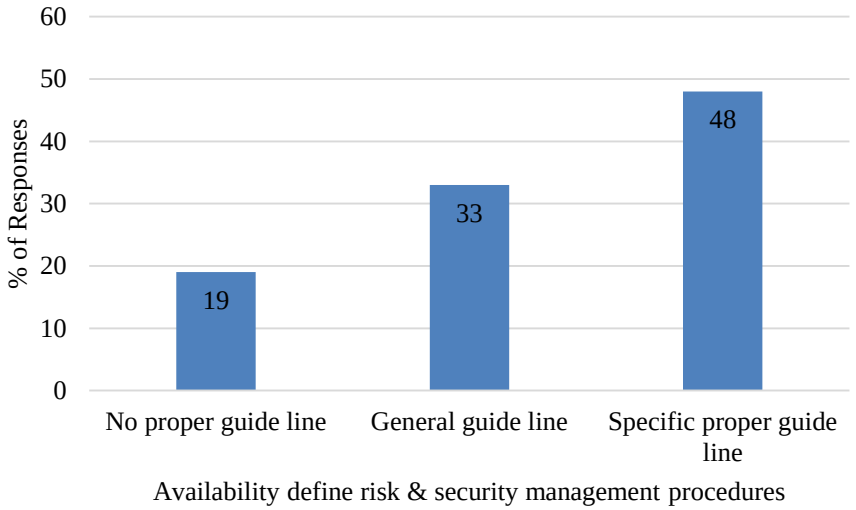

Figure 4.36: Risk and security management procedures

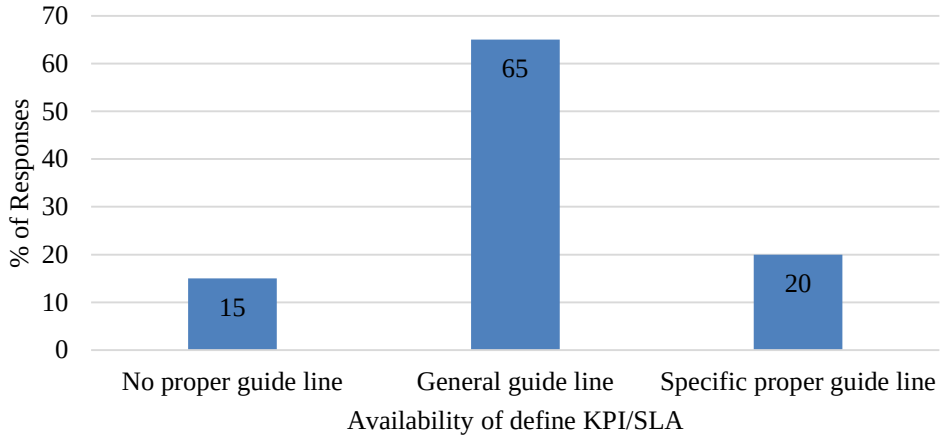

Figure 4.37: Definition and usage of IT service management strategy

Figure 4.38 illustrates institutes are at a high level in the definition and usage of IT service management strategy by defining KPIs, SLA. 65 % of the staff rated that they use some kind of SLA, KPIs for 3rd party vendors, out of these responses, 20% of staff have responded that they are closely monitoring defined KPIs and SLAs, 15 % of institutes have rated that they are not putting considerable effort into controlling the define SLA and KPIs on 3rd party vendors.

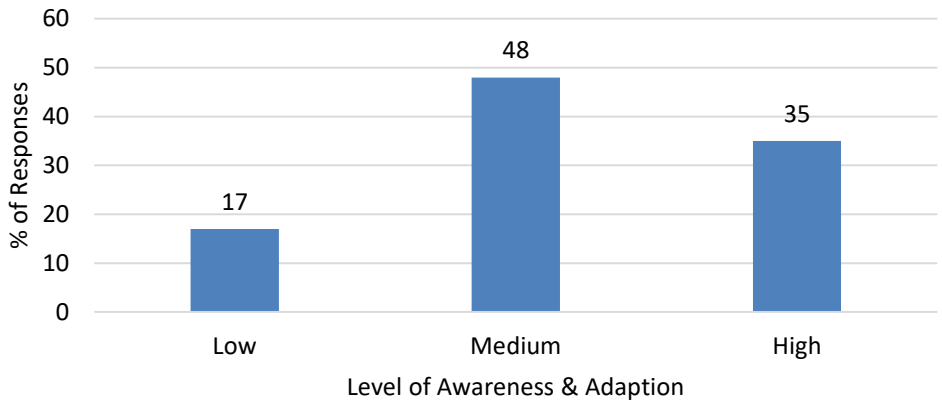

Figure 4.38: Analysis of awareness and adaptation of industry best practices

Analysis of awareness and adaptation of industry best practices (PMP, ISO, ITIL); Figure 4.38 illustrates, among the select institutes 35 % IT and operational staff believe relevant institutes have a good attention, 48 % have rated to some extend they are paying attention to new market trends, 17 % have rated attention is in a lower level. Figure 4.39 shows IT and operational staff perception on the adaptation of industry best practices will increase the PCI IT Governance, 48.7 % rated as Yes, where 39.7 % have stated that to medium and 11.6 % rated that it has a low or zero impact.

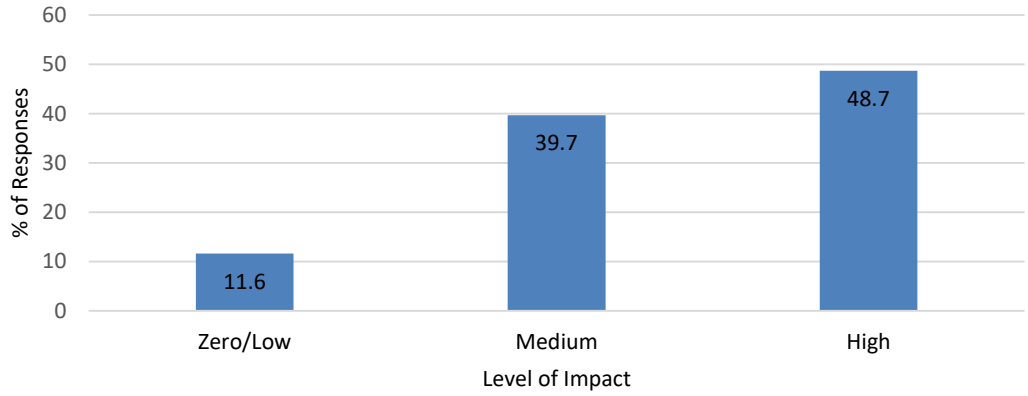

Figure 4.39: Industry best practices impact for IT governance

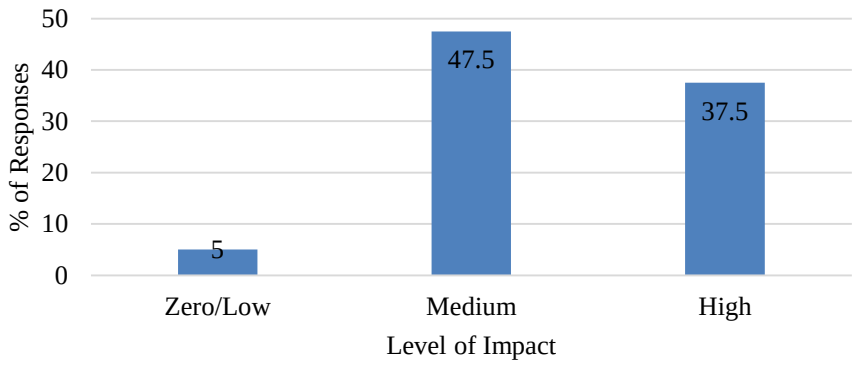

Figure 4.40: Third party vendor support impact for user satisfaction

When mapping the relationship between the 3rd party vendor support and user satisfaction, Figure 4.40 shows that 15 % IT and operational staff have rated low or zero impact, 47.5 % mention that impact to medium where 37.5 % in the vision of increasing the user satisfaction.

Challenges in handling PCI IT related external vendors and consultants: Top senior managers highlighted the main categories of challenges that they faced dealing with 3rd parties as the increasing complexity of the third-party network, limited collaboration, increased redundancies, high costs, regulatory compliance pressures, large volumes of data, limited transparency etc.

4.4 Gaining Competitive Advantages with Effective IT Governance

Various aspects were pointed out as ways to achieve competitive advantage using effective IT Governance. To become competitive in the payment card industry institutes, need to respond quickly to the market trends in the effective and innovative manner mentioned by senior operational managers. It was stated PC can achieve by profit generation, low-cost products/services, innovative ideas etc.

4.4.1 PCI related products and services

IT senior managers explained effective IT governance will help the organizations develop new products and services which cater to the customer's needs and market

trends. IT also highlighted that better IT governance will help to provide the personalize products and services to attract and retain customer within the business.

4.4.2 Reacting to competitors and the competition

Senior operational managers mention that the financial institutes need to have a sharp eye on the market changes as well as the competitor's actions. When a competitor introduces some product to customers competitive responses will be much easier with effective IT governance. With the provided views when a particular customer is connected with the business IT governance can provide more personalized services to the customer.

4.4.3 Better decision-making process

It was pointed out that effective IT governance will help the payment card businesses to make better decisions. As a summary real-time information will enable the organizations to analyze staff performance market, customer behavior, products/service performance and make the most suitable decisions. It also viewed these decisions can be strategic, tactical and operational.

4.5 Conclusion

A number of findings were discussed above which were discovered from the conducted interview sessions and questionnaires to the person in all research sites. Most of the findings that were raised are not directly answering the research question but support as evidence to that. As a summary, effective IT Governance is essential in Sri Lankan payment card business. Payment Card Businesses can achieve user satisfaction and organizational performance by effective IT governance. More attention needs to pay for domain expert's availability, compliance of rules and regulations, technology adaptation and obtaining support from 3rd party vendors. In Chapter 5, it is going to discuss the analysis and discussion of the gathered information/ data using the data collection methodology.

CHAPTER 5 - ANALYSIS AND DISCUSSION

5.1 Introduction

This chapter builds on the analysis and discussions base on the results of data and information gathered in the previous chapter using the data collection methodology, viewing them with themes discussed in Chapter 2.

5.2 IT Governance and how it fits the Payment Card Industry in Sri Lanka

With ideas discussed in Section 4.2, it emphasizes that IT Governance in Payment Card Industry general focus is on security, risk and compliance aspects while keeping its attention on the compliance management in local context. Application of IT governance in Sri Lankan PCI industry has a greater impact on user satisfaction both internal and external. As a summary of responses; all 6 card center senior managers; IT governance is an essential factor for today's Sri Lankan payment card industry to deliver better products and services. It shows that effective IT governance is important to meet the competition among the players in payment card industry. Figure 4.1 analysis shows the application of IT Governance to Sri Lankan Payment Card Industry is at a moderate level.

5.2.1 IT Governance and its place in Payment Card Industry

When analyzing IT Governance and its place in Payment Card Industry; Figure 4.4 displays more than 74 % card center staff believe effective IT governance is needed to deliver higher user satisfaction. Figure 4.5 analysis shows 73 % of card center staff have rated that IT governance is essential to achieve and support payment card related organization strategic objectives. Analyzing Figure 4.6 it shows more than 50 % of card center staff believe IT Governance in payment card industry is vital to deliver competitive products and services to their customers. Above factors implies that the Sri Lankan Payment card industry IT governance has a major role in terms of increasing user satisfaction, organization performance and delivering competitive products and services.

5.2.2 Sri Lankan Payment Card Industry IT Usage

Based on the interview data analysis; Types of IT usage in Sri Lankan payment card industry can categorize into the Information system (IS), Application Systems, Network & Communication, IT security, PCI Compliance, PCI Risk. It shows that more IT application is done for information and application systems, PCI security and compliance.

According to Figure 4.7, IT department engineers; the level of IT governance application in managing payment card related IT systems and component are in a moderate level. Figure 4.8 exhibit more than 29 % of IT department representatives are not in a satisfactory level about current IT governance. Table 4.2 shows effective project management, IT service management, and quality control management are the other aspects that organizations need to focus on delivering effective IT governance to Sri Lankan payment card business.

5.2.3 IT Governance as a strategic and operational tool

It empathized IT Governance usage can be defined as a Strategic and Operational tool in payment card business, but in Chapter 4; Figure 4.9 and Figure 4.10 indicate IT governance as an operational tool which has a considerable contribution to carry out payment card business operations in smoother way. This indicates that IT Governance has more influence as a strategic tool in delivering operational objectives.

5.3 Factors Affecting the Efficient IT Governance in Sri Lankan Payment Card Industry

Main features of the payment card industry can be classified as business and technology orientation, high sensitive data, rapid and dynamic changes to business and industry trends, high investment cost, requirement of stratifying compliance, global and local payment associations, highly specialized skill set in PCI business domain and high competition among the financial institutions who provide payment card solutions.

5.3.1 Availability of PCI domain experts with management capacity

Overall feedbacks it shows the current Sri Lankan Payment Card Industry has a shortage of domain experts with both technical and management expertise.

Demographic analysis of PCI related staff shows that; PCI domain expertise is lacking among the managerial positions in Sri Lankan payment card business. Figure 4.11 shows that most of the PCI staff experience is less than 5 years where staff with more than 15 years are very low. It shows most of the employees have a considerable managerial experience in the financial sector, but comparatively PCI domain experience is low**.** Figure 4.12 emphasizes the job roles wise number of employees related to strategic level IT governance is comparatively low where operational level none IT managerial level involvements are high in IT governance. According to Figure 4.13 operational manager's participation on PCI IT-related decision making is at a moderate level. PCI is more technology depended; due to this; it shows more involvement of operational level PCI domain expertise is needed for strategic level IT governance in Sri Lankan context.

When analyzing the summarize responses, technical staff's PCI domain experience is also at a lower level. A special trend was identified as staff who has considerable PCI domain experience and business trends are trying to switch to different fields by not stagnating in the same department. Figure 4.14 shows technical staff participation on PCI IT related decision making is at a high level both on strategic and operational aspects. It was highlighted due to these gaps there are incidents of technology compatibility issues and challenges of bringing all IT services to a single platform.

The availability of human capacity to manage PCI related IT systems are at a moderate level. Based on the Figure 4.15 most of the institutes have limited dedicated IT resource allocation, between 5 to 10 people. Analyzing Figure 4.16, 35 % of IT department representatives have participated in PCI domain related technical training programs during the last 5 years where 60% of them have gone overseas to participate in these training sessions. 65 % of IT department representatives haven't participated in any PCI related training programs. This shows that employees have a low percentage to expand their PCI IT knowledge in local context. The percentage of

training programs are conducted outside the country is higher than the local training programs. Highlighted challenges are to fill up technical knowledge gaps as limited training programs available in local context, low number of training institutes which focus on PCI related training and capacity building. Other main challenges in building PCI IT HR capacities as the flat organizational structures in the businesses and technology units, the absence of defined roles and responsibilities to PCI IT related positions and job rotation of IT engineers and banking staff.

Figure 4.17 illustrates operational staff perspective ATM/POS and other device application handling, risk management, security management, card systems and related applications category vise behavior against the user satisfaction. In these areas, the PCI expertise level has more impact on higher user satisfaction. Figure 4.18 illustrates operational staff perspective risk management, card system, and related application areas have more impact on greater organizational performance if the PCI expertise level is high.

When analyzing the IT staff exposure in IT Governance, average percentage of participation on the PCI IT solution implementations and decision-making process. According to Figure 4.19, 77% of IT department engineers attached to PCI solutions have participated to PCI IT implementations (at least one implementation) for last 3 years. Therefore, PCI IT implementation participation is high. Analyzing Figure 4.20, with related to IT engineers; participation in decision making either strategic or operational is also in a considerable amount. According to Figure 4.21, IT department staff awareness of the PCI related IT policies, procedures and standards are at a moderate level. More expertise is available on Visa /MasterCard compliance management, ATM application handling, Card system and related applications, where lower expertise levels are shown on the PCI IT system implementation, Project Management, PCI IT procurement management.

From above factors and analysis, it shows that Sri Lankan payment card industry current context has a scarcity of PCI domain expertise. This shortage has a direct impact on PCI IT related decision-making process which is an integral part of PCI IT governance. Therefore, the availability of domain expertise is essential to have

effective PCI IT governance by increasing the user satisfaction (internal and external) and overall organization performance.

5.3.2 Legal acceptance and regulatory policies for PCI related IT governance

Local legal and regulatory frameworks play a major role in PCI related IT governance in terms of maintaining compliance, security standards while adhering to the global payment card networks (Visa, MasterCard, Amex etc.). It shows Consumer Protection, Financial Data Privacy, Standardization (Ease of Use and Convenience), Fraud Prevention and AML drives can be affected by legal and regulatory policies where IT governance needs to consider the factors mentioned in Table 4.3 and Table 4.4. This will enable organizations to gain better user satisfaction and overall organizational performance by having an increased choice of products and services for customers due to innovation and standardization. On the other hand, IT governance can enable PC businesses to reduce their costs by handling a minimum number of arbitration, lawsuit cases.

It shows that PCI IT related arbitration and lawsuits are growing day by day. In order to minimize these numbers; use of effective IT governance is an essential factor. To minimize the impact of increasing laws and regulation cases available local legal and regulatory acts are at a minimum level. Feedbacks shows most of these available general acts creates gaps in PCI business when addressing arbitration and lawsuit cases.

Sri Lankan PCI business face lots of challenges in handling PCI IT related legal cases due to the absence of specialized legal representatives. In most cases, stakeholders are directed to their legal department due to the absence of these specialized PCI legal teams. Challenge identified in the local context as general legal framework and acts are not in a strong position safeguard the interest of the customers, merchant, issuer, and acquirer locally, legal and regulatory frameworks are not updating according to the latest industry trends. It shows these factors have a considerable impact in delivering effective IT governance in terms of bringing new technology, defining new products and services, responding to market competition.

Considering Risk, Security compliance; continuous management and update is an essential factor in PCI. Based on the analysis Figure 4.22 and Figure 4.23; 65 % believe IT governance requirement is essential to have the effective risk, security and compliance management. Whereas 78% PCI staff perception of effective risk, security compliance contribution for user satisfaction and organization overall performance.

The local context availability of risk, security compliance frameworks and alignment is in a better position compared to the legal framework availability. But institutes are facing a lot of challenges in the implementation of these processes. Statistics show that fully complied PCI organizations are at a low or zero level where average compliance range is 50% - 60%. Even though PCI is high risk-oriented; annual audit conducting rate is also at a moderate level where PC institutes conduct annual compliance application to meet the minimum compliance requirement.

Main challenges that Sri Lankan PCI face in relation to risk, security compliance is the absence of defined risk, security, compliance policies, and procedures. By analyzing Figure 4.24, PC institute's staff has an average awareness of these policies. Responses of the availability of internal risk and audit teams are at a lower level where institutes are more dependent on 3rd party firms to satisfy required compliance requirements at a high cost.

From the above factors, it shows that Sri Lankan payment card industry is facing a challenge dealing with the local legal and regulatory frameworks. Most of the cases have a negative impact on the effective IT governance in terms of delivering the user satisfaction and overall organization performance. From risk, security compliance aspects; Sri Lankan PCI business has a better position compared to legal frameworks with a challenge of meeting 100 % compliance. It also has a negative impact on IT governance in terms of meeting the user satisfaction. Table 4.7 shows that the 100% compliance will also open up new business opportunities where PC businesses can increase overall organizational performance.

Overall, if a PC business has defined legal and regulatory frameworks they will have better opportunities in delivering higher user satisfaction. By analyzing Table 4.5 and

Table 4.6, PC businesses who comply the risk and security compliance has a null impact as it can be either an opportunity or a threat to the business.

By overall analysis, well defined legal, regulatory frameworks have a positive impact on PCI IT governance. Where risk and security compliance framework has both positive and negative impacts on PCI IT governance.

5.3.3 Technology adaptation and PCI IT Governance

By feedback, analysis shows that technology adaption is another vital factor for effective IT governance for various aspects. Table 4.9 discusses the reasons for technology adaptation in PCI is high due to technical orientation with dynamic market trends with rapid changes. It highlights if any PCI institute who ignore this factor has a survival challenge owing huge financial and customer losses in terms of not complying with new regulatory frameworks, rethinking of business models, low growth on the business and services.

Technology adaptation is important to card business to meet the competition by delivering innovative products and services, increase the ease of use both internal and external and reduce technology cost. Legal and regulatory compliance is also highlighted as a factor where payment card business is highly enforced towards some new technologies. When it comes to Sri Lankan payment card industry interview responses explained that technology adaptation is important to deliver new products and services which will ultimately increase the user satisfaction and reduce technology operational cost. According to Table 4.8 possible technology adaptations can be derived as smart cards, contactless payments, mobile payments, virtualization, and cloud computing.

It shows that to achieve the organization performance; technology adaptation and maintain the implemented technology is an essential factor in proper IT governance. Main reasons to initiate technology adaptation are the competitive advantage, changing market needs, better decision making, reducing costs, and allowing competition in specific technology markets. Figure 4.25 analysis shows that IT adaptation has a positive impact on the IT Governance. Figure 4.26 categorized this

in main 4 aspects as Financial, Customer, Internal, and Innovation Perspective. Which enable the enhancement of innovative compatibilities via new products and services, reduce IT costs and increase the ease of use.

Common technologies that use in PCI; chip and magnetic stripe card, smart card, proximity card, NFC card and most popular technologies in Sri Lankan context are EMV, card personalization, 3D Secure, NFC and mobile technology. The statistic shows institute's annual expenditures on payment card technologies are in a moderate level. Among those budget expenditures on payment card related information technology expenses are also at a moderate level. Figure 4.28 and Figure 4.29 analysis show that an average level of new PCI related IT solutions adaptation and technology implementations are also at an average level.

Figure 4.27 illustrates Sri Lankan payment card industry has a significant focus on adapting new PCI related technology with the aim of increasing internal and external user satisfaction. Organization perspective said technology adaptations are aiming to meet the competition, improve processes while reducing operational cost.

Most of the PCI organizations are aware of the latest technology adaptation in global trends and have identified the possible technology that can be adapted to local context. Increasing user satisfaction, delivering innovative products and services, reduce overall IT costs are the main aims of focusing the technology adaptation in Sri Lankan PCI. By overall analysis, focus on technology adaptation on Sri Lankan PCI is at a moderate level.

Above factors show that PCI organization who perceive to adapt new technology has a positive impact on the IT governance in terms of user satisfaction and overall organization performance.

5.3.4 External support from vendors and consultants

Overall analysis shows that external vendor and consultants support plays a major role in payment card business. It also categorizes the needs of the 3rd party vendors as high technical orientation, services from Visa, MasterCard, etc., application and maintenance of compliances, internal staff knowledge gaps in PCI related IT/

technology solutions implementation, outsourcing the non-core business, brings industry best practices.

The importance of the external vendors and consultants can be viewed in both strategic and operational aspects. Strategic importance was explained as bring industry best practices to the business where operational can be derived as smooth day to day activities. It also highlights the limitations of delivering unique products or services via outsourcing services, but the advantage of PCI businesses to focus on their core business to deliver competitive products and services. By analyzing Figure 4.30 products and services that can purchase from the external parties can be categorized into network associates services, IT products and services, network and communication services, project, program management and consultancy services, risk, and security audit services, recovery services. It also emphasized due to the availability of the high number of local and internal parties who deliver these common services, selecting the appropriate partners is a challenging and competitive task.

Based on Figure 4.31, IT Department staff responses on the perception of the essentiality of external vendors and consultants are on a moderate level. Analysis categorized the objectives of receiving 3rd party services as rapidity and expertise, share the risk of technology implementation and usage, reduced operational and recruitment costs and enable the organization to focus on their core business. Analysis of Figure 4.32, an average percentage local payment card business is outsourced to achieve the above-mentioned services. This shows that the 3rd party vendors and consultants involvement is high in Sri Lankan payment card business in PCI related IT/Technology implementation.

By analyzing the interview feedbacks in order to have effective IT governance in payment card business 3rd party vendor management defines processes, policies are essential. It highlights that proper due diligence is the key to selecting a 3rd party vendor, but Figure 4.34 shows the application is at a lower level and this will add risks for the business. It shows that the cost and technology factors are not always the criteria to select the vendor.

With the feedbacks in Figure 4.35, the availability of defined procurement policies and procedures for selecting PCI technology related vendors, consultants are at a lower level. Responses emphasize most of the organizations conduct PCI related procurements based on the general procurement guidelines by adhering to PCI related standards. Figure 4.36 shows, availability of defined risk and security procedures related to PCI IT is at a moderate level. It emphasizes that availability of risk analysis guidelines related to vendor selection is also at lower levels.

Figure 4.37 indicates the local PCI context, definition and usage of IT service management is high by using SLA definitions, but need more improvements on monitoring the define KPI and the stipulated deliveries. And also awareness and adaptation of industry best practices (PMP, ITIL, and ISO) among the Sri Lankan PCI business, Figure 4.38 shows the weighted as moderate level. Figure 4.39 emphasizes more attention needs to provide in adhering to these best practices which will increase the effective IT governance.

In the current context, it shows that 3rd party vendors and consultants reliance is at a higher level with a minimum level of procurement, IT service management, Industry standard application. This shows more attention needs to pay in terms of improving define policies and guidelines for the organization to carry out effective IT governance; which enable them to meet the organization's strategic business goals. Without a proper 3rd party IT service management organization will face challenges in increasing the internal user satisfaction. As well as without proper products and service delivery external user satisfaction is also at a risk. Ultimately this will create a risk to the overall organizational strategic business objectives.

By analyzing the above factors, it shows the best value addition by the 3rd party vendors, consultants to Sri Lankan PCI is bringing the industry best practices while enabling the organizations to implement innovative products and services. For this, effective IT governance is an essential factor; which enables to align people, processes, and technology with overall organizational objectives.

This shows that payment card organizations with accessible external support from vendors and consultants are likely to have positive user satisfaction and organizational performance in their IT governance framework adoption.

5.4 Gaining competitive advantages with effective IT governance

Feedbacks emphasize that to become competitive in the payment card industry institutes need to respond quickly to the market trends in effective and innovative manner via profit generation, low-cost products/services, and innovative ideas.

Effective IT governance will enable the payment card business to earn competitive advantages in terms of products/ services development and enhancement, identifying new market opportunities and threats, response to competition and competitors, offer better personalize customer services, better decision making, identify customer loyalty, values, and segments. Section 4.4 also support by mentioning that effective IT governance facilitates to make quick, accurate, efficient, effective decisions which can use as a strategic weapon in response to dynamic market changes.

5.5 Conclusion

In this chapter number of analysis and discussions are derived based on chapter 4 data and discussions. Most of these analyses are not directly answering the research question but support as evidence to that. As a summary effective IT governance is essential in Sri Lankan payment card business to increase the user satisfaction and overall organization performance. Data and analysis shows that there are various factors that can affect effective IT governance in Sri Lankan payment card industry. It shows that availability of PCI domain experts, well define PCI related legal, regulations and compliance frameworks, policies and procedures, technology adaptation and 3rd party vendor and consultants support services play a major role in effective IT governance in Sri Lankan context. In Chapter 6, it is going to discuss the main issues highlighted in chapter 4 and ways to overcome these issues. This includes recommendations to effective IT governance in Sri Lankan payment card industry while gaining competitive advantage.

CHAPTER 6 - CONCLUSIONS AND RECOMMENDATIONS

The discussion items in above section and chapter 2 shows that Sri Lankan payment card industry has a greater impact on effective IT governance to meet user satisfaction and strategic organizational objectives. It was identified that in order to have an effective IT governance PCI domain expertise availability, PCI supported legal, regulatory and compliance frameworks, new technology adaptation, and 3rd party vendors and consulting services are important. In the current context, most of these identified factors are at a lower or moderate level with the awareness of strategic improvements.

6.1 Conclusions

Section 5.3.1 shows that Sri Lankan payment card industry current context has a scarcity of PCI domain expertise. This shortage has a direct impact on PCI IT related decision making process which is an integral part of PCI IT governance. Section 5.3.2 highlights well defined legal, regulatory frameworks have a positive impact on PCI IT governance. While risk and security compliance frameworks have both positive and negative impacts on PCI IT governance. Section 5.3.3 stated that PCI organization who perceived to adopt new technology has a positive impact on IT governance in terms of user satisfaction and overall organization performance. Section 5.3.4 highlights Sri Lankan payment card industry is a high reliance on 3rd party vendors and consultants.

Among above findings, it shows that Sri Lanka payment card organizations with domain expertise to support IT governance frameworks adoption are likely to have a positive user satisfaction and perceived organizational performance.

Well defined PCI related legal and regulatory frameworks will support the IT governance adaptation framework, are likely to have a positive user satisfaction and perceived organizational performance. Payment card businesses with a positive vision in technology adaptation to IT governance are likely to have higher user satisfaction and organizational performance.

Availability of defined 3rd party vendor management policies and procedures in terms of procurement, IT service management, risk management and using industry best practices will have a positive impact on the user satisfaction and overall organization performances.

It also highlights main challenges that face to achieve effective IT governance as knowledge gap and domain expertise availability both in technical and management capacity, adaption of best practices and frameworks in IT governance, procurement, due diligence of 3rd party vendors and consultants and their support levels, legal & regulatory framework in Sri Lanka and gaps in handling the payment card incidents and technology adaptation processes within defined policies, procedures and guidelines.

6.2 Recommendations

The analysis shows the ways how Sri Lankan payment card business can obtain competitive advantages through effective IT governance by increasing user satisfaction with better customer service, delivering new products and services, reduce IT costs and finally meeting organization's strategic business objectives. With this research, it was identified ways to increase effective IT governance in Sri Lankan payment card business.

In order to establish PCI domain experts in Sri Lankan payment card industry needs to focus on creating a mechanism to build internal PCI domain expertise by giving required training and industry exposure. Needs to create job rotations, knowledge sharing with relevant managerial skills for appropriate managerial level. Forming industry level professional bodies will enable PCI related professionals to build their career path.

Establishing legal regulatory and compliance framework to ensure PCI key players interest dealing with PCI business. Identification of existing legal and regulatory framework gaps and addressing these regulatory gaps will increase the user satisfaction and overall organization performance. Apart from that building required human capital to support legal and regulatory lawsuits will enhance the efficiency of

PCI IT governance. Execute activities to create awareness of the available legal and regulations will increase the end user satisfaction. Apart from that establishing institutions to monitor, evaluate and audit legal and regulations standard maintenance will increase the efficiency in effective PCI IT governance.

New technology adaptation is vital to increase the efficiency of PCI IT governance. The main aim of these technology adaptations will enable organizations to introduce new products and services while gaining competitive advantage among the other players in the industry. In the process of new technology adaptation is vital by creating positive awareness among the all the levels of the organization and industry, deciding, selecting and bringing the solutions which align the people, process, technology with the organizational strategic objectives. Establishing the processes related PCI IT governance framework support the decision processing, create a mechanism to make the right decision in right time by using the data analytics, business intelligence (e.g.: Use forecasting analysis tool, BI tool). Establishing processes and procedures to manage the technology alignment initiatives. Local legal and regulatory frameworks should support and encourage the PCI organizations to bring these technology initiatives to local industry.

Finally Sri Lankan payment card business needs to focus on the industry prescribe best practices, quality and performance frameworks like PMP, ISO, ITIL when dealing with 3rd party vendors, consultants in the process of PCI IT governance. Defining processes, policies to effective vendor management, procurement processes, IT service management, risk management, alignment of industry best practices.

When the PCI IT governance is in place with effective manner organizations will have all the information related to overall operations in a transparent manner, all the strategic and tactical decisions need to be based on the available data, analytics and business intelligence within the defined policies and procedures. This will enable PCI organizations to gain competitive advantages through new products and services, low operational cost.

6.3 Future Research Opportunities

Due to the limitations mentioned in Section 3.9 certain areas of the research are still remaining unanswered which create some gaps in the research, eliminating full understanding about the application of effective IT Governance in Sri Lankan payment card industry.

To a considerable level the Research Objectives and Question are addressed successfully, but there are some areas still have further research opportunities like how to improve the legal and regulation impact to PCI IT governance, methods, best practices, effective PCI IT operations via technology governance, tested and proven guidelines to increase the effective IT governance in Sri Lanka payment card business, technology tools to increase the PCI IT Governance in Sri Lankan context. From the industry capacity building point of view, more research opportunities are there on training needs analysis, defining training programs to increase the PCI related knowledge, experience and domain specific job roles definitions, ways to increase the job market attractiveness.

With this research, it was identified ways to increase effective IT governance in Sri Lankan payment card business but there are some niched areas still open to performing more research under this industry. One main identical area is to find out the factors which are affected by the efficiency of IT Operations.

Few identical limitations of the Sri Lanka payment card industry are lack of managerial and technical domain experts who has both managerial and technical knowledge, gaps in the current legal and regulatory frameworks in support for PCI industry, Challenges in the 100% compliance implementation, Procuring, and technology implementation with the right 3rd party external vendors by conducting proper due diligence. Above sections discuss the findings and the recommendation for these limitations by connecting academic knowledge and practical work.

Finally, in conclusions, there is a big potential/ opportunity to effective IT governance in Sri Lankan payment card industry. This will provide various ways to

gain user satisfaction, overall organization performance, and competitive advantages in terms of innovation, profitability, and effectiveness.

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APPENDIX I - SAMPLE QUESTIONNAIRE

CONSENT FROM FOR QUESTIONNAIRE

MBA in INFORMATION TECHNOLOGY FINAL DISSERTATION

Dear Participants,

You are invited to participate in a Final Research Project in MBA in IT which is conducting under approval of UOM/CS. I'm researching on **"Factors affecting efficiency of IT governance in Sri Lankan Payment Card Industry".**

In order identify the main factors which is affected to efficiency of IT Governance with in Sri Lankan finance context specific to the payment card industry, and find the main gaps in between IT Governance and the factors and finding solutions for these identified gaps and it's behavior for gain competitive advantage, your valuable ideas and opinion are really appreciated.

You are requested to fill up the bellow questionnaire to identify the main factors and its affected relationship with IT governance specific to the payment card domain in order to gain your ideas in terms of how Card Center Staff can handle their structured, unstructured data , how IT Governance framework can apply for these data in order to find efficacy.

You will be assured of complete confidentiality. The information you provide for this project will have your name removed. You are free to withdraw from this study at any time with obligation. If you have any question about this project, please contact:

K.B.Manawaduge Email: kushbuddhi@gmail.com

Thank you for your assistance!

Sincerely,

K.B.Manawaduge.
MBA IT Batch 2013,
UOM/ CS Deparatment.

I have read the above information and I understand it. I know of no reason I cannot participate in this study.

Name : ----------

Date : ----------

Signature :----------

Questionnaire for Card Center Staff

1. How do you rate the completion among the financial institutes in the Sri Lankan payment card industry?

   ○ High ○ Moderate ○ Low

2. How do you rate the IT usage with relates to payment card business in your organization?

   ○ High ○ Some extend ○ Low

3. How do you rate the importance of the effective IT governance in delivering high user & customer satisfaction?

   ○ High ○ Some extend ○ Low

4. How do you rate the importance of IT governance to achieve and support payment card related organization objectives?

   ○ High ○ Some extend ○ Low

5. How do you rate the importance of IT governance to achieve and support payment card related organization objectives?

   ○ High ○ Some extend ○ Low

6. How do you rate the importance of IT governance to deliver competitive products and services?

   ○ High ○ Some extend ○ Low

7. What % of following categories that you rate the distribution of IT usage in your card center?

   Select only one percentage range in each category based on your experience:

	(0-25) %	(26-50) %	(51-75) %	(76-100) %
Information System	☐	☐	☐	☐
Application System	☐	☐	☐	☐
Network & Communication	☐	☐	☐	☐
IT security	☐	☐	☐	☐
PCI Compliance	☐	☐	☐	☐
PCI Risk	☐	☐	☐	☐

   a. Any identified other categories that not mention in above?

8. What is the level of that your card center used IT governance?

   ○ High ○ Some extend ○ Low

9. As per the industry experience what it the satisfactory level of IT governance usage in Sri Lankan PCI?

   ○ Highly satisfied ○ Satisfied ○ Unsatisfied

10. How do you categories IT governance?

    ○ As an Operational tool ○ As a Strategic Tool

11. What is your core job roll in your organization?

○ IT ○ Non IT

If your answer is “IT”

A. How many IT resources are allocated for your organization payment card division?
    a) Less than 10
    b) 10-15
    c) More than 15
B. How many project that you have participated on PCI IT implementations during the last three years?
    a) Zero
    b) 1-5 Projects
    c) 6-10 Projects
    d) More than 10 Projects

C. If you are a IT engineer what would be your partition for decision making process? (Select only most appropriate category)
    a) Extensive participation
    b) Some extend participation
    c) Initial discussion participation
    d) No participation
D. How do you rate the IT department staff awareness on the PCI related IT policies, procedures and standards?
    a) Very Pour
    b) Pour
    c) Some extend
    d) Know
    e) Thoroughly Know

11. Are you in managerial position in your organization or have you been in managerial position?

○ Yes ○ No

If your answer is “YES”

A. What is your PCI domain experience in managerial position

a) Less than 5 years
b) 5-10 years
c) 10-15 years
d) More than 15 years

B. What should be your job category in the management position?

a) Operation Management Position
b) Strategic/Decision making Management Position

C. If you are in an Operational Management Position what would be your partition for decision making process? (Select only most appropriate category)

a) Extensive participation
b) Some extend participation
c) Initial discussion participation
d) No participation

If your answer is “NO”

A. What is your PCI domain experience in managerial position

a) Less than 5 years
b) 5-10 years
c) 10-15 years
d) More than 15 years

12. Did you participate any training program during last three years?

○ Yes ○ No

If your answer is “YES” specify the number of training according to below categories during the last three years

Local Context -------

Foreign Context -------

13. How many project that you have participated on PCI IT implementations during the last three years?
    a. Zero
    b. 1-5 Projects
    c. 6-10 Projects
    d. More than 10 Projects

14. What would be the reason for technology adaptation? Select all possible answers.
    a. Technology Characteristics such as cost, profitability, familiarity, divisibility, perceived usefulness
    b. User Characteristics such as education/human capital, socio economic system income and assets, risk perceptions, environmental needs
    c. Social Context such as social network, adaptation decision by same sector, demonstrability, cultural appropriateness
    d. Markets such as development of technology, availability of technologies(locally and domestically), access to finance
    e. Transfer Mechanisms such as knowledge dissemination strategy, incentives
    f. Policy environment such as regulatory and investment environment, sectorial development policies ,

g. Infrastructure changes such as communication channel changes, Software hardware platform changes

15. What is the frequency of technology changes in your organization?

○ Very High ○ High ○ Average ○ Low ○ Very Low

16. Base on your experience and knowledge in PCI which statement is most suitable for your organization?
    a. If technology adaption is high user satisfaction will goes up
    b. If the technology adaptation is low user satisfaction will goes down
    c. If the technology adaptation is low user satisfaction will goes down
    d. If the technology adaptation is high user satisfaction will goes up
    e. If the technology adaptation is high or low user satisfaction will not very

17. Base on your experience and knowledge in PCI which statement is most suitable for your organization?
    a. If technology adaption is high organizational performance will increase
    b. If the technology adaptation is low organizational performance will decrease
    c. If the technology adaptation is low organizational performance will decrease
    d. If the technology adaptation is high organizational performance will increase
    e. If the technology adaptation is high or low organizational performance will not very

18. What is the most important type of Technology adaptation which creates the value to your Organization?
    a. Innovation capability
    b. IT cost reduction
    c. Ease of use

19. Which of the following status that you can categories in average your current PCI systems?
    a. Not a latest version
    b. Upgraded to Latest version
    c. Upgraded in Progress
    d. Have to upgrade to latest version

20. How do you rate the new implementations of the PCI related IT solution and technology in your card center?
    ○ Low ○ Average ○ High

21. How many project do you have implemented with the help of third party vendor during the last three years?
    a. Less than three
    b. Three to five projects
    c. Sex to ten projects
    d. More than ten projects

22. I believed that outsource solution and support (third party system and vendor involvement) play a major role in my organization's card center department?
    a. Strongly agreed
    b. Agreed
    c. Some extend
    d. Not agreed
    e. Strongly not agreed

23. What would be the level of due diligence analysis when you selecting third party vendors/supplier to your card center operations?
    a. Low analysis(product and technology evaluation)
    b. Some extend
    c. Strong analysis

24. What is your perception as per your experience regarding the below availability when the organization selecting PCI related outsource solution, product or system?

Availability of define :	Haven't proper Guide line	Have only general Guide line	Have Specific proper guide line
a. Procurement Policy and gridline	☐	☐	☐
b. Risk and Security management procedures	☐	☐	☐
c. IT service (KPI/SLA) management Strategy	☐	☐	☐

25. Do you aware PC industry best practices and what is the level of adaption them of your job functions?

	Awareness		Adaption	
a.	Low	☐	Low	☐
b.	Some extend	☐	Some extend	☐
c.	High	☐	High	☐

26. What is your perception about the impact level of PC industry best practices to the IT governance?
    a. Zero
    b. Low
    c. Moderate
    d. High

27. What is your perception about the impact level of third party vendor support to the users in your card center?
    a. It’s in a satisfactory level
    b. It’s in a moderate satisfactory level
    c. It’s in a low satisfactory level
    d. It’s not in satisfactory level

APPENDIX II - SAMPLE INTERVIEW QUESTION

(Senior IT/ Operational Managers)

1. Briefly describe the overall Payment Card Business of your Organization?
2. How the IT department and its services support the payment card business, what are the main areas that you pay more attention in relation with payment card business?
3. How do you define IT Governance?
4. In which ways do you think Payment Card Industry can use IT Governance in the process of running the Business?
    a. Any industry specific functionalities, areas that you think that IT governance is essential?
        i. Have these mention areas are using IT Governance already
        ii. Any areas that you think that IT Governance needs to pay attention in payment card industry
5. How do you think the IT Governance Usage in Sri Lankan payment card industry
    a. What are the main areas that IT governance focus more
    b. Any areas that you think that IT Governance needs to pay attention in pay attention in your business payment card industry
6. How to you see the relationship between the IT Governance and User Satisfaction in payment card industry
7. Types of IT usage in the payment card business both local and internal?
8. What type of information technologies are available in your organization related to PCI?
9. How do you think the current application of IT governance in your organization related to PCI?
10. How do you think IT governance in terms of strategic level management and operational level management?
11. Any gaps , challenges that you see in the application of IT governance in the current context
    a. What will be the impact of the said gaps for effective IT governance in Sri Lankan payment card system

12. What do you think about the IT staff experience in PCI domain, participation of decision making and any challenges that you face in managing them
    a. Are you satisfied with the current dedicated resource allocation in your organization
    b. What are the roles and responsibilities that these dedicated resource need to perform?
    c. Any challengers that you face in handling these dedicated resources
13. What do you think about the capacity building on PCI business?
    a. Any challenges that you face on Human Capacity Building on PCI
14. Why payment card needs Technology Adaptation?
    a. Reasons for technology adaptation
    b. Objectives for technology adaptation
15. Importance of Technology Adaption for Payment Card Business
    a. How do you think the importance of technology adaptation to Sri Lankan payment card industry
    b. Reasons for technology adaptation?
    c. Types of technology available in the industry?
16. How do you define the need of IT governance in payment card business? Especially in Sri Lankan payment card industry?
17. What is your view on the PCI related IT policies, procedures and standards available in your organization?
    a. Any gaps/ challenges that you think needs to improve
    b. Any suggestions
    c. How to see the awareness of the available policies and standards among your staff
18. PCI IT implementation in your organization for last 3 years,
    a. These are from which business areas/ type of business?
    b. Any challengers that you face during the implementation?
19. How do you see the need and the important of 3rd party vendors and suppliers for PCI business
    a. Any advantage of using 3rd party services?
    b. Types of External Products and Services for the Payment Card Business?

c. Challenges face in dealing and managing 3rd party vendors and consultants

20. How do you define the legal and regulatory importance to PCI?
    a. Availability of legal and regulatory framework and support for PCI IT Governance
    b. Gap between the local legal and regulatory frameworks and current payment card industry
    c. Risk and security compliance for PCI IT governance importance to IT Governance
    d. Availability of risk and security compliance support
    e. Importance of Legal, regulatory compliance and PCI IT governance
    f. Challenges in application of risk and security compliance in Sri Lankan PCI
21. How do you define sources of Competitive Advantage in the payment card industry?
    a. In which ways do you believe IT Governance will help payment card business to find out the Competitive sources?
    b. Any constraints that you find using IT Governance on finding CA in CC environment?
26. In which ways do you think IT Governance can help a payment card business to improve their competitiveness?
27. What are the cost reduction ways that can be used to increase CA alone with IT governance?
28. What kind of support that you expect of use of IT Governance in the process of Promote new, innovative Product and Services?
30. How do you think providing personalize services to Customer will increase CA in the payment card business?
31. Type of IT Usages in Payment Card Industry
32. How do you see the user satisfaction with bellow context with current Sri Lankan PCI industry/organization performance
    a) Risk management, compliance management, security management, card personalization process, ATM/POS and other device application handling, card system and related applications