Curtin Business School
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Blended Value Based Modelling for E-Business Sustainability: The Case of a Commercial Bank in Bangladesh

Mohammed Naim Ahmed Dewan

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DECLARATION

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledge has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

(Mohammed Naim Ahmed Dewan)

Date: 18 December 2014

To my loving family

My mother, brothers, and sisters

My wife: Nasrin

My daughter: Alfiya

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'In the name of Allah, most gracious, most merciful'

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ABSTRACT

E-business, the integration of economic value creation and information technology, has changed the way the businesses are operated nowadays. But information technology can have both positive and negative impacts on the society. Hence economic value creation via e-business is not enough. Organisations need to address other dimensions of sustainability via e-business. On the other hand, extant literature confirms that fulfilment of only customer's requirements via e-business is not enough to be competitive in today's challenging market. Instead, blended value requirements need to be addressed for customer satisfaction, for efficient value process, and to achieve strategic goals. It is surprising that although 'e-business' and 'sustainability' are the two current major global trends but very few studies cover the sustainability aspects of the e-business. Thus, it is imperative for the sustainability of e-business to identify the important blended value requirements effectively, and to fulfil or mitigate those blended value requirements efficiently. Sparse literature is available on sustainability of ICT but none of them clearly explains how important blended value requirements can be effectively identified and efficiently fulfilled to achieve e-business sustainability. This research aims to close this research gap by using Analytic Hierarchy Process (AHP) integrated Quality Function Deployment (QFD) modelling approach to explore and determine the important blended value requirements for e-business sustainability, and to determine optimised mitigation strategies to fulfil those requirements efficiently.

There are growing researches concentrating on the sustainability practices by banking companies within the context of developed countries; but there is a general lack of research focus on the sustainability practices by the banking companies within the context of a developing country (e.g., Bangladesh). This research thus uses the banking industry of Bangladesh as the research context and a particular large commercial bank is used as a case to exemplify the application of developed model for e-business sustainability.

Following a positivist research paradigm, this research adopted a mixed-method approach in which a qualitative method was applied first followed by quantitative phases. In the qualitative phase, the constructs and variables of the initial research model were contextualised and enhanced via field study. There are two phases in the quantitative part. In the first part (Analysis Part 1), the blended value requirements were prioritised and mitigation strategies were developed and optimised by employing

AHP integrated QFD technique. Also, non-linear 0-1 quadratic integer programming method was employed to determine the optimal mitigation strategies. In the second phase (Analysis Part 2), hypotheses were developed and a quantitative test was conducted using Partial Least Square (PLS) based Structural Equation Modelling (SEM) to examine perceived fulfilment of blended value requirements via optimised strategies.

The first phase of the study identified a total of 63 blended value requirements for e-business sustainability and 18 corresponding optimal mitigations strategies. Based on these findings a total of seven hypotheses were developed for quantitative tests. Findings from the second phase of the research strongly supported all the hypotheses. The outcome from this phase confirmed that optimal mitigation strategies will have significant impact on the sustainability outcome of e-business of the case bank.

This research has methodological, theoretical, and practical implications. Firstly, as opposed to the most studies in the e-business sustainability area, which commonly engage mono-method approach, this research applied mixed-method approach by combining qualitative and quantitative approaches. Secondly, the study found that three dimensional blended value requirements for sustainability were emphasised by numerous scholars in a standalone fashion and not in an integrated way. This study closes the research gap by establishing the concept of three dimensional blended value requirements for sustainability. Thus, the development of the blended value based model for e-business sustainability, not just from data but scrutinised data and factors from qualitative and quantitative studies, is a major theoretical contribution. Finally, though this research developed blended value based model for e-business sustainability of a commercial bank, based on the findings of this study and the suggestions, other banks as well as other businesses and e-businesses may adapt this model in planning their future strategies and policies for achieving sustainability.

PUBLICATIONS ASSOCIATED WITH THIS THESIS

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9. Dewan, Mohammed Naim Ahmed, and Mohammed A. Quaddus. 2012. "Blended Value Based E-Business Modeling Approach: A Sustainable Approach Using QFD." In *The 8th International Conference on Computing and Information Technology (IC2IT 2012)*. Pattaya, Thailand (Published as full paper).

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LIST OF ABBREVIATIONS

AHP	analytic hierarchy process
BVR	blended value requirement
CR	customer value requirement
ICT	information and communications technology
IS	information systems
IT	information technology
MS	mitigation strategies
PLS	partial least squares
PR	process value requirement
QFD	quality function deployment
RbV	resource-based view
SEM	structural equation modelling
TBL	triple bottom line
telco	telecommunications company
VPN	virtual private network

CHAPTER 1
INTRODUCTION

1.1 OVERVIEW

E-business and use of information and communication technology (ICT) has changed the way we do business nowadays (Robeiro and Love 2003). The rapid expansion of ICT and its application in various activities have opened new opportunities for businesses and customers. More clearly, adoption of e-business has significantly increased the productivity of businesses and has assisted them to manage intra- and inter-organisational matters (Konings and Roodhooft 2002). E-business has also provided customers with the facilities to conduct personal communications, business transactions, and banking operations in a more flexible and efficient manner. At the same time while this 'e-business' revolution is taking place, another revolution led by the concept of 'sustainability' is also taking place in this 21st century. According to the scholars, businesses including e-businesses must adopt sustainability practices for the betterment of the society and the business itself (Aras and Crowther 2009; Brønn and Vidaver-Cohen 2009; Deutsch 2007). But adoption of sustainability practice by the e-businesses is not straight forward as there is no comprehensive model for adopting sustainability available yet. Literature shows that though 'sustainability of ICT' or 'e-business sustainability' is a contemporary research problem, insight on this issue is very limited (Melville 2010). There is no clear framework for e-businesses about how to adopt sustainability without hindering any interests of customer and the business itself. Hence, this study attempts to develop a comprehensive model for e-business sustainability that considers the value requirements of customer, business, and process.

Sustainability of business has been an established management agenda over the last two decades (Dao, Langella and Carbo 2011; Schaltegger, Windolph and Herzig 2012). A sustainable business by definition is a business that creates long-term shareholder value by embracing opportunities and managing risk from economic, environmental and social dimensions (Lo and Sheu 2007). More clearly, a sustainable business refers to businesses with dynamic balance among three mutually inter dependent elements: (i) economic efficiency; (ii) consideration of social well-being; and (iii) protection of ecosystems and natural resources (Bell and Morse 2009). Both researchers and managers have raised academic debates on this important agenda since the World

Business Council for Sustainable Development (WBCSD) (http://www.wbcsd.org/home.aspx) brought widespread attention to the notions of sustainability and sustainable development. The businesses are being increasingly persuaded by the rise of sustainability-related pressures to review the concepts of value and profitability that drive their business models, and to reconsider the balance between the dual objectives of profitability and sustainability (Bryson and Lombardi 2009). Moreover, there has been evidence that there is a positive correlation between environmental and social sustainability and economic return (Carter and Rogers 2008; Griffin and Mahon 1997). Scholars suggest that managing, measuring, and reporting sustainability help companies add business value in many ways, such as, by tracking where a company's performance is versus where it wants to be and where the competition is (benchmarking), and by demonstrating stewardship of the resources they manage and the value they generate (Schneider, Wilson and Rosenbeck 2010).

Overall sustainability of the business nowadays largely depends on the productive usage of ICT. Thus, answers to this renewed paradox will have important implications for businesses in investing and managing ICT. Zhu and Kraemer (2005) revealed that implementation of ICT in business (e-business) enhances organisational performance. By applying the notion of the Resource-based View (RbV), they reported that the integration of ICT with front-office functionalities and back-end databases can create unique ICT capabilities which cannot be easily imitated, and thus, have the potential to create improved business performance (Zhu and Kraemer 2002; Bharadwaj 2000). That is the reason why ICT use and e-business are growing at an exceptional rate and literally penetrating into every corner of our society and revolutionising the way we live and we do business (Yi and Thomas 2006). There is no doubt that e-business has landed with the potential of generating tremendous new wealth (Amit and Zott 2001, p.494). But the question being faced by the businesses now is how to utilise the benefits of ICT in a sustainable way and make businesses and e-businesses sustainable. As stated above, sustainability has been an important agenda for all types of businesses, aiming to achieve economic growth while simultaneously making development of the society without degrading the environment. This growing requirement for e-businesses to engage with sustainability practices and to implement information systems innovatively and strategically, lead to this study to examine how sustainability outcome of e-business can be maximised with limited resources of the organisation.

1.2 PROBLEM STATEMENT

As indicated above, there has been much recent discussion about the remarkable growth of e-business implementation by organisations, and the ability of these systems to deliver on innovative and competitive strategies (e.g., Amit and Zott 2001; Gordijn and Akkermans 2001; Papakiriakopoulos, Poulymenakou and Doukidis 2001; Osterwalder, Lagha and Pigneur 2002; Osterwalder and Pigneur 2003). A separate but equally important discussion has been taking place regarding the need for organisations to engage with sustainability practices to secure competitive advantages and reduce risk (e.g., Yi and Thomas 2007; Hilty and Hercheui 2010; Haigh 2004; Haigh and Griffiths 2008; Melville 2010; Elliot 2007; Elliot and Binney 2008; Elliot 2011; Dao, Langella and Carbo 2011; Daniel et al. 2004; Kettinger et al. 1994). To increase overall value creation and to gain competitive advantage many businesses including e-dominated businesses (e.g. telcos, bank) have recognised the importance of adopting sustainability as a proactive and strategic tool (Waage, Shah and Girshick 2003). Consistent with the definition for sustainability of a business, a sustainable e-business can be defined as one that meets the needs of its stakeholders without compromising its ability to meet their needs in the future. Scholars argue that investments in ICT sustainability or e-business sustainability (social, economic, and environmental) help to improve business value (innovation, brand equity, and shareholder value) and process value (operational efficiency, lower risk, and talent attraction) (Waage, Shah and Girshick 2003).

The literature reveals that although over the past 30 years information systems (IS) researchers have investigated various aspects of ICT applications and practices, this research has provided little assistance to businesses which are unsure about how, where, and when to respond to imperatives to make their ICT applications and practices sustainable (Elliot and Binney 2008). A few researchers have attempted to link the sustainability concept to the ICT domain using the name 'green IT' or 'environmentally sustainable ICT' for business (e.g., Heinonen, Jokinen and Kaivo-oja 2001; Watson, Boudreau and Chen 2010; Melville 2010; Elliot 2007, 2009; Wati and Koo 2011), however, research relating to the sustainability of e-business is still very scarce.

1.2.1 E-Business in Banking Sector

The adoption of e-business in the banking sector has revolutionised the way that banks are now doing business. Electronic banking is seen as a segment of e-business to the extent that banks are involved in conducting business transactions via electronic media (Bony and Kabir 2013, p.168). The term 'electronic banking' or 'e-banking' entails all transactions of a bank which are possible to be performed with the use of electronic means, mainly through Internet, but also through virtual private networks (VPNs), intranet, extranet, phone and mobile phone, and these transactions do not necessitate a visit by the customer to a branch (Angelakopoulos and Mihiotis 2011; Aggelis 2005). Globally, banking is no longer circumscribed within the walls of bank branches. In the last decade of the 20th century intense technological transformations were observed, one of which was the advent of electronic commerce, that is, the exchange of products and services and payments via telecommunication systems (Kalakota and Whinston 1997). The use of technology by banks and financial service providers in selling to and serving customers is growing at a fast pace: they are investing in ICT with the expectation that it will contribute to their overall profitability and market share (Yousafzai, Pallister and Foxall 2003). The successful implementation of e-business by the banking sector has made it possible for one to do most banking transactions from a remote location even without stepping into a physical financial structure—that is, it has seen the emergence of electronic banking (Boyes and Stone 2003).

The e-banking industry has followed the trend of e-business growth in the past two decades. E-banking is now part of a wider economic context where digital networks and communication infrastructure provide a platform for individuals and businesses to interact, communicate, collaborate, and transact. As an integral part of e-business, the e-banking industry is helping banks to create new products, services and market opportunities, to cut costs, to increase customer and revenue, and to develop more information- and systems-oriented business and management processes, thus becoming more convenient for customers (Halperin 2001; Liao and Cheung 2002). By using e-banking facilities, a bank can reach out to customers and provide them with not only general information about its services but also the opportunity to perform interactive retail banking transactions (Yousafzai, Pallister and Foxall 2003). E-banking has also enabled banks to create and maintain better relationships with other businesses. A recent study examined the impact of e-banking on building inter-firm relationships within 200 Australian banks and revealed that effective e-banking may enhance inter-firm relationships through improved communications (Rao 2004). Issues

currently being addressed in the recent literature about e-banking, include customer acceptance and satisfaction, privacy concerns, profitability, operational risks, and competition from non-banking institutions (Yang, Whitefield and Boehme 2007). However, despite sustainability being an established management agenda, issues related to the sustainability of e-banking have not yet been comprehensively explored. However, it has been argued that the banking sector has a crucial role to play in the development and promotion of social and environmental sustainability (Sobhani, Amran and Zainuddin 2012). Previous research in this domain has attempted to identify the main drivers (e.g., enhanced reputation, social responsibility, cost savings, competitive advantage) and barriers (e.g., measuring benefits, absence of legal requirements, high implementation costs) of sustainability adoption in the banking industry (Kontic and Kontic 2012).

E-banking is heavily dependent on ICT applications. Furthermore, the impacts of ICT applications can be direct (i.e. the impacts of ICT applications themselves, such as, energy consumption and e-waste); or can be indirect (i.e. the impacts of ICT applications, such as, intelligent transport systems, buildings and smart grids); or third-order and rebound (*i.e.* the impacts enabled by the direct or indirect use of ICTs, such as, greater use of more energy-efficient transport) (Houghton 2010). After implementing e-banking, the present scale of banking operations has remarkably increased the carbon footprint of banks due to their substantial consumption of energy (e.g., electrical equipment, ICT systems, generator, air conditioning, lighting), usage of chemical inks, lack of green buildings, etc. (Chisty 2013). The application of ICT in e-banking has become a key source of environmental contamination at all stages of the technology life cycle: design, operation, and disposal.

On the other hand, e-banking has enabled banks to easily connect the unbanked community— the people who are not part of the financial system due to various reasons (e.g., geographical location, cost, mobility). E-banking has also enhanced the movement towards 'fair trade' by simplifying the disclosure of and access to information by private and government organisations. The effort to improve social responsiveness improves the firm's long-term capability in terms of intangible strategic assets (Michalisin, Smith and Kline 1997). Moreover, the sustainability of e-banking consists of multidimensional benefits, such as, business benefits (i.e., less operating costs, greater customer satisfaction, better customer relationships); environmental benefits (i.e., less energy consumption, less paper usage, less pollution); and social benefits (i.e., employment, poverty reduction, service to the wider community, access to

the disadvantaged). Thus, like other e-businesses, the e-banking industry is now compelled to adopt sustainability to increase overall value creation, to gain competitive advantage and for the betterment of society and the natural environment.

To implement sustainability practices, the e-banking industry worldwide is now trying among other initiatives to develop and maintain sustainability reporting, environmental management systems, green banking policy, and social and environmental risk assessment guidelines. However, in many cases, banks are not successful in effectively practising sustainability due to the lack of a clear and comprehensive framework or model for adopting sustainability. Although a limited number of frameworks have been proposed for the sustainability of traditional banking (e.g., Stubbs and Cocklin 2008; Jeucken 2004; UNEP 2011), there is still no comprehensive and effective model available for adopting e-business sustainability in the banking industry. The availability of a comprehensive and effective model for e-business sustainability would provide significant assistance to the e-banking industry in adopting sustainability practices.

In adopting sustainability practices, firms need to evaluate whether or not customers are receiving the total (sustainable) value that they are expecting. If not, firms must identify all the existing discrepancies and try to fulfil those requirements to effectively deliver sustainable value to customers. On the other side, for the viability of the business, business value requirements need to be considered and fulfilled. Similarly, increasing process performance and reducing firms' emissions are two of the major goals of process sustainability that lead to total business sustainability (Kalitventzeff, Maréchal and Closon 2001). The literature shows that several researchers have focused on sustainability from the business value point of view (e.g., Hutchins and Sutherland 2008; Carter and Easton 2011; Foerstl et al. 2010; Enticott and Walker 2008; Schneider, Wilson and Rosenbeck 2010; Chowdhury et al. 2012; Vinodh and Chintha 2011), whereas a number of other researchers have considered sustainability in a stand-alone fashion from the customer value point of view (e.g., Schaefer and Crane 2005; Charter et al. 2002; Luo and Bhattacharya 2006; Choi and Ng 2011). However, the academic literature has recognised the importance and benefits of adopting the process-oriented perspective of business (e.g., Mooney, Gurbaxani and Kraemer 1996; Crowston and Treacy 1986; Bakos 1987; Wilson 1993; Tallon 2007; Radhakrishnan, Zu and Grover 2008). Scholars suggest that an e-business that is built on top of inadequate and inefficient business processes will indicate a company's poor operational processes (Earl 2000). Hence, sustainable business processes have been referred to as another

key requirement for achieving e-business sustainability. Moreover, the lack of adequate insight, tools and techniques to address the complexity of social, economic and environmental issues at multiple levels of the process has been identified as one of the greatest barriers to the adoption of sustainability practices by businesses (Bakshi and Fiksel 2003). Consequently, a few researchers have attempted to focus on business sustainability from the process value point of view (e.g., Bryson and Lombardi 2009; Gonzalez and Smith 2003; Azapagic, Millington and Collett 2006; Bateman 2005; Diwekar 2005) in a standalone fashion. This viewpoint indicates that, to achieve sustainability, the fulfilment of process value requirements is essential in addition to the fulfilment of customer value requirements and business value requirements. However, existing research in this area has failed to provide a comprehensive model for e-business sustainability that integrates these three value requirements (i.e., customer value requirements, business value requirements, and process value requirements).

Moreover, as with any research, recognising the problem is not the only challenge: the research needs to find out what can be done, how it can be done and to propose and choose certain solutions (Yi and Thomas 2007). Researchers argue that many e-businesses have failed because they have taken the dive into ICT without considering some crucial factors in their strategies (Kulatilaka and Venkatraman 2001). Similarly, there is greater chance of e-businesses failing in their adoption of sustainability practices if important factors are not considered to have significance when formulating the strategy. Given the recognised role of ICT in e-business, it is arguable that ICT resources should be carefully considered in enabling firms to develop capabilities to address sustainability issues, deliver sustainability values to stakeholders and gain sustained competitive advantages (Dao, Langella and Carbo 2011). Previously, resource optimisation for sustainability was much appreciated. However, limiting the usage of resources alone is not enough now for an e-business to be fully sustainable. The appreciation of the paucity of resources is now extended from the narrow task of resource optimisation to the broad task of the continuity of the business, with an understanding that sustainability is the composite ingredient for building the business's strategies (Sakalauskas et al. 2009). Thus, sustainability issue has to be a core part of the e-business strategy. Strategies or management decisions that neglect social and environmental issues obstruct the whole organisation from improving in terms of sustainability (Schaltegger, Ludeke–Freund and Hansen 2012). Businesses may need to engage in wide-ranging activities, such as redesigning business processes and changing business culture to develop the capabilities of the business or company to

address sustainability issues (Hart and Milstein 2003). Ensuring sustainability in the organisation may also require constant vigilance from planners, managers, and others (Goldsmith and Brinkerhoff 1990, p.229). Thus, firms need to carefully consider these sustainability issues in developing their strategies for e-business but very few studies in this research domain have shown them how to develop these strategies.

1.2.2 Summary

Based on the above discussion, it is clear that investments in e-business sustainability (social, economic and environmental) help to improve business value, customer value and process value. However, to date, the literature has provided very little support to e-businesses which are unsure about what needs to be done and how. In addition, the literature has failed to respond to the mounting demand by businesses and e-businesses seeking to adopt sustainability. A few researchers (but very limited in number) in the e-business domain have started raising the issue of sustainability under the name of 'green IT' or 'environmentally sustainable ICT', but studies relating to the sustainability of e-business are still very rare. As an integral part of the wider e-business context, e-banking has not only revolutionised the banking industry but also other businesses through the advent of e-commerce. However, as e-banking is profoundly dependent on ICT applications, it has direct, indirect, third-order and rebound impacts on society and the environment. Thus, as with other e-businesses, the e-banking industry is also now under pressure and eager to adopt sustainability practices. However, owing to the unavailability of a comprehensive and effective model, most e-banking organisations are unsuccessful in adopting sustainability practices. A limited number of frameworks or models for the sustainability of traditional banking have been proposed by previous studies (e.g., Stubbs and Cocklin 2008; Jeucken 2004) but none are appropriate and sufficiently effective to be adopted by the e-banking industry. Moreover, in developing the models, researchers have considered customer value requirements, business value requirements and process value requirements each in a stand-alone fashion and have failed to integrate them in one model despite their importance in sustainability adoption. Furthermore, most of the proposed models do not explain how to develop and implement the strategies for e-business sustainability.

Using an appropriate case of a commercial bank in Bangladesh, this study develops a comprehensive model for sustainability that clearly guides e-businesses, including the e-banking industry, on what needs to be done and how this should be done, when adopting sustainability practices. The e-business sustainability model developed in this

study integrates the sustainability dimensions (social, economic and environmental) with the organisational value dimensions (customer value requirements, business value requirements and process value requirements). The model also shows how to explore and determine the optimal mitigation strategies of an e-business when adopting sustainability practices.

After reviewing the relevant literature, a minimal number of empirical studies have been revealed in this area of e-business sustainability (Caldelli and Parmigiani 2004; Kuhndt et al. 2003). Therefore, a case study approach has been adopted in this research. Yin (2003) and Eisenhardt (1989) agree that the case approach is appropriate for exploratory research. Furthermore, Eisenhardt (1989) supports the utilisation of this approach in research where the measurement is unclear, when changes need to be tracked in complex systems, or where theory is absent from new topics, all of which are relevant to this study.

1.3 RESEARCH QUESTIONS AND OBJECTIVES

Based on the discussions above, this research analyses various theoretical concepts to explore and determine the optimal mitigation strategies for e-business. In determining the optimal strategies this study investigates how the concept of blended value dimensions can be used in developing the e-business model. This study also investigates how the sustainability dimensions can be integrated with the organisational value dimensions in developing the e-business model. This study, therefore, attempts to investigate the following research questions:

Research Question 1:
What are the optimal mitigation strategies to fulfil the value requirements of customer, business, and process in developing a model for e-business sustainability?

Research Question 2:
How can the sustainability dimensions be integrated with the value dimensions in developing a model for e-business sustainability?

Research Objectives:
Based on the above research questions this research approach consists of the following objectives:

1. To explore and determine the optimal mitigation strategies of an e-business model.

2. To investigate how the concept of blended value dimensions can be used in developing a model for e-business sustainability.
3. To investigate how the sustainability dimensions can be integrated with the organisational value dimensions in developing a model for e-business sustainability.
4. To develop a 'value-sustainability' framework for modelling e-business sustainability in conjunction with organisational values and sustainability concepts.

The above research questions and objectives will be studied in the context of a large commercial bank in Bangladesh.

1.4 DEFINITION OF TERMS

The following are the operational definitions of terms used throughout this study:

Analytic Hierarchy Process (AHP): The analytic hierarchy process (Saaty 1980) is an established multi-criteria decision-making approach that employs a unique method involving hierarchical structuring of a problem and subsequent ranking of alternative solutions by a paired comparison technique.

Blended Value: Blended value is the integration of economic value, social value, and environmental value (Emerson 2003, 2006; Emerson and Bonini 2003) for the customer, business, and process. More clearly, blended value is the integration of economic value, social value, and environmental value for the customer; economic value, social value, and environmental value for the business; and economic value, social value, and environmental value for the process.

E-business: A broad definition of e-business is "digitally supported interaction and transactions between organisations, clients, and other stakeholders" (Haigh 2004; Deitel, Deitel and Steinbuhler 2001). It is not limited to just buying and selling but also involves servicing customers and collaborating with business partners (Bichler 2001).

Economic Strategy: Economic strategies are developed and implemented to mitigate or fulfil the economic value requirements.

Environmental Strategy: Environmental strategies are developed and implemented to mitigate or fulfil the environmental value requirements.

Mitigation Strategies: Mitigation strategies, also known as, design requirements or HOWs are the strategic initiatives necessary to fulfil the 'blended value' requirements in the quality function deployment (QFD) process. After needs , also known as, WHATs are revealed the company's technicians or product development team or managers develop a set of mitigation strategies in measurable and operable technical terms (Chan and Wu 2005) to fulfil the value requirements.

Quality Function Deployment (QFD): Quality function deployment (QFD) is a "method to transform qualitative user demands into quantitative parameters, to deploy the functions forming quality, and to deploy methods for achieving the design quality into subsystems and component parts, and ultimately to specific elements of the manufacturing process" (Akao 1994, p.339). This tool is used in various fields for determining customer needs (Stratton 1989), developing priorities (Han et al. 1998), formulating annual policies (Philips, Sander and Govers 1994), manufacturing strategies (Crowe and Cheng 1996; Jugulum and Sefik 1998), and environmental decision making (Berglund 1993).

Shared Value: Shared value is defined as the policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates (Porter and Kramer 2011).

Social Strategy: Social strategies are developed and implemented to mitigate or fulfil the social value requirements.

Sustainability: The term 'sustainability' is an evolution of more conventional phrases describing ethical and moral business practice. A sustainability-oriented company is one that develops over time by taking into consideration the economic, social and environmental dimensions of its processes and performance (Perrini and Tencati 2006).

Value Requirements: Value requirements are the demands for value by the customer, business, and process. Value can be economic and/or social and/or environmental demanded by customers and/or businesses and/or business processes to fulfil the customer's requirements and/or to achieve strategic goals and/or to ensure efficient value processes.

1.5 RESEARCH SIGNIFICANCE

1.5.1 Theoretical Significance

This study investigates and shows how the concept of blended value dimensions can be used in developing the model for e-business sustainability. There exists a growing body of literature about the sustainability of businesses. Ideas and proposals about e-business sustainability are also increasing. The literature also includes studies on green IT/ICT. However, there is no clear proposal or framework about sustainable e-business modelling. Similarly, there are few thoughts in the literature about blended value (Emerson 2003, 2006) or shared value (Porter and Kramer 2011). Most studies have considered value requirements for sustainability only from the customer's value requirements point of view (e.g., Schaefer and Crane 2005; Charter et al. 2002; Luo and Bhattacharya 2006; Choi and Ng 2011). Most have not integrated business value requirements or process value requirements with customer's value requirements. In this current approach, all of the value requirements (customer, business and process) are taken into consideration to develop the model. Therefore, the theoretical contributions of this study can be listed as follows:

(i) In this study, the 'sustainability dimension' is integrated with 'organisational value dimensions' in developing the model for e-business sustainability.

(ii) A few modelling approaches exist that have considered 'e-business' and 'sustainable business' separately, but no integrated model for 'e-business sustainability' has yet been developed. In this research, the concept of 'e-business' and 'sustainability' are integrated in developing the model.

(iii) Blended value is considered not only from the customer's point of view but also from the points of view of the business and value process.

1.5.2 Practical Significance

The literature reveals that businesses including e-businesses are now concerned about the importance of sustainability and are showing a willingness to adopt sustainability practices. However, due to the lack of a clear framework (what can be done, how it can be done) businesses are facing difficulty in adopting sustainability practices. This research develops a framework to identify the important value requirements that need to be mitigated for e-business sustainability, and to determine optimal mitigation

strategies based on their respective importance and the resources available. Hence, the practical contributions of this research are as follows:

(i) The banking industry in Bangladesh may consider the proposed model and the findings of this study for the advancement of sustainability practice while safeguarding the interests of all stakeholders.

(ii) The proposed model for e-business sustainability contributes in the efficient allocation of resources for banks. Optimised mitigation strategies are determined based on their respective importance and the resources available that may help banks to decide the correct allocation of resources for sustainability.

(iii) This research approach develops a 'value-sustainability' framework for e-business sustainability in conjunction with 'organisational values' and 'sustainability values' which can be implemented by other businesses, taking into consideration their business contexts.

1.6 ORGANISATION OF THE THESIS

This thesis is structured and presented in nine chapters followed by references and appendices. The chapters are closely connected and complementary to each other. Figure 1.1 presents the organisation of this thesis according to the chapters. A brief outline of the chapters is presented below:

Chapter 1: Introduction

This first chapter of the thesis provides the overview of this study. It presents the discussion on the importance of conducting this research including the research gap, research questions and research objectives. The objectives of this study are then elaborated in the research questions in order to concentrate on very specific areas. This chapter also provides the overview of the overall structure of the thesis.

Chapter 2: Research Context and Case Bank

Chapter 2 presents the research context and the background of the bank used as the case for this study. This chapter explains the rationale for choosing the case bank and the banking industry of Bangladesh as the research context. This chapter also elucidates the issues relevant to the research topic, the research context and the case bank.

Structure	*Description*	*Outcome*
Chapter 1	**Introduction of the Thesis** ● Establish the research problem	Determines the research questions and objectives
Chapter 2	**Research Context and Case Bank** ● Sustainability of business and e-business in Bangladesh ● Overview of the case bank	Provides overview of the research context and the case bank
Chapter 3	**Literature Review and Conceptual Model** ● The theoretical background ● Discussion about the existing gap ● Conceptual framework	Discusses the relevant literature and proposes initial research-models
Chapter 4	**Research Methodology and Design** ● Details the methodology	Presents the methodology adopted for this research
Chapter 5	**Field Study and Comprehensive Research Model** ● Details of the field study ● Analysis of the field study	Proposes the comprehensive research model
Chapter 6	**Mitigation Strategies Development and Optimisation** ● Prioritisation of blended value requirements ● Development and optimisation of mitigation strategies	Determine the optimised mitigation strategies for mitigating the blended value requirements
Chapter 7	**Hypotheses Development and Quantitative Tests** ● Details of the hypotheses development ● Details of the survey method ● Analyses of the survey data using PLS based SEM	Provides the hypotheses and presents the data and data analysis
Chapter 8	**Discussion and Interpretation** ● Discussion of the findings	Provides the interpretations of the research findings
Chapter 9	**Conclusion and Future Research Directions** ● Overview of the research and future research directions	Wrapping up the thesis and proposing future research directions

Figure 1.1: Structure of the thesis

Chapter 3: Literature Review and Conceptual Model

Chapter 3 presents and discusses the review of the literature that is relevant to business and e-business sustainability and its dimensions. This chapter also comprehensively explicates the three-dimensional value requirements for e-business sustainability. In addition, the relevant theories engaged in this study are explained in this chapter. Finally, based on the findings from the field study, a preliminary research model for e-business sustainability is proposed.

Chapter 4: Research Methodology and Design

Chapter 4 discusses the research methodology and design incorporated in the study. This chapter primarily focuses upon determining the appropriate research approach employed to undertake this research and discusses the methodology adopted for this research. This chapter also explains the rationale and justifications for adopting these research methods. Firstly, the research paradigm of the study is introduced followed by the research methods and research process. As this study adopts the mixed-method approach, both qualitative and quantitative approaches are discussed in this chapter.

Chapter 5: Field Study and Comprehensive Research Model

Chapter 5 presents details of the field study and the development of the comprehensive research model. The field study analysis including questionnaire development, sample selection, data collection, data analysis and findings are presented in this chapter. An extensive discussion of the factors and variables identified by this qualitative field study is also provided. Based on the findings from the field study, the initial research model is then modified to develop the comprehensive research model. The comprehensive research model consists of two prone analyses: 'Analysis Part 1' and 'Analysis Part 2'.

Chapter 6: Mitigation Strategies Development and Optimisation

Chapter 6 deals with 'Analysis Part 1' which comprises mitigation strategies development and optimisation based on quality function deployment (QFD) analysis. To develop and optimise the mitigation strategies, blended value requirements are prioritised by employing AHP (Analytic Hierarchy Process). Thus, this chapter presents the prioritisation of blended value requirements, development of mitigation strategies, and optimisation of mitigation strategies. In explaining the QFD and AHP analyses, this chapter presents the sample selections, data collections, data analyses, and findings.

Chapter 7: Hypothesis Development and Quantitative Tests

Chapter 7 presents 'Analysis Part 2' which comprises hypotheses development and quantitative tests. To confirm the findings of 'Analysis Part 1', hypotheses are developed and quantitative tests are conducted by employing the partial least squares (PLS)-based structural equation modelling (SEM) technique. This chapter is divided into two main parts. The first part provides details of the hypotheses development and data analysis instruments including questionnaire development. The second part of this chapter presents the quantitative tests. Confirmation of the research hypotheses is provided based on the results of the analysis.

Chapter 8: Discussion and Interpretation

Chapter 8 discusses the findings obtained from 'Analysis Part 1' and 'Analysis Part 2'. The findings from the QFD-based analyses are discussed in the first part of this chapter followed by the findings from the PLS-based quantitative tests. Based on the findings from both analyses, this chapter provides the discussion from the theoretical and practical perspectives.

Chapter 9: Conclusions and Future Research Directions

This final chapter (Chapter 9) of this thesis delivers the summary and conclusion of the study. This chapter also addresses how the research findings contribute both theoretically and practically to the existing body of relevant knowledge. The limitations of the study are acknowledged in this chapter and recommendations for future research directions are proposed.

1.7 SUMMARY

This chapter has presented the background and overview of this research which is documented in this thesis. This chapter has provided an overview of the existing literature pertaining to the research topic to reveal the literature gap and has outlined how the gap has been addressed by this research. This chapter has determined the research objectives based on the identified research questions. The significance of this study, both theoretical and practical, has also been discussed in this chapter. Finally, the organisation of the thesis structure has been outlined.

CHAPTER 2

RESEARCH CONTEXT AND CASE BANK

2.1 INTRODUCTION

This chapter presents the research context and the case company that has been used in this research. Hence, this chapter is divided into two main parts- Part I: Research context, and Part II: Research case. Since banking industry of Bangladesh was chosen as the research context, the existing e-business and e-banking contexts in Bangladesh and their sustainability practices are presented in Part I. Then, the case bank, its e-banking services, and its sustainability practices are discussed in Part II. Along with Part I and Part II, the reasons for choosing Bangladesh are also mentioned briefly at the beginning of this chapter.

2.2 REASON FOR CHOOSING BANGLADESH AS RESEARCH CONTEXT

The literature reveals that banks are very important for the agenda of sustainable social and environmental development (Stephens and Skinner 2013). The majority of the population of most of the developed countries are already relishing the entire benefits of e-business/e-banking and most of them have acknowledged the importance of sustainability. However, in many developing countries (such as Bangladesh), the majority of the people who live in rural areas are not aware of the importance of sustainability as the rural community is not well connected to the urban community. Thus, the inclusion of the rural community along with the urban community is very important for sustainable development. The banking industry of Bangladesh is trying to include the rural community and the urban community in sustainable development by connecting the unbanked people through e-banking services. Among all other businesses in the country, the banking sector is ahead in implementing e-business. Bangladesh was selected as the context for this research for the following reasons:

(i) Banking companies in Bangladesh are successful; furthermore, the financial sector of the country is dominated by the banking industry (Sarkar 2000).

(ii) Growing numbers of research studies are concentrating on sustainability practices by banking companies within the context of developed countries; however, there is a general lack of research focus on sustainability practices by

banking companies within the context of a developing country like Bangladesh (Khan et al. 2011).

(iii) Banking is the largest sector in Bangladesh, where the total number of scheduled banks is 56, of which 29 are dually listed with the Dhaka and Chittagong Stock Exchanges (Sobhani, Amran and Zainuddin 2012).

(iv) Banks in developing countries, such as Bangladesh, have a fair degree of implications in relation to sustainability through constructing reputational capital and gaining community trust (Khan et al. 2011).

(v) Recent research endeavours in the context of the banking industry of Bangladesh have demonstrated an increase in social responsibility programs conducted by banks together with evidence of international award-winning programs (Khan, Halabi and Samy 2009; Khan 2010).

(vi) The banking industry of Bangladesh has drawn global attention in the last few years as 'Grameen Bank' received the Nobel Peace Prize in 2006 for its sustainable contribution to poverty alleviation;

(vii) There is an overall research gap in the sustainability area of the banking industry of Bangladesh (Sobhani, Amran and Zainuddin 2009).

2.3 PART I: RESEARCH CONTEXT

2.3.1 E-Business in Bangladesh

The successful usage of various ICT applications in developed countries has significantly influenced the adoption and usage behaviour of technology in developing countries. Recent statistics have depicted considerably higher growth in Internet usage in developing countries than in developed countries thus creating grounds for the diverse use and utilisation of ICT in developing nations. Bangladesh is a developing country in South Asia with a population of more than 156 million. The growth indices, development initiatives and ICT infrastructure of Bangladesh are identical with those of a typical developing country. The growth trend of the Internet population in Bangladesh is consistent with the trends of other Asian countries (Azam and Quaddus 2009). Despite this, the government of Bangladesh has planned to make the country a technology based society by the 50th anniversary of the birth of the country in 2021 with this aim adopted in the national development plan, *Vision 2021*. Raven et al. (2007) argue that governmental policy is an influential driver of Internet usage and e-business. Measures that have accelerated the growth process of e-business in Bangladesh include the government's recent emphasis on building a *digital Bangladesh*

(Government of Banglaesh [GoB] 2009), setting up an ICT park, raising the allocation for developing ICT infrastructure, waiving taxes on computer peripherals, and other measures such as the automation program of the banking sector led by the central bank (the Bangladesh Bank) as well as competition among businesses. Moreover, recent competition within the telecommunications industry has significantly facilitated Internet penetration in Bangladesh: the increased adoption of the Internet is playing a key role in the rapid growth of e-business. The Internet service providers of Bangladesh have already introduced 3G (third-generation) and 4G (fourth-generation) broadband services. According to Laisuzzaman et al. (2010), Internet in the developing countries is boosting efficiency and enhancing market integration.

In Bangladesh, high density urban areas with higher literacy rates; a vast rural population with a fast increasing literacy rate; a rapidly growing Internet user base through technology advancement; and the adoption of similar technologies in other sectors are all enhancing the rapid growth of e-business (Islam, Islam and Hasan 2014; Azam and Quaddus 2009). Landline-based Internet models are rapidly being overtaken by mobile Internet connections in the country and mobile technology is allowing even more users to have access to the Internet and e-business. In addition, businesses in Bangladesh are encouraged by the government through regulation and other initiatives to embrace new technologies in order to be competitive in world markets and to be connected to the necessary information. From big corporations to small industries, businesses in Bangladesh are adopting e-business, opening up their products and service offerings to new groups of people nationally and internationally. Web based buy/sell portals, such as, 'cellbazaar' (*http://www.cellbazaar.com*), 'clickbd' (*http://www.clickbd.com*), 'bdhaat' (*http://www.bdhaat.com*), 'bdbazar24' (*http://bdbazar24.com*), 'bikroy' (*http://bikroy.com*), 'easy' (*https://easy.com.bd*), 'ushop' (*http://www.ushop.com.bd*) are gaining popularity in Bangladesh due to the availability of credit cards and debit cards from almost all the banks. However, e-business is more than just buying and selling products online; it also includes the entire online process of developing, marketing, selling, delivering, servicing, and paying for products and services (Malhotra 2014, p.11).

Global business processes are gradually becoming more complex due to the rapid advancement of technology in which e-business, especially in the banking sector, is superseding traditional business processes. It has been observed by Mia et al. (2007) that the latest advancement in the banking industry of Bangladesh is e-banking, where banks are now comprehensively implementing ICT to take advantage of its power and

access in order to cope with the accelerating pace of change of the business environment. Although Bangladesh is still lagging behind in terms of availing itself of the full opportunity of e-business, the banking sector of the country as a whole has started utilising online banking systems which are playing a complementary role in spreading e-business (Ali 2010).

2.3.2 E-Banking in Bangladesh

In a developing country like Bangladesh the banking system as a whole play a vital role in the progress of economic development (Chowdhury and Ahmed 2009). Although the service sector's contribution to total gross domestic product (GDP) is the most significant at 52% (Khan, Halabi and Samy 2009), the financial sector of the country is dominated by the banking systems (Alam et al. 2007). However, only few years ago, banking sector in Bangladesh was operating using traditional systems. However, the last few years have shown a dramatic increase in the awareness among the banking sector of Bangladesh regarding the comprehensive application of ICT (Alam et al. 2007). Among all other businesses in the country the banking sector has been ahead in implementing e-business. In recent years, online banking systems have been dominating the banking sector thus facilitating the acceleration of e-business. Biswas et al. (2011) mention that financial institutions in Bangladesh are increasingly adopting e-banking and improving banking capabilities. E-banking is considered to be a part of e-business to the extent that banks conduct business transactions through electronic media (Bony and Kabir 2013, p.168). Although e-business has a wider range of fields, e-banking can be considered as a subset of e-business. The growing popularity of e-banking stems from the fact that its services are much more attractive than those offered by traditional banks (Alam et al. 2007). The term e-banking is now a global phenomenon which is an invaluable and powerful tool that is driving development, supporting growth, promoting innovation and enhancing competitiveness (Kamel 2005; Nath, Schrick and Parzinger 2001). Developed countries are already enjoying the entire benefits of e-banking. In addition to developed countries, developing countries are also experiencing sturdy growth in e-banking (Mia, Rahman and Uddin 2007) with Bangladesh experiencing similar growth. The banking sector in Bangladesh is clearly recognising the importance of information technology (IT) in their continued success (Huda, Momen and Ahmed 2004). Shamsuddoha (2008) states that the banking industry of the country is now much more mature than in earlier periods and has developed an excellent image in their various activities including e-banking. He also

stressed that in Bangladesh, e-banking is one of the most sought-after and up-to-date technology in the banking sector (Shamsuddoha 2008).

Currently, almost all private commercial banks and foreign commercial banks in Bangladesh are offering e-banking facilities. As part of stepping forward towards e-banking, the foreign commercial banks (e.g., HSBC, Standard Chartered, Citibank N.A.) played a pioneering role during the late 1990s in the adoption of modern technology in retail banking whereas the state-owned commercial banks and private commercial banks have recently come forward with such services (Hasan et al. 2010). On 28 February 2011, the central bank of Bangladesh (Bangladesh Bank) inaugurated electronic funds transfer (EFT) payment systems which are now being used by most of the 56 scheduled banks (39 private, nine foreign, nine state-owned, nine specialised). Electronic funds transfer (EFT) assists banks in instantly making bulk payments using less paper and manpower. The initiation of mobile banking in Bangladesh has been one of the most significant advancements in banking. Through this system, the franchises of banks through mobile operators can provide banking services to even the remotest corner of the country. Almost every commercial bank is now using their own 'core banking' solution which has made banking much faster and more efficient (Bangladesh Bank 2014). Full or partial online banking is now being practised by most of the banks (see Table 2.1).

Table 2.1 : Bank branches with e-banking [source: Bangladesh Bank Report (2012a)]

Types of Banks	No. of Branches	No. of Branches with Online Banking
SCBs	3,482	177
PCBs	3,378	3,116
FCBs	75	75
SDBs	1,457	77

Note: *SCB = State-owned Commercial Bank; PCB = Private Commercial Bank; FCB = Foreign Commercial Bank; SDB = Specialised Commercial Bank.*

Bangladesh has also developed automated clearing systems through which 80% of payments are now cleared and settled (Bangladesh Bank 2011). The following e-banking services are currently available in Bangladesh:

- *Online banking:* This service offers any branch banking facilities through their respective bank's online network.
- *Internet banking:* This service includes most of the services provided by Internet banking facilities in developed countries.

- *Mobile banking:* Mobile banking uses different software and a different platform than normal mobile Internet banking but provides similar services.
- *Telebanking:* This service is provided by phone and is also known as 'phone banking'.
- *EFT:* This service allows money to be sent from one bank account to another without having any paper money transaction. All of the banks now provide this facility.
- *ATM banking:* Automated teller machine (ATM) services are offered as in developed countries.
- *SMS banking:* Through this service, the short message service (SMS) allows the customer to do selected banking inquiries and transactions on a mobile phone from anywhere within the coverage of the mobile network.

Moreover, credit card and debit card point-of-sale (POS) services are now available from almost all banks in Bangladesh. Magnetic ink character recognition (MICR) technology was adopted in 2009 by banks in the country for automated cheque clearing (Chowdhury and Ullah 2013). The automated teller service (ATM) service is expanding rapidly across the country, and microchip-embedded smart cards are also becoming popular in Bangladesh, particularly for utility bill payments (Alam et al. 2007). For example, more than 2400 ATM booths have been installed across the country and are being run by a single private bank (Dutch-Bangla Bank Ltd.): currently, similar numbers of ATM booths are also being operated by other banks.

2.3.3 Sustainability of Business in Bangladesh

Research on sustainability issues in developing countries is very limited: as in other developing nations, Bangladeshi businesses have yet to adopt sustainability practices (Sobhani, Amran and Zainuddin 2012). However, the move towards industrialisation during the past few years has increased the number of different types of enterprises in Bangladesh. These enterprises have played a crucial role in achieving sustainable development, alleviating widespread poverty, enhancing productivity, broadening employment opportunities, increasing export earnings and ensuring efficient use of the country's scarce resources (Nasrullah and Rahim 2014). Belal (2006) states that while the industrial units have started making significant contributions to the country's economy and development agendas, their social, ethical and environmental performance have become a concern for investors, buyers, consumers and other local stakeholders. Given the need to protect business interests in the market and the urgency of providing societal benefits, the private sector of Bangladesh has been

pushed to engage more in addressing corporate sustainability issues in their business activities (Nasrullah and Rahim 2014). A few examples of sustainability activities are next described: British American Tobacco in Bangladesh began its afforestation program in 1980 to compensate for wood burning in the tobacco curing process; Nestlé Bangladesh Ltd. started the Pure Drinking Water Supply Project in some areas and invested a significant amount in a garbage treatment plant to minimise the effect of waste in the surrounding areas; Grameen Phone sponsors different sports events, has helped cyclone-affected victims and arranged free eye camps for the poor; Unilever Bangladesh's social initiative to encourage women's economic empowerment through information and resources has created waves across the country (Uddin, Hassan and Tarique 2008).

2.3.4 Sustainability of Banking Industry in Bangladesh

The financial sector of Bangladesh, as in most developing countries, is dominated by banking enterprises and financial institutions. These banks and financial institutions play a key role in boosting economic activities and social conditions in Bangladesh (Khan, Halabi and Samy 2009). Chisty (2013) argues that the banking sector of Bangladesh can play a mediator role between economic development and environmental protection, in order to advance environmentally sustainable and socially responsible investment. Sobhani et al. (2012) back this argument by stating that the financial community of the country has a very crucial role to play in the development and promotion of corporate social and environmental sustainability. In 2013, the green banking and corporate social responsibility (CSR) department of Bangladesh Bank issued sustainable banking policy guidelines to all banks and financial institutions in which they were brought under the purview of sustainable banking activities and uniform reporting (Bangladesh Bank 2013). According to the policy, all banks in Bangladesh are required to allocate a considerable amount for green banking in their annual budgets which includes provision for: (i) a budget for green finance; (ii) a budget for a climate risk fund; and (iii) a budget for green marketing, training and capacity building. Realising the importance of this policy initiative, most banks in Bangladesh have already initiated sustainability practices. For instance, in 2012, 39 banks have utilised 271,270 million Bangladeshi taka (BDT) for: (i) green finance; (ii) CSR activities for green projects and green events; and (iii) green marketing, training and capacity building (Bangladesh Bank 2012a, p.9). In addition to green

banking activities; banks in Bangladesh are also investing in social causes as shown in Table 2.2.

Table 2.2: Sustainability investments by banks [source: Bangladesh Bank (2012b)]

Sustainability sector	**2008** BDT (million)	**2009** BDT (million)	**2010** BDT (million)	**2011** BDT (million)
Humanitarian & disaster relief	58.60	125.10	460.41	188.03
Education	30.50	94.80	400.79	612.48
Health	112.10	245.50	689.07	520.42
Sports	49.80	1.20	265.23	359.07
Art & culture	0.80	0.30	328.91	171.52
Others	158.90	86.90	125.58	198.73

Note: *BDT = Bangladesh Taka (local currency).*

Corporate sustainability initiatives by Bangladeshi banks are mainly focused on (i) financial inclusion of the less privileged population segments and underserved economic sectors; (ii) emergency relief at times of humanitarian distress; (iii) promotion of health, education and cultural/recreational activities for the advancement and well-being of underprivileged population segments; (iv) financing and promotion of environment-friendly projects; and (v) adoption of an energy-efficient carbon footprint through reducing internal processes and practices in their offices and establishments (Bangladesh Bank 2012b).

As of July 2012, the green banking practices by the banks at a glance are as follows (Bangladesh Bank 2012b):

- Out of all the scheduled banks, 40 banks have formulated their own green banking policy guidelines approved by their Board of Directors/competent authority.
- 43 banks have formed Green Banking Unit (GBU) for contributing to green banking activities while four banks are yet to establish a GBU. Some banks have started developing strategic planning for sector specific green banking policy.
- Banks are now assessing their environmental risk rating as per the environmental due diligence checklist of the environmental risk management (ERM) guidelines.
- Banks have disbursed a substantial amount as green finance.
- Three state-owned commercial banks (SCBs), four specialised commercial banks (SDBs), 24 private commercial bank (PCBs) and seven foreign commercial banks (FCBs) reported substantial engagement in 2011 in credit programs promoting the financial inclusion of socially disadvantaged rural and urban population segments.

Some examples of sustainability activities by banks in the country are as follows: Dutch-Bangla Bank Ltd. has donated more than ninety million BDT (USD11.4 million) for research work undertaken at Dhaka University and provided 102 crore BDT (USD12.9 million) (one crore is equal to 10 million) as scholarships for deserving poor students (Uddin, Hassan and Tarique 2008); HSBC Bangladesh initiated Water: Beyond Blue—an environmental awareness campaign—to familiarise students with the concept of water efficiency. In the first half of 2012, HSBC provided educational support to a total of 670 needy and disabled students and computer skills training to 60 visually impaired students (source: HSBC Corporate Sustainability Report 2012). Eastern Bank Ltd implemented strong social and environmental policies that include the reduction of energy consumption, conservation of water, management of waste, procurement of green supplies, and self-assessment and reporting (Eastern Bank Ltd. 2014). Islami Bank Bangladesh Ltd. has established a Green Banking Unit, headed by a Senior Executive and has introduced 'Green Branches' that use maximum natural light; renewable energy including energy saving bulbs and other equipment; and reduced consumption of water and electricity (Islami Bank Bangladesh Limited 2012).

2.3.5 Sustainability of E-Banking in Bangladesh

As the reach of ICT expands into the developing world, so does its impact on the environment, both positive and negative (Ansari et al. 2010). Although almost all the banks are implementing ICT in order to sustain their viability amongst the competition, the sustainability of ICT is still not considered as the business driver in this early stage of its implementation in Bangladesh. Signs of increasing government interest in green ICT issues include the proposal of a new national ICT strategy, formulated by a government-nominated review committee in 2008. Recommendations in the report include promotion of environmental preservation by adopting environmentally green technologies and environmental protection through the use of ICT tools (Ansari et al. 2010). Even though the banking sector has not been considered a polluting industry, the present scale of banking operations, after the implementation of e-banking, has noticeably increased the carbon footprint of banks due to their substantial consumption of energy (e.g., electrical equipment, ICT systems, generators, air conditioning, lighting, etc.), usage of chemical inks, lack of green buildings, etc. (Chisty 2013). Riyadh et al. (2009) identify that the economic benefits from e-finance or e-banking in Bangladesh are tri-dimensional: benefits for the business (i.e., less transaction cost, greater customer reach, better customer relationship management,

etc.); benefits for the customer (i.e., convenient access, speedy delivery, less transaction fee, etc.); and benefits for society (i.e., employment, poverty reduction, service to wider community, access to the disadvantaged, etc.).

In addition to economic sustainability (customer relationship management [CRM] systems in e-banking, technological sophistication of e-banking services, trust and security management, etc.), banks in Bangladesh are also concentrating on the social and environmental aspects of e-banking for sustainability. For example, in terms of the social aspect, a number of banks are now trying to include customers from various geographical areas and hard-to-access segments (i.e., disabled, various age groups, living in remote areas, etc.) through ATMs, Internet and mobile banking. In addition, banks are providing short-term education training in the area of ICT for those using different technologies in e-banking. Banks are also trying to reduce the risk of poverty among several highly vulnerable segments of the community by providing e-banking services through ATMs and mobile banking that is aimed at helping people to manage their personal finances, direct debits, savings, etc. Among other initiatives, health care treatment information for the poor and creating awareness about issues such as health and social violence are significant social activities currently performed by banks.

From the environmental aspect, some common in-house green activities are now practised by banks in Bangladesh (Bangladesh Bank 2012b). These include: use of solar energy/renewable energy sources; introduction of e-statements for customers instead of paper statements; efficient use of printer cartridges, photocopy toner and office stationery; use of both sides of paper for internal consumption; economic use of lights and air conditioners; and conversion of bank's pool vehicles to compressed natural gas (CNG). Other activities are: use of energy-efficient lights; using natural daylight more instead of electric light and proper ventilation in lieu of air conditioning; use of eco-font for printing light impressions on both sides of paper; setting defaults such as "*think twice before printing*"; "*print only if really needed*"; "*please check your environmental responsibility*", etc.

Table 2.3 depicts the total number of operating bank branches in Bangladesh as of 2013, and their transformation to solar energy for branch and ATM operations. As no comprehensive model is available to banks for e-business sustainability, these sustainability activities are performed discretely. Hence, most of the banks are not successful in achieving e-business sustainability even though they are willing and seeking to achieve this outcome.

Table 2.3: Internal environmental management by banks [source: Bangladesh Bank (2013)]

Types of Banks	No. of Branches	No. of branches powered by Solar Energy	No. of ATM booths powered by Solar Energy
SCBs	3,527	16	0
SDBs	1,498	37	2
PCBs	3,580	255	181
FCBs	73	3	6

Note: *SCB = State-owned Commercial Bank; SDB = Specialised Commercial Bank; PCB = Private Commercial Bank; FCB = Foreign Commercial Bank.*

2.4 PART II: THE CASE BANK

> *This Bank engineers enterprise and creativity in business and industry with a commitment to social cause. 'Profits alone' do not hold a central focus in the Bank's operation; because 'man does not live by bread and butter alone'* – Mission statement of the case bank.

2.4.1 Overview of the Case Bank

The bank started its operation in Bangladesh as a joint venture bank in 1995. The bank was an effort by local shareholders and the Netherlands Development Finance Company (FMO). The bank is a leading bank in the country with a customer base of more than 3.4 million and having largest ATM networks. It is currently operating with 136 branch offices, 263 FastTrack booths (small branch offices with limited activities and multiple ATM machines), 2,454 ATM booths, and 6,571 POS (Source: Annual Report 2013). Besides, more than 2 million unbanked people have already been included in the banking system through recently introduced mobile banking services. Unlike most of the other banks, one of the main focuses of this bank is 'social responsibility'. The bank has become one of the largest donors and the largest bank donor in Bangladesh. It has won numerous international awards because of its unique approach as a 'Socially Conscious Bank'. Even with a history of hefty technological investments and even larger donations, consumer and investor confidence was never faded. The bank stock set the record for the highest share price in the Dhaka Stock Exchange in 2008. Focus and strategy of this bank is concentrated on sustainable growth of business, improving the quality of assets, rationalizing operating cost, improving operational efficiency and productivity of resources, better and faster

customer service, expansion of branches, ATM, FastTrack and POS network, mobile banking services, offering a number of new products in retail banking, SME financing and card services, and strengthening the overall risk management and corporate governance system (source: Annual Report 2013).

2.4.2 E-Banking Services by the Case Bank

The case bank was the first bank in Bangladesh to be fully automated. The 'Electronic Banking Division' of the bank was established in 2002 to undertake rapid automation; and the full automation process was completed in 2003. This was the first bank in Bangladesh to introduce ATM and e-banking in 2003 (Biswas, Taleb and Shinwary 2011). This bank maintains the largest online banking network of the country supported with state-of–the-art technological innovations and extensively using its on-line facilities. The bank also operates the nation's largest ATM fleet and provides unrivalled banking technology offerings to all of its customers. In 2007, the bank won the 'Bangladesh Business Awards' for being the 'Best Financial Institution' mainly for its commitment to technology and social cause activities.

This bank has been one of the pioneers in introducing Internet Banking in the country back in 2004. With internet connectivity, a customer gets access to his/her bank account to get the balance, account detail, see account transactions, print account statement, transfer funds, open/redeem term deposit accounts, pay utility bills/tuition fees and many more at anytime from anywhere in the world.

The bank launched country's first 'mobile banking' service in March 2011. Mobile banking is a banking process without bank branch which provides financial services to all segments of the community, including rural and insolvent, efficiently and at affordable cost. Through mobile banking services customers can complete transactions by using mobile phones. This service does not require Internet connection for completing transactions. It is different from Internet banking through mobile phones. Using mobile banking facilities customers can complete transitions at ATM machines without an ATM card. In 2013, customers have transacted an amount of BDT 49.21 billion through this service (Source: Annual Report 2013).

The bank has introduced SMS banking in the country for the convenience of the customer. With a mobile phone device a customer can enquire about his account balance, see on the screen last few transactions, transfer funds, pay utility bills and many more.

The FastTrack booths, as mentioned earlier, are smaller branch offices which are also known as 'e-banking branch' because of their service types. These booths are located around the country including the rural areas. These booths not only provide enough e-banking facilities (ATM, Internet banking, Mobile banking, Customer services, Loans, etc.) but also provide free trainings for the customers to use e-banking facilities. Hence, they are educating the communities.

2.4.3 Sustainability Activities by the Case Bank

The bank is trying to enrich economic and social indicators of society by trying to reduce poverty and ensuring environment friendly society for the present and future generations. The following are some of the sustainability activities that this bank is performing regularly:

Free e-banking services, less profit:

The bank believes in ultimate development of human beings which can bring about basic improvement of civilization as a whole and can make the globe liveable. According to the Chairman of the bank, "*profit alone is not our motto*". Many of the bank's e-banking services including online banking, ATM and FastTrack services are offered free of cost though input cost of providing this service is very high and economically rewarding for the bank. Without such social programs, the amount of profit of the bank could have been much higher.

Free treatment:

Social cause initiatives undertaken by the bank includes awarding of scholarship to the needy and meritorious students, 'Smile Brighter Program' for cleft-lipped children (free surgery), rural healthcare, and financial support to medical infrastructures. The bank is providing free cataract operation for underprivileged blind people and contributes regularly to the development of disabled community.

Educating community:

The bank is regarded as the largest contributor in the education sector among the private businesses in terms of social responsibility activities. The Bank has been awarding BDT 1.02 billion (USD 12.9 million approx.) as annual scholarship to the meritorious students who are in need of financial aid. The bank also organises and sponsors number of educational and sports programs, such as, Bangladesh Physics

Olympiad, Bangladesh Mathematical Olympiad, Bangladesh Olympic Games 2013, BAF Golf Tournament.

Support for research:

In 2008, the bank donated of BDT 100 million (USD 1.27 million approx.) to fund the construction of an 11-storey research centre at the Dhaka University campus in Dhaka, Bangladesh.

Encouraging grass-root entrepreneurs:

The bank strongly believes that small and medium enterprises (SME) play a significant role in the economy in terms of balanced and sustainable growth of a nation. In order to facilitate the SMEs of the country, the bank has been financing the SME sectors since its inception. A full-fledged SME division of the bank was established in 2008 to further reinforce SME financing to bring the grass-root entrepreneurs into the main stream of economic growth.

Helping the unprivileged:

The bank contributed BDT 112.7 million (USD 1.43 million approx.) to help the victims of Rana Plaza tragedy, the deadliest ever building collapse at Savar, Dhaka that left 1,127 killed and 100's injured especially ready-made garment workers.

Care for environment:

The bank is trying to protect environmental degradation by way of reshaping their financing patterns and internal practices to minimize wastages and use of resources. The lending policy of the bank is supportive for creating employment opportunities and it is free from environmental hazards.

The bank believes that a country can improve substantially by prioritizing the waste management services and recycling industries. Keeping this in mind, the bank has come forward to extend its full financial support to waste management services throughout the country. These services include collecting medical wastes from the Government/non-Government medical colleges, clinics, hospitals, diagnostic centres, pathologies, etc.

Climate Risk Fund:

The management of the bank allocate budget for 'Climate Risk Fund' every year for helping/rehabilitation of affected peoples in the country due to natural disaster like flood, cyclone, drought, etc. for climate change.

Funds for awareness programs:

The management of the bank allocate fund for awareness development and training of the officials of the bank as well as consumers and clients of the bank in respect to environmental, social and green banking issue.

More sustainability activities and setting targets:

There are more sustainability activities that this bank performs every year which contributes significantly to the sustainable development of the society. For instance, donations to build colleges in rural areas, donations to rural clinics and hospitals to buy ambulances, donations to the volunteer associations, donations for well-being of children with special needs, donations to the communities affected by natural disasters, financial supports to poor/disable talents, donations for maintenances of parks and lakes, financial supports to the 'clean environment' campaigns, and more.

For sustainability achievement, the bank set certain targets for every year. For example, for the year 2014 the following targets (as shown in Figure 2.1) have been set by the bank to achieve sustainability (Annual Report 2013):

- Establishing more *Green* branch;
- Establishing more *Green* ATM and FastTrack booths;
- More *Green* product development;
- Designing Environmental and Social Management Systems (ESMS) through external expert;
- Client awareness building on environmental and social issues;
- Designing website and email background on "*Green*";
- Finance in SME considering environmental and social issues;
- Finance of *Green* products against Central Bank's target;

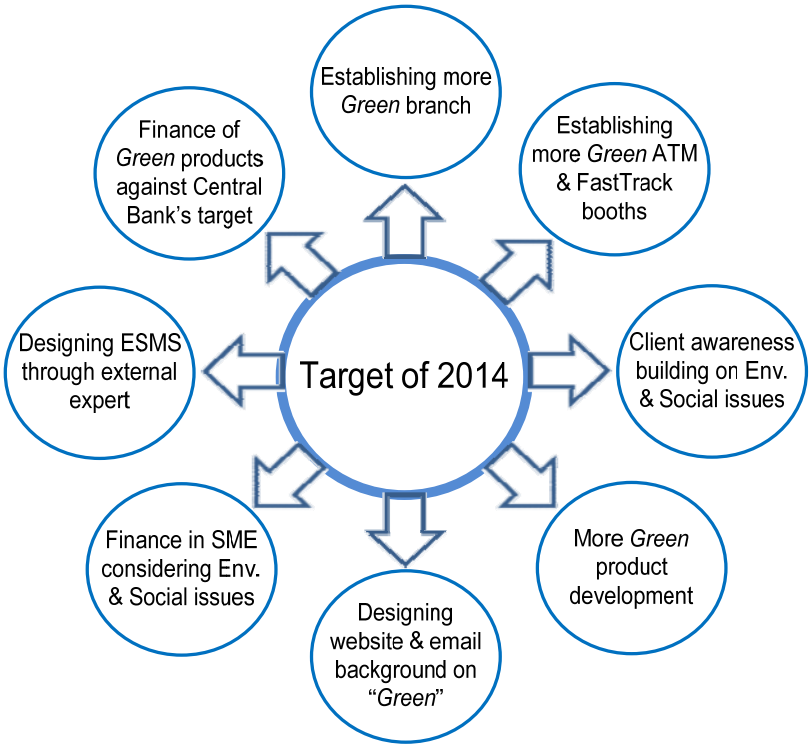


Figure 2.1: Case bank's sustainability target of 2014 [adapted from Annual Report 2013 p.185]

2.4.4 E-Banking Sustainability Activities by the Case Bank

Though sustainability activities are not separately performed by the ICT division of the bank, some sustainability activities are different and only possible because of the availability of facilities from the e-banking operations. Some of those sustainability activities are mentioned below:

Including unbanked community and generating employment:

The main intension of launching mobile banking services was to include insolvent and unbanked people who live in the rural areas of the country and mostly deprived of conventional banking services. Moreover, through this service huge employment opportunity has been created at different rural area of the country. Till now, the bank has employed 849 staffs and engaged 62,572 agents for mobile bank services and these numbers are growing (Source: Annual Report 2013).

Supporting NGO programs:

The bank has signed an agreement with the "Urban Partnership for Poverty Reduction Project", an organisation of the United Nation (UN) to support them on disbursement of the grant to the project beneficiaries through e-banking services.

Through mobile banking service the bank is supporting 'World Food Programme' (WFP) in disbursing financial aid to the ultra-poor segment of the country. Through mobile banking service the bank is also supporting NGO projects, such as, 'URC-TB Care' (a USAID project) in disbursing incentives to the TB patients.

Reducing carbon emission:

The bank is conducting ICT operations in such a manner that helps the overall reduction of external carbon emission and internal carbon footprint. To comply with 'Green IT policy' of the Central Bank, this bank has adopted necessary technology, process and product which resulted substantial reduction of the carbon footprint as well as develop sustainable business.

Green Office Guide:

The ICT division of the bank has adopted *3R* (Reduce, Reuse, Recycle) policy for environmental protection. A guide on this *3R* policy named as 'Green Office Guide' has been made available to all the staffs, which contains the following guidelines:

(i) *Reduce*: No paper statements (electronic delivery of statements via Internet Banking); Fewer letters to open (call or email rather than writing); No paper-based marketing; Savings energy consumption. Reduced utilisation of electricity and minimum usages of water and paper have become mandatory for the officials.

(ii) *Reuse*: Use all writing papers on both sides; Build up awareness for reducing wastage by way of reusing the same.

(iii) *Recycle*: Investing in renewable energy. Few of the branch offices are already using solar energy. Planning to use solar energy for all the ATM booths.

Creating awareness:

This bank has been engaging in creating awareness through electronic (Internet, Mobile, ATM) media since long on different social issues like – 'Hope and love make us lovely', 'Stop acid violence', 'Willpower is enough to do a good job', 'Stop demand for dowry', 'Uphold justice', 'Good behaviour with mentally retarded persons - a moral duty', 'Human for humanity', 'Combat AIDS', 'Drug addiction- a menace to destroy life', 'Plant tree and save environment', etc. The bank spent BDT 69.3 million only in 2013 for creating these types of awareness (Annual Report 2013 p. 225).

2.4.5 Need for E-Business Sustainability Model and its Application in the Case Bank

It is clear from the mission statement (see Section 2.4 above) of the case bank that making profit is not their only goal and the bank is determined to make a difference by contributing for the social causes. Moreover, the bank is committed to fulfil the demand of the customers and implement the government regulations regarding sustainability. It is also clear from the above discussion that the bank is already investing a considerable amount to perform several activities (see Section 2.4.4) for achieving e-business sustainability. But still the bank is not fully successful in achieving a complete sustainable e-business. The main reasons for not being successful are: (i) the sustainability activities are done discretely by the bank without following a particular model; (ii) customer value requirements, business value requirements, and process value requirements for sustainability are not considered combinedly while making decisions or developing strategies for the sustainability activities. Because of these reasons, the bank is not able to make investments efficiently on sustainability activities to fulfil the value requirements of customer, business, and process for achieving e-business sustainability. But owing to the unavailability of a comprehensive and effective model, this organisation is unsuccessful in adopting sustainability practices. As mentioned before, only a limited number of frameworks or models for the sustainability of banking have been proposed by previous studies (e.g., Stubbs and Cocklin 2008; Jeucken 2004) but none are appropriate and sufficiently effective to be adopted by the e-banking industry. Furthermore, in developing the models, researchers have considered customer value requirements, business value requirements and process value requirements each in a stand-alone fashion and have failed to integrate them in one model despite their importance in sustainability adoption. Therefore, an e-business sustainability model is required by the case bank which will integrate the sustainability dimensions (economic, social, and environmental) with the organisational value dimensions (customer value requirements, business value requirements, and process value requirements) and will enable the bank to invest efficiently for achieving e-business sustainability. This study meets these needs of the case bank by developing a model for e-business sustainability that integrates the sustainability dimensions with the organisational value dimensions. The developed model will also enable the case bank to invest efficiently for achieving e-business sustainability by efficient allocation of resources.

2.5 SUMMARY

This chapter is presented with the details of research context and the case bank used in this research. In the first part of this chapter, the research context which is the banking industry of Bangladesh is explained. E-business, e-banking, and sustainability of e-banking in the context of Bangladesh are described in this part. The case bank is explained in the second part of this chapter. In elucidating the case bank, the overview of the case bank, its e-banking services and sustainability activities are also explicated.

The next chapter (Chapter 3) reviews the literature relevant to e-business sustainability. Discussion regarding sustainability of business and e-business, and three dimensional requirements for sustainability along with their dimensions are also addressed and discussed in that chapter.

CHAPTER 3

LITERATURE REVIEW AND CONCEPTUAL MODEL

3.1 INTRODUCTION

This chapter reviews the literature relevant to e-business sustainability. While reviewing the literature this chapter reveals that literature gaps exist which are to be addressed in the current research. The literature review reveals that though sustainability of e-business is a significant agenda, there is no single model or framework which can mitigate or fulfil the blended value requirements for e-business sustainability by developing and optimising strategies. Hence, this chapter carries out the groundwork to develop such a model after discussing the relevant issues from theoretical perspective.

Discussion regarding sustainability of business and e-business along with their dimensions is presented first. The three dimensional requirements for sustainability are then addressed and discussed to explain the blended value requirements. Finally, having undertaken extensive analyses of the existing literature and discussion on e-business sustainability this chapter presents the research concept used in this study and then proposes the preliminary research model.

3.2 SUSTAINABILITY OF BUSINESS

The term 'sustainability' is an evolution of more conventional phrases describing ethical and moral business practice. Over the last three decades, sustainability has been an established management agenda and has raised academic debates both by researchers and managers. The World Business Council for Sustainable Development (WBCSD) brought widespread attention to the notions of sustainability and sustainable development to the boardrooms of organisations (Schaltegger and Burritt 2000). A sustainable business has been defined as one that meets the needs of its stakeholders without compromising its ability to meet their needs in the future (Hubbard 2009, p.181). Again, according to Bell and Morse (2009), sustainable business refers to businesses with dynamic balance among three mutually inter dependent elements: (i) protection of ecosystems and natural resources; (ii) economic efficiency; and (iii) consideration of social wellbeing. More clearly, the economic dimension of sustainability refers to financial viability which encompasses issues of competitiveness,

job and market creation and long-term profitability; the social dimension centres on the impact of the organisation on the social systems within which it operates that incorporates issues of public health, community issues, public controversies, skills and education, social justice, workplace safety, working conditions, human rights, equal opportunity, labour rights; and the environmental dimension focuses on an organisation's impact on living and non-living natural systems that involves a comprehensive approach to a company's operations, products, and facilities that takes account of assessing business products, processes and services; eliminating waste and emissions; maximising the efficiency and productivity of all assets and resources; and minimising practices that might negatively affect the gratification of the planet's resources by future generations (Jamali 2006).

In recent years, many businesses including e-dominated businesses (e.g. telecom, bank) are adopting sustainability as a proactive and strategic tool to increase overall value creation and gain competitive advantage (Waage, Shah and Girshick 2003). The rise of sustainability-related pressures is increasingly persuading firms to revisit the concepts of value and profitability that drive their business models, and to reconsider the balance between the dual objectives of profitability and sustainability (Bryson and Lombardi 2009). It is evident that there is a positive correlation between environmental and social sustainability and economic return (Carter and Rogers 2008). Griffin and Mahon (1997) provide the empirical evidence on the relationship between sustainability performance and financial performance. Since sustainability practices by organisations are now beyond legal and regulatory requirements, a growing number of organisations are shifting towards sustainability to manage reputation risk, to protect brand value, to ensure long-term financial excellence, and to achieve competitive advantage (Aras and Crowther 2009; Brønn and Vidaver-Cohen 2009; Deutsch 2007). This shift gives an opportunity to show effort that responds to societal expectations and to do those initiatives that are most imperative to the business (Economist 2008). To Schneider et al. (2010), managing, measuring, and reporting sustainability help companies add business value in two main ways: (i) by tracking where a company's performance is versus where it wants to be and where the competition is (benchmarking); and (ii) by demonstrating stewardship of the resources they manage and the value they generate through transparency and dialogue with a variety of both internal and external, traditional and emerging stakeholders.

Therefore, it is clear that sustainability has become a mantra for the 21st century that embodies the promise of societal evolution towards a more equitable and wealthy

world in which the environmental and social achievements are preserved for generations to come (Dyllick and Hockerts 2002). Global competitiveness and challenges as well as the need to incorporate IS strategy into corporate strategy, constitute the need for an integrated concept of sustainability in information systems. Many studies are available dealing with the sustainable management, but sustainability in IS/ICT is still not explored extensively (Schmidt et al. 2009). Although a number of studies are available on sustainability and it's indicators (e.g., Shrivastava 1995; Setthasakko 2009; Ageron, Gunasekaran and Spalanzani 2012; Enticott and Walker 2008; Veleva et al. 2003; Labuschagne, Brent and van Erck 2005), there is a scarcity of research on the development of e-business sustainability model that integrates the dimensions of social, environmental and economic sustainability.

3.3 SUSTAINABILITY OF E-BUSINESS

E-business brings together economic value creation and information technology/ICT/IS (Akkermans 2001; Li, Yuan and Guo 2009). E-business/ICT is growing at an exceptional rate and playing a more and more important role in our life today (Yi and Thomas 2006, p.262). The application of electronic information standards and Internet technologies by e-businesses are redefining the way organisations conduct their activities now (Robeiro and Love 2003). E-business constitutes the ability of a business to electronically connect many organisations, in multiple ways, both internal and external, for many different purposes; and it allows an organisation to execute electronic transactions with any individual entity along the value chain-suppliers, logistics providers, wholesalers, distributors, service providers, and end customers (Fahey et al. 2001, p.891). E-business is part of a wider economic context that is responsible for radical transformations in business, and encompasses digital networks and communication infrastructure that provides a global platform where individuals and organisations interact, communicate, and collaborate (Borges, Hoppen and Luce 2009). Empirical studies have already confirmed the relationships between e-business and sustainability (Waage, Shah and Girshick 2003). Some organisations, including major players in the ICT industry, have started to seriously consider sustainability issues which represents a major change in companies' approaches, as the ICT industry was not perceived to be greatly aware of sustainability needs just a few years ago (Piotrowicz and Cuthbertson 2009). The way debate is taking place over the phenomenal growth of e-business deployment by organisations and its ability to deliver on innovative and competitive strategies, the same way debate

has been taking place regarding the need for organisations to engage with sustainability practices to secure competitive advantages and reduce risk (Haigh 2004).

So far, management information systems research on sustainability seems to constrained in the domain of 'green IT/ICT' (Dao, Langella and Carbo 2011). As stated by Fuchs (2008), a sustainable society uses ICT for fostering a good life for all human beings of current and future generations by strengthening biological diversity, technological usability, economic wealth for all, political participation of all, and cultural wisdom. A key finding in a major study on ICT and sustainability was that several ICT applications cancel each other out, leading to the conclusion that specific strategies are necessary to harness the potential of ICT for supporting sustainable development, while at the same time inhibit its potential for negative environmental impacts (Ansari et al. 2010). While understanding that business, technology, and research are not the only important contributors to sustainability, their contributions are acknowledged as being of the highest significance and so are worthy of our attention (Elliot 2011).

Information systems researchers have investigated diverse aspects of ICT applications and practices in organisations over the last 30 years but the literature to date, has provided little assistance to the businesses which are unsure about how, where and when to respond to imperatives for their ICT applications and practices to become sustainable (Elliot and Binney 2008). A few scholars have tried to link the sustainability concept to the ICT domain in the name of 'green IT' or 'environmentally sustainable ICT'. The relationship between the information society and sustainable development was theoretically examined by Jokinen et al. (1998) and Cohen (1999). Heinonen et al. (2001) developed scenarios, criteria, and indicators as tools for identifying various environmental impacts of ICT. Elliot (2007, 2009) in his work tried to increase awareness and understanding of the environmental sustainability of ICT and proposes stages of development framework for building organisational capabilities in ICT environmental sustainability. Melville (2010) tried to develop a research agenda on information systems innovation for environmental sustainability that reveals the critical role that IS can play in shaping beliefs about the environment, in enabling and transforming sustainable processes and practices in organisations, and in improving environmental and economic performance. According to Watson et al. (2010) 'green information systems' incorporates the concept of 'green IT/ICT' and contains a greater variety of possible initiatives to support sustainable business processes. They propose ways for the IS community to engage in the development of environmentally

sustainable business practices. Dao et al. (2011) develops an integrated sustainability framework, demonstrating the integration of human, supply chain, and ICT resources to enable firms develop sustainability capabilities, which help firms deliver sustainable values to relevant stakeholders and gain sustained competitive advantage. Wati and Koo (2004) introduce the green IT balanced scorecard by incorporating an environmental aspect of technology into the scorecard measurement method. Haigh and Griffiths (2008) investigated the impact of IS based operational processes on the environmental sustainability and found that IS have a discernable impact on the resource consumption in most cases, and the impact may be positive or negative depending on how the IS is operationalised. Fuchs (2008) discusses the implications of new information and communication technologies for sustainability. A study by Houghton (2009) explores ICT and environmental challenges in developing countries through examining the status of current and emerging environmentally friendly technologies, equipment, and applications. Molla (2009) provides an extensive overview of current research on green IT.

However, literature reveals that the current level of knowledge relating to the sustainability of e-business is very limited. Only a few researchers have tried to link the 'sustainability' term directly to the 'e-business' term. For example, Waage et al. (2003) argue in their paper that there is potential for ICT to transform modern business into e-business for more efficient, cyclical, networked, and sustainability oriented system that pays returns through social, environmental, and economic prosperity. By linking e-business and sustainability outcomes, Haigh (2004) tried to examine the impact of e-business on the natural environment. Her study supports the existence of significant links between e-business and sustainability (environmental) along with the need to weave sustainability practice into the early stages of organisational design and e-business strategy development. Erek (2011) tries to apply the concept of sustainability into the field of information systems management using practical concepts, such as, the balanced scorecard and the maturity model; and suggests that ICT based organisations have to be aware that sustainable measures are no longer a question of choice, it is a necessity in order to remain competitive in the future. Schmidt et al. (2009) integrate the concept of sustainability into the field of IS management by developing a sustainable IS management procedural model, that lines out the steps towards the implementation of sustainability within IS organisations. Yi and Thomas (2007) presented with comprehensive literature review on the impact of e-business on environmental sustainability. While some authors, such as, Yi and Thomas (2007,

2006), discuss the economic, social, and environmental impacts of e-business, other authors, such as, Piotrowicz and Cuthbertson (2009), stress the need for a sustainable approach by e-businesses that considers all three equally important aspects: social, economic, and environmental.

It is commonly agreed standing that regardless of the type of business a balance between economic, social, and environmental factors is inevitable for the long term success and sustainability of the business. Thus, sustainability oriented companies focus not only on economic performance, but also social and environmental performance (Waage, Shah and Girshick 2003). It has been revealed from the literature that the dimensions of e-business sustainability do not differ much from the dimensions of conventional business sustainability. The dimensions of e-business sustainability are explained in the next section.

3.3.1 Dimensions of E-business Sustainability

Different scholars mentioned different dimensions for achieving and improving sustainability; but the most commonly used dimensions can be found in the triple bottom line concept of John Elkington (1994) which considers organisational sustainability to include three components: the natural environment, society, and the economic performance (Dao, Langella and Carbo 2011). All the definitions of sustainability have the preservation of these economic, social, and environmental system for the benefit of future generations in common and these dimensions represent the three main pillars of sustainability and triple bottom line concept (Erek et al. 2009). Economic development is defined as ethical, healthy economic growth; social development is typically referred to as social responsibility and is defined as the responsibility that multinationals hold to behave fairly in their host countries and to reduce the effects of industrial development on the local communities they operate in; and environmental prudence, on the other hand, is defined as admitting our obligation to future generations to reduce our ecological footprint on planet Earth (Beheiry, Chong and Haas 2006). Thus, triple bottom line seeks to evaluate business performance on its impacts on the environment and interested stakeholders besides profitability concerns (Dao, Langella and Carbo 2011). The United Nations world summit 2005 also describes these three pillars of sustainability (see Figure 3.1).

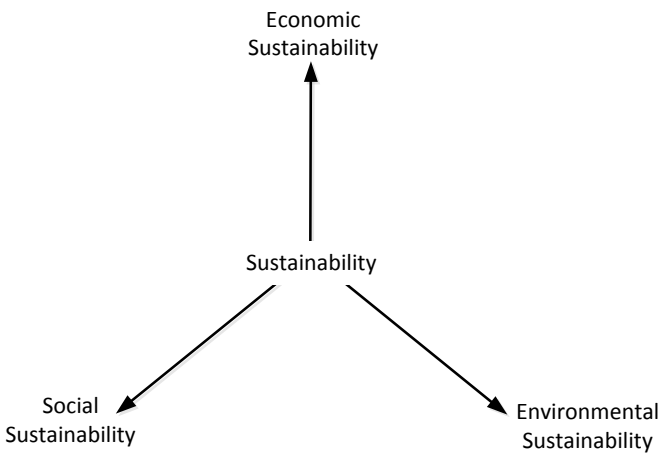


Figure 3.1: Three dimensions of sustainability [adapted from Dyllick and Hockerts (2002)]

Based on the multitude of products, services and operations, Labuschagne et al. (2005), Epstein and Wisner (2001), Vasileiou and Morris (2006), Hutchins and Sutherland (2008), and other scholars considered common dimensions of sustainability in the specific context, namely, economic, social, and environmental sustainability. As stated earlier, a limited number of studies (e.g., Dao, Langella and Carbo 2011; Elliot 2011; Melville 2010; Watson, Boudreau and Chen 2010) exists in which some aspects of the sustainability of IT/ICT are included, but empirical study on e-business sustainability in terms of social, environmental, and economic dimensions is very rare. The following sections discuss the three dimensions of e-business sustainability.

3.3.1.1 Economic sustainability

According to Dyllick and Hockerts (2002), an economically sustainable business guarantees at any time cash flow sufficient to ensure liquidity while producing a persistent above average return to their shareholders. To them, economic sustainability requires firms to manage several types of economic capital: *financial capital* (i.e. equity, debt), *tangible capital* (i.e. machinery, land, stocks) and *intangible capital* (i.e. reputation, inventions, know-how, organisational routines). More clearly, economic sustainability evaluates short term and long term economic value generated by the organisational activities and the corresponding relationship with shareholders (Delai and Takahashi 2011). For example, financial capital, such as, debt-equity, tangible capital and intangible capital need to be managed sustainably to produce maximum outputs. In other words, economic sustainability is concerned with the long term economic health of organisation and accounts for share value, sales growth, profitability, such as, debt-equity, and other important indicators while maintaining

social and environmental responsibilities (Delai and Takahashi 2011). Eco-efficiency, development, internal costs to the company, revenue opportunities, access to capital and insurance, corporate governance, customer relationship management, financial robustness, investor relations, risk and crisis management, and shareholder value are commonly identified as the important aspects of the economic sustainability in a business (Tanzil and Beloff 2006; Lo and Sheu 2007; Dow Jones 2005). While discussing about sustainability of ICT, Waage et al. (2003) suggest that investments in all three areas of sustainability will pay off for economic sustainability in the form of innovation, operational efficiency, brand equity, lower risk, and shareholder value.

3.3.1.2 Social sustainability

The second dimension of sustainability relates to social aspects that considers how the ICT/IS practice impacts social issues (Piotrowicz and Cuthbertson 2009). Social sustainability mainly focuses on the social responsibility practices of the businesses. The fulfilment of the social value requirements is intended to minimize any harm and maximise the long run beneficial impact of the firm on society (Bloom and Gundlach 2000). One of the main principles of social responsibility is conducting business in a way that is consistent with the morals and values of society (Hutchins and Sutherland 2008). Bowen (1953) was a pioneer in defining the social responsibilities of 'businessmen,' as "the obligations of businessmen to pursue those policies, to make those decisions or to follow those lines of action which are desirable in terms of the objectives and values of our society" (Bowen Howard 1953, p.6). From organisational perspective social sustainability focuses on impact of organisational activity on the stakeholders specifically, employees, customers, suppliers, shareholders and government (Delai and Takahashi 2011). Although profitability is essential for business, society often has a number of other expectations. It is proposed by Carroll (1979) that these societal expectations are in fact social responsibilities that corporations must undertake. This can be viewed as organisations entering into a social contract that obligates them to consider the societal interests when making decisions (Andreasen and Drumwright 2001). The effort to improve social responsiveness can improve the firm's long-term capability in terms of intangible strategic assets (Michalisin, Smith and Kline 1997). Legislation and code of conduct compliance, customers' safety of the product, generating local employment, supporting education, health and welfare, loans and assistance to the charities, etc. are the common social sustainability factors of e-business identified in the context of developing countries.

3.3.1.3 Environmental sustainability

During the last 50 years, ICT have become a major contributor to business innovation and wealth generation and in making these contributions, ICT has also become a major source of environmental contamination at all stages of the technology lifecycle: design, manufacture, operation and disposal (Elliot and Binney 2008). A study by Haigh and Griffiths (2008) demonstrates how ICT can create positive and negative environmental sustainability outcomes for the organisations. The impacts of ICT on the environment can be direct (*i.e.* the impacts of ICTs themselves, such as, energy consumption and e-waste), or can be indirect (*i.e.* the impacts of ICT applications, such as, intelligent transport systems, buildings and smart grids), or third-order and rebound (*i.e.* the impacts enabled by the direct or indirect use of ICTs, such as, greater use of more energy efficient transport) (Houghton 2010). This environmental dimension of sustainability focuses on the maintenance of natural capital (Goodland 1995). Scholars argue that the depreciation of natural capital cannot go on endlessly (Lovins, Lovins and Hawken 1999). In organisational perspective, environmental sustainability concentrates on the production and consumption of resources by corporations in a responsible fashion (Seuring et al. 2008). Responsible companies now keep track to the carbon foot print of their activities and open the records to the public. The consumers' concern and environmental regulation regarding the impact of production and consumption is getting tougher as a result companies are shifting their production bases to the areas where the regulations are relaxed specifically the developing and under developed countries (Chowdhury, Khan and Dewan 2014). Vital issues for emerging and developing economies to achieve environmental sustainability include: access to infrastructure and ways to enable investments in smarter greener energy, transport and building infrastructures, as well as access to the broadband networks and ICT equipment and services necessary to enable their operation; and access to information to enable individuals to make smarter greener choices, and communicated to individuals in such a way as to inform and educate, influence and change behaviours (Houghton 2010). An extensive literature review on the environmental impact of e-business/ICT has been presented by the work of Yi and Thomas (2007).

Erek (2011) and Hewlett et al. (2009) emphasise that the changing requirements of the stakeholders are increasingly putting the e-businesses in challenges in the scope of eco-awareness and social consciousness because of the growing global impact of information technology on the society, the environment, and the economy. This indicates that an e-business needs to fulfil multiple value requirements of stakeholders,

namely customer value requirements, business value requirements, and process value requirements, to be competitive and sustainable. However, review of literature suggests that the coherent link between e-business sustainability and these three dimensional value requirements has not been explored yet. The following section explains these three dimensional value requirements extensively.

3.3.2 Gaps in E-business Sustainability Research

The following points summarises the research gaps and the importance of an integrated model development for e-business sustainability:

- The rise of sustainability related pressure on the businesses is increasing to fulfil the social and environmental expectations (Bryson and Lombardi 2009) and this pressure is persuading the firms to shift towards sustainability. This shifting gives the organisations not only the opportunity to show their efforts for fulfilling the social expectations (Economist 2008) but also to manage reputation risks, to protect brand value, to ensure long term financial excellence, and to achieve competitive advantage (Aras and Crowther 2009; Brønn and Vidaver-Cohen 2009; Deutsch 2007). Several studies are available that attempted to consider common dimensions of sustainability in the specific context, namely, economic, social, and environmental sustainability. In spite of these, still there is a paucity of research on e-business sustainability and it still faces some considerable challenges, such as, lack of integrated focus for economic, social, and environmental aspects (Labuschagne, Brent and van Erck 2005; Adams and Frost 2006). Even more scarcity is present in the research area that deals with the model for e-business sustainability which can integrate the dimensions of social, environmental and economic sustainability.

- E-business is the integration of ICT application and economic value creation (Akkermans 2001; Li, Yuan and Guo 2009). The growing body of research in this area has clearly shown that ICT is part of the solution and part of the problem at the same time, and thus, research in 'ICT and sustainability' has the obligation to strive for a realistic view and provide decision-makers with scientifically sound answers (Hilty and Hercheui 2010). Literature shows that researchers have provided little assistance to the businesses which are unsure about how, where and when to respond to imperatives for their ICT applications and practices to become sustainable (Elliot and Binney 2008).

- Information systems research on sustainability seems to be limited within the domain of 'green IT/ICT' (Dao, Langella and Carbo 2011). Quite a few studies are available in this area that attempt to link the sustainability concept to the ICT domain in the name of 'green IT' or 'environmentally sustainable ICT' (e.g., Melville 2010; Heinonen, Jokinen and Kaivo-oja 2001; Elliot 2007, 2009; Dao, Langella and Carbo 2011; Wati and Koo 2011; Houghton 2009); but they lack the integration of social and economic factors which are considered vital to the business and e-business sustainability.

- According to the literature, the current level of knowledge relating to the sustainability of e-business is very limited. Only a limited number of studies are available that tried to link the 'sustainability' term directly to the 'e-business' term (e.g., Waage, Shah and Girshick 2003; Haigh 2004; Erek 2011; Yi and Thomas 2007; Piotrowicz and Cuthbertson 2009; Schmidt et al. 2009). Most of the existing studies either discuss research problems or provide conceptual idea or framework and do not provide empirical evidences. But just recognising the research problem is not enough; rather, what can be done, how it can be done, and finding certain solutions for the specified problem are more important.

Therefore, development of an integrated e-business model that recognises all three dimensions of sustainability (i.e., economic, social, and environmental) and clearly outlines the necessary directives is essential.

3.4 THREE DIMENSIONAL VALUE REQUIREMENTS FOR SUSTAINABILITY

As mentioned above, because of the mounting global impact of information technology on the society, the environment, and the economy, the changing demands of the stakeholders are increasingly challenging the firms in terms of sustainability (Erek 2011; Hewlett, Sherbin and Sumberg 2009). Instead of economic value in early days, customers now want to know what total value they are going to receive from the businesses. Businesses now try to create organisations, institutions and market mechanisms capable of maximising economic value as well as social and environmental value (Emerson 2003). Business value of IT/ICT has already been highlighted by many researchers (e.g., Melville, Kraemer and Gurbaxani 2004; e.g., Tallon 2007; Kohli and Grover 2008; Barua et al. 2004; Amit and Zott 2001). Process efficiency is also an emergent issue because of the stakeholders' strong move towards resource

conservation and environmental impact of the processes. These environmental, social, and economic values cannot be fully achieved only by fulfilling the requirements of business or customer. Bakshi and Fiksel (2003, p.1352) points out that one of the greatest barriers to broader adoption of sustainability is the lack of adequate insight, tools, and techniques to address the complexity of social, economic, and environmental issues at *multiple levels of the process*. The importance and benefits of adopting process oriented perspectives of business are well recognised within the academic literature (e.g., Mooney, Gurbaxani and Kraemer 1996; Crowston and Treacy 1986; Bakos 1987; Wilson 1993; Tallon 2007; Radhakrishnan, Zu and Grover 2008). Therefore, value processes of the businesses must also include process value in addition to customer value and business value to produce and deliver the complete sustainable value by the firms.

Carroll (1979) argued that social responsibility activities are not only performed for the firm's sake (business value) but also for the sake of society (customer value) at large. Harmon and Auseklis (2009) have shown how the societal value is interrelated with the customer value and the business value. Since there are numerous stakeholders of the businesses, a number of researchers focused on sustainability from business value point of view (e.g., Hutchins and Sutherland 2008; Carter and Easton 2011; Foerstl et al. 2010; Enticott and Walker 2008; Schneider, Wilson and Rosenbeck 2010; Chowdhury et al. 2012; Vinodh and Chintha 2011), whereas a number of other scholars considered sustainability from customer value point of view (e.g., Schaefer and Crane 2005; Charter et al. 2002; Luo and Bhattacharya 2006; Choi and Ng 2011). At the same time, a number of researchers in this research domain have focused on sustainability from the process value point of view (e.g., Tyteca 1998; Bryson and Lombardi 2009; Gonzalez and Smith 2003; Kalitventzeff, Maréchal and Closon 2001; Azapagic, Millington and Collett 2006; Bateman 2005; Diwekar 2005). Thus, it indicates that all these three value requirements are important for achieving sustainability.

A number of researchers proposed business sustainability model based on the balanced scorecard (Kaplan and Norton 1996; 2004) in which customer value requirements, business value requirements, and process value requirements are considered. For example, Epstein and Wisner (2001) proposed a sustainability model in which financial perspective (business value), customer perspective, and internal process perspective are included. The proposed sustainability models by Figge et al. (2002), Bieker et al. (2001), Dias-Sardinha and Reijnders (2005), Möller and Schaltegger (2005), Hubbard (2006), and Panayiotou et al. (2009) also include customer perspective, process

perspective, and business (financial) perspective in addition to learning and growth perspective. In this research, learning and growth perspective is considered as part of the process perspective since it assists in enhancing the process value.

The three dimensional value requirements (customer value requirements, business value requirements, process value requirements) for e-business sustainability are also mentioned by ICT researchers directly or indirectly. For example, Dao et al. (2011) developed an integrated sustainability framework for ICT based organisations in which they presented how sustainable process (process value) will pay-off for sustainable business (business value). For illustration, they have shown how prevention of pollution will reduce costs and increase profitability; or how improved supply chain management can reduce environmental impacts and increase reputation and, thus, competitive advantage. Melville (2010) demonstrates the critical role that IS/ICT can play in enabling and transforming sustainable processes and practices in organisations, and in improving environmental and economic performance. He proposes strong links between information systems, organisational performance, and sustainability performance. Though business value and process value for sustainability have been focused in his proposals, direct indication of customer value for sustainability has not been mentioned. But customers are one of the main stakeholders who affected by the corporation actions (Freeman 2010). According to Waage et al. (2003) investments in ICT sustainability (social, economic, and environmental) performance will help to improve business value (innovation, brand equity, shareholder value) and process value (operational efficiency, lower risk, talent attraction). Customer value was not directly considered in their research approach. Watson et al. (2010) mentioned that consumers will apply and react to economic and social pressures that promote IS/ICT sustainability. This indicates the importance of customer value requirements and the need for the fulfilment of those requirements to be sustainable. Elliot (2009) states that enabling environmental sustainability in the ICT organisation is important because of the necessity to respond to market pressure, regulatory imperatives, and growing environmental concerns in society. Though market pressure (business value) is pointed out in his work, his main area of concern for sustainability is the society (customer value). Elliot (2007) also emphasises that more research should be conducted on the triple bottom line and ICT's impact on the society. Erek (2011) in his work identifies that sustainable IS management addresses are particularly internal (e.g. business units, employees) and external (e.g. customers, owners, suppliers, investors) stakeholders who exercise tangible or intangible influence on the organisation through various

mechanisms of action. He proposed sustainability of IT/ICT model based on the framework developed by Figge et al. (2002) and Bieker et al. (2001) which initially includes customer's economic value, business's economic value, and process's economic value. In the Erek's proposal for sustainability of IT/ICT, environmental and social measures are added as separate 'quadrants' in the scorecard and only sustainability requirements of business is mainly considered while sustainability requirements of customer and sustainability requirements of process is not focused. But Earl (2000) advocates that building an online channel of business (e-business) on top of inadequate and inefficient business processes achieves only one thing: it broadcasts and magnifies the fact that a company's operational processes are really bad. Harmon and Auseklis (2009) emphasise on the sustainable processes as the requirement for achieving ICT/e-business sustainability. According to them, a sustainable ICT strategy must extend throughout the company to include the supply chain, distribution channels, manufacturing, operations, and marketing (Harmon and Auseklis 2009, p.1714).

What has been realised from the literature review that sustainability requirements for customer value, sustainability requirements for business value, and sustainability requirements for process value are important in the research domain of business and e-business sustainability. Though different scholars indicated the importance of these three value requirements discretely or jointly, it is clear that the fulfilment of these requirements is essential for achieving overall sustainability by the firm. It can be also summed up from the literature that each of these three value requirements includes conventional three dimensions of sustainability which are economic, social, and environmental dimensions. Moreover, businesses must realise that to be competitive in the market and to be sustainable economic, social, and environmental values requirements need to be considered from three dimensions:

Dimension 1: What total value is required by the customers? (Customer Value)

To sustain, every business must find out the requirements that need to be fulfilled to minimize gap of what value the customers are receiving and what value they are expecting. Harmon and Auseklis (2009, p. 1713) claim that focus on customer value requirements forces companies to look to the markets and the customer as the core drivers of business activity. According to them businesses must first understand how their customers perceive value in terms of the perceived benefits and the perceived price of the service that delivers those benefits. Because there is a general agreement in

the literature that customer value is determined by the customers' perception and not by the suppliers' assumptions or intentions (Zeithaml 1988; Khalifa 2004). A number researchers have mentioned the importance of customer value requirements (e.g., Harmon, Demirkan and Raffo 2012; Kadembo 2008b; Harmon and Laird 1997; Geng and Chu 2012; Kadembo 2008a; Weinzimmer et al. 2003). Firms need to see whether the customers are receiving the total value that they are expecting, or not. If not, the businesses must identify all the existing discrepancies and try to fulfil those discrepancy requirements to deliver the total value to the customers effectively. Generally, voice-of-the-customer (VOC) approach is used to identify these discrepancies.

Dimension 2: What total value is required by the businesses based on their strategy to reach their goals? (Business Value)

Conventionally, customer requirements were the only concern for the businesses to compete successfully in the market and still now there is no doubt about the importance of customer requirements in business. But nowadays, only fulfilment of customer requirements does not guarantee the long term competency and profitability for the businesses. As mentioned earlier, a number of scholars have cited the importance of business value perspective (e.g., Harmon and Auseklis 2009; Giaglis, Paul and Doukidis 1999; Waage, Shah and Girshick 2003). To compete successfully every business must have their own clear goal defined in their strategy that they want to achieve in time. Simply, business value requirements need to be considered and fulfilled for the existence of the business. This dimension includes all the business requirements necessary to reach the organisational targets and to be sustainable.

Dimension 3: What total value is required by the businesses to have efficient value processes? (Process Value)

Simply producing and delivering the value is not enough to be competitive these days. Rather, value need to be produced effectively by the businesses to compete and to ensure profitability for the long run. To produce value effectively, efficient process is a must. All the inefficiencies of the value processes must be identified and corrected to produce the value effectively. According to Kalitventzeff et al. (2001) increasing process performances and reducing its emissions are two of the major goals of process sustainability that leads to total business sustainability. Scholars have identified important indicators for efficient and sustainable process, such as, conserving energy and material use (not only the quantity of materials and energy used but also their

type: renewable versus non-renewable, toxic versus non-toxic), protection of natural environment (air, water, biodiversity, soil, waste production and disposal, climate, etc.), maintaining the economic viability (innovation potential, reputation or image, intellectual assets, etc.), community development and social justice (job creation, local investment, quality of life, etc.), workers (handling of toxic chemical and waste, emission, etc.), and more (Veleva and Ellenbecker 2000). A number of other scholars, such as, Harmon and Auseklis (2009); Diwekar (2005), Bryson and Lombardi (2009), Lems et al. (2003) also emphasised about the importance of efficient value process for achieving sustainability. This dimension of measurement includes all the requirements that are necessary to make all the processes of a business efficient and sustainable.

3.5 BLENDED VALUE

Practitioners and investors involved in corporate social responsibility, social enterprise, social investing, strategic philanthropy, and sustainable development are changing the traditional for-profit/non-profit approaches by pursuing strategies that strive to blend social, environmental and economic values (Bonini and Emerson 2005). As stated earlier, the most commonly used sustainability dimensions can be found in the triple bottom line concept of John Elkington (1994). The idea of the triple bottom line has been found to be an immensely simple and effective tool for companies and stakeholders to think about the role and function of business. However, there are also limitations inherent in the over-simplified definition of economy, society, and environment, which the triple bottom line approach implies (Elkington 2006). Therefore, based on the discussion above on the three dimensional sustainability requirements (customer value, business value, and process value) the term 'blended value' has been introduced in this research. The concept of 'blended value' integrates the sustainability dimensions with the value requirements dimensions.

According to the literature, scholars (e.g., Emerson 2003, 2006; Emerson and Bonini 2003) used the term 'blended value' lately, which is the integration of economic value, social value, and environmental value. The 'blended value' concept introduced by Jed Emerson posits that "value is generated from the combined interplay between the component parts of economic, social and environmental performance. All firms (whether non-profit or for- profit) create blended value—the only issue up for debate is the degree to which they maximise the component elements of value, best tracked through the use of a triple bottom line framework" (Emerson and Bonini 2003, p.15). To be sustainable, Isaak (2002, p.90) suggests, every time we invest we should think of

our own personal values and use a 'blended value' approach combining social and environmental as well as financial objectives. According to Elkington (2006), firms and capital should seek to maximise the contribution of each component of sustainability to ensure that both performance and returns are greater than the sum of their parts. Porter and Kramer (2011) uses the term 'shared value' which can be defined as policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates. The term 'blended value' has been also cited by many other researchers (e.g., Harold, Spitzer and Emerson 2007; Dees 2008; Dawans and Alter 2009; Hutchinson and Molla 2009). But these definitions of 'blended value' in the literature mainly expressed from the firm's point of view and do not directly include the customer value perspective or the process value perspective. Though some of them tried to include customer value perspective indirectly, they mainly focus on business value perspective for sustainability. But the importance of customer value requirements and process value requirements are pointed out by many scholars as described in the previous section.

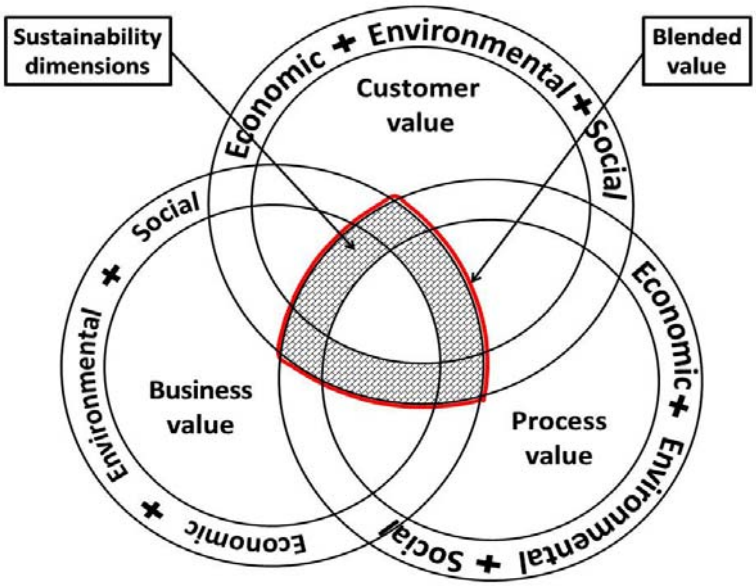


Figure 3.2: Blended value

Therefore, in this research blended value is defined as the integration of economic value, social value, and environmental value for customer; economic value, social value, and environmental value for business; and economic value, social value, and environmental value for process. Figure 3.2 represent the concept of blended value. In Figure 3.2, the area marked in plain blue color represents the value dimensions; the

area marked in patterned color represents the sustainability dimensions; and the area marked in orange color represents the integration of these two dimensions (value and sustainability) to form blended value. This definition of blended value can be differentiated from Emerson's (2003, 2006) definition in the sense that though the sustainability value requirements (economic, social, and environmental) are clearly identified in his definition, the three dimensional perspectives discussed above (customer, business, and process) are not mentioned. It is also different from corporate social responsibility (CSR) value in the sense that CSR value is separate from profit maximisation and agenda is determined by external reporting, whereas blended value is integral to profit maximisation and agenda is company specific and internally generated. Moreover, this value is not only concerned with the business's demand or expectation regarding sustainability but also it safeguards the interests of the customers. The blended value dimensions are comprehensively explained in the next section.

3.6 BLENDED VALUE DIMENSIONS

In the past, businesses limited their view of business profitability as they were only aware of economic gain and were focused on sound financial systems to maintain that gain. Then slowly the trend for socially conscious businesses started and now to compete in the market businesses need to deliver not only the economic value but the blended value. Based on the discussion above if the sustainable value is measured from three dimensions, blended value requirements can be categorised into nine groups as follows:

a) Sustainability requirements for customer value: VOC-based
    1. Economic requirements for customer value (EcVR1)
    2. Social requirements for customer value (SoVR1)
    3. Environmental requirements for customer value (EnVR1)

b) Sustainability requirements for business value: strategy-based
    4. Economic requirements for business value (EcVR2)
    5. Social requirements for business value (SoVR2)
    6. Environmental requirements for business value (EnVR2)

c) Sustainability requirements for process value: process-based
    7. Economic requirements for process value (EcVR3)
    8. Social requirements for process value (SoVR3)

9. Environmental requirements for process value (EnVR3)

3.6.1 Dimension 1: Sustainability Requirements for Customer Value

Customer value is increasingly comprehended as the next source of competitive advantage for the businesses (Woodruff 1997). The importance of superior customer value is recognised in most of the business strategy models (Khalifa 2004; Cravens et al. 1997). In general, voices of the customers (VOCs) are indicated by customer requirements. Since rich literature is available on VOCs, it is not explained here comprehensively. In a number of research approaches VOCs are translated as customer requirements through evaluation and validation (Wang and Hong 2007; Chan and Wu 2005; Han et al. 2001; Hwarng and Teo 2001; Chien and Su 2003). But in this research, more specifically, by customer requirements, mean the total value (economic, social, and environmental) that is demanded or desired by the customer. This requirement can be any or any combination of the economic, social and environmental value. Choi and Ng (2011) postulate that consumers care about protecting and preserving favourable economic environments (an economic dimension of sustainability) as much as they care about natural environments.

To maximise the value delivery to the customers, it is necessary to classify the customers by their demands and then rank customer requirements according to the segments. Customers can be of different types, such as, internal customers (shareholders, managers, employees), intermediate customers (wholesale people), ultimate customers (recipient of service, purchasers, institutional purchasers), etc. (Chan and Wu 2005). If the organisation cannot identify its customer segments and considers all customers equally important then there is a greater chance of getting misleading customer requirements. That is why when identifying customer requirements, every organisation should ask itself few general questions (Mazur 2003):

- Which customer will help them the most in achieving their business goals?
- Are all customer equally important to them, or some are more valuable to them than others?

Commonly, there are too many customer requirements to be manageable and that is why classification of customer requirements is beneficial (Han et al. 2001) and necessary to limit the budget of investments. There are different techniques that are available to be used for identifying customer requirements, such as, market surveys (González et al. 2004; Andronikidis et al. 2009), focus-groups (Chan and Wu 2005;

Hwarng and Teo 2001), in-depth qualitative interview, market research, and concept engineering (Griffin and Hauser 1993; Schmidt 1997), etc. Epstein and Wisner (2001) indicates that to achieve sustainability social and environmental values requirements of customer should be considered along with the economic value requirements. Community support (park, safety, recreation), social report requests, product recalls, community meetings, and cause related events are some of the social value requirements of customers; and green products, products safety, product life, customer returns, cause related marketing, and product eco-efficiency are some of the environmental value requirements of customers as exemplified by Epstein and Wisner (2001). Therefore, three types of customer value requirements are considered in this research approach. They are as follows:

3.6.1.1 Economic requirements for customer value (EcVR1)

There are number of different definitions and explanations in the past literature about the economic value of a product or service (e.g., Boztepe 2004; Hinterhuber 2004, 2008; Dolan and Matthews 1993; Liozu et al. 2012; Nagle and Holden 1995; Zeithaml 1988). Therefore, we are not going to define it further; rather we focus on economic value requirements for customer requirements. In this approach, customer requirement means any of the customer's value requirements which is somehow economically related directly or indirectly to the product or service that is to be delivered to the customer. These economic requirements are not the factors from business's point of view which are mentioned by Porter in his classical work on Competitive Strategy (1980) and Competitive Advantage (1985), instead these economic requirements are the demands from the customer's point of view. In other words, these requirements mean all types of economic benefits that the customers are looking for. For example, price of the product or service is directly related to the product or service economically (Kwong and Bai 2002). Quality of the product/service, security of the service, availability or ease of access, customer service, etc. (Levesque and McDougall 1996) also belongs to this group. Many other scholars have emphasised the importance of customer's economic value (e.g., Bauer, Staat and Hammerschmidt 2003; Johansson and Andersson 2012; Chan, Yim and Lam 2010; Netseva-Porcheva 2011; Forbis and Mehta 2000; Agarwal, Rastogi and Mehrotra 2009).

Economic value requirements, generally, are considered as the top prior requirement from the customers' point of view within all of the value requirements except some product and services whose value dimensions are different. From the previous

research it has been found that majority of the customers look for economic value requirements of the product or service before any other requirements. For example, Schechter (1984) and Bishop (1984) identified customers that equate value with price. Zeithaml (1988) identified from a study that customers equated value of the product or service with low price. Zeithaml (1988) also found that number of customers consider value as price first and quality second. According to Porter (2011), value for the customer is defined as benefits relative to costs. In another study by Hoffman (1984) reveals the salience of price in the value equations of customers.

3.6.1.2 Social requirements for customer value (SoVR1)

According to Freeman (2010), customers are one of the main stakeholders who affected by the corporation actions. Any value for the customer's society is considered as the social value requirement for the customer (Biswas, Dewan and Quaddus 2014). Almost all of the products or services create some sort of value impact to the society. It will be very difficult to identify many products or services which do not have any social value impact, direct or indirect. Also, there will be very few business activities which are totally detached from producing some kind of social value. If it is true that most of the businesses produce some kind of social value, positive or negative, then the social value requirements also must be encountered at the core of the business. Moreover, customer's perception about social value requirements differs from business's perception of social value requirements for sustainability. Today's customers are interested to see the contribution or impact of the product or service or operations of the business organisations to the society they are living. These social value requirements are not the social responsibilities that the business organisations are thinking to perform; rather these are the requirements that the customers are demanding or expecting from the products or services or from the supplier of the products or services.

There can be different dimensions of social value requirements. For instance, it can be directly related to the product or service of the business, such as, knowledge of the customers' society, customers' safety of the product, customers' health (fresh food, harmful packaging or ingredients in the food, life-saving medicines, hospitals, abusive use of drugs, use of tobacco, over consumption of alcohol), prostitution, availability of pornographic material, gambling, availability of arms, etc.; or it can be indirectly related to the business, such as, generating local employment, supporting education, health and welfare, loans and assistance to the charities, investments in the society through

donations, etc. (Biswas, Dewan and Quaddus 2014). Social value requirements may also include employment policies of the organisation that ensure diversity, including gender, race and religion, proper work environment for all the staff that meets social necessities, encouraging or allowing organisation's staff to get involved in fundraising and volunteer activities for the disadvantaged within the society, offering business education, community training programs, persuading the business partners to act in a socially accountable manner, etc.

Porter and Kramer (2011) identify significant link between social value delivered and economic value received. They identify three ways to create economic value for the business by creating social value for the customer: by re-conceiving products and markets, by re-defining productivity in the value chain, and by building supportive industry clusters at the company's locations. According to them, by better connecting companies' success with social improvement, the organisation opens up many ways to serve new needs for the customer, gain efficiency, create differentiation, and expand markets. For example, food companies that traditionally concentrated on taste and quantity to drive more and more consumption are now refocusing on the fundamental need for better nutrition (Porter and Kramer 2011). Other social value requirements, such as, compliance of legislation and code of conduct, contribution to social development at local and national level, accountability of products and services, etc. are also cited by many scholars (e.g., Labuschagne, Brent and van Erck 2005; Vinodh and Chintha 2011; Poon and Lee 2012). Therefore, to be competitive in the market businesses need to sincerely consider the social value requirements of the customers in modelling businesses.

3.6.1.3 Environmental requirements for customer value (EnVR1)

Currently environmental value has become a significant requirement for the customers. Customers, suppliers, and public are increasingly demanding that businesses minimize any negative impact of their products and operations on the natural environment (Klassen and Whybark 1999). Customers now do not just look at the economic value of the product or service, they also want to know whether that product or service or the supplier of that product or service cause any impact on the natural environment. They also want to know, if there is any impact, then whether it is positive or negative, and to what extent; because they believe business have major role to play in helping and enhancing the environment and thus, every business should develop sound environmental management policies for processes and products (Demirdogen 2007). It

is also believed now by the customers that there are number of ways how businesses can reduce the impact on the environment; for example, sourcing responsibly, such as, using recycled materials and sustainable timber, creating an efficient and fuel-efficient distribution network, creating recyclable products, minimising packaging, buying locally to save fuel costs, etc. As a whole, the customers want the businesses to act more responsibly by performing an important and positive role in the society through creating additional environmental value for the future generations.

Environmental value requirements include all the environmental factors related directly or indirectly, to the product or service delivered to the customer or they can be somehow related to the operations of supplier of the product or service, such as, emissions (air, water, and soil), waste, radiation, noise, vibration, energy intensity, material intensity, heat, direct intervention on nature and landscape, etc. (Figge et al. 2002). The impacts on the environment may occur directly from the product or service, and/or they may occur internally within the organisation, and/or they may occur along the value chain of the businesses. Bovea and Vidal (2004) suggest how more value can be added to the product for the customer by integrating environmental impact, costs and customer evaluation during the product design process. Munoz and Sheng (1995) present a model which they believe can serve as a framework for decision-making in environmentally-conscious manufacturing. Moreover, it is noticeable now that numerous businesses have already implemented plan to minimise the impact on the environment. For example, Intel and IBM are both devising ways to help utilities harness digital intelligence in order to economize on power usage (Porter and Kramer 2011). The demand for environmental requirements is also mentioned by many other researchers (e.g., Haigh and Griffiths 2008; Veleva et al. 2003; Elliot 2009, 2011; Haigh 2004; Caniato et al. 2012; Lo and Sheu 2007).

3.6.2 Dimension 2: Sustainability Requirements for Business Value

Better quality of the products or services lead to the fulfilment of customer requirements or higher customer satisfaction. But only fulfilment of customer requirements does not guarantee the future profitability of the businesses as the market changes. Thus, businesses need to think in advance about how to sustain the profitability in the long run. Every business must ask themselves at least two questions for their economic sustainability: (i) What do they want to achieve in the future? and, (ii) How to achieve? The answers from these two questions will help the businesses to decide about their future directions, including innovations and proper allocation of the

resources. Strategic managers will be mainly responsible to identify the business requirements by evaluating the current situations and the future directions of the businesses. Managers must clearly define their goals and targets when identifying these requirements. The businesses must consider its future strategy and all the cost drivers relative to its operations when selecting these business requirements. For example, there can be a number of different business goals that businesses may aim to achieve in the long run based on their current circumstances. It can be only increasing the profit, or increasing the sales only by keeping the profit unchanged, or increasing both sales and profit, or can be reducing the cost to increase the profit, or even can be increasing the social value or environmental value in the future for the customers subject to the availability of resources, etc. But whatever the goals are, to achieve them there are always relative business requirements that need to be fulfilled. Porter (1980, 1985) provides with a list of common cost drivers which may guide all the businesses during the business requirements selection to achieve their goals. They are: economies of scale, learning and spill over costs, coordination among different activities, pattern of capacity utilisation, linkages with suppliers and channels, inter-relationships with other business units within a firm; location of the firm, etc. A number of researchers have specified the positive correlation between social and environmental performances and economic performance. For instance, a study by Lo and Sheu (2007) found significant positive relation between social and environmental performances of the business and the economic growth. They advocate that aside from making profit a sustainable company captures other qualitative, non-financial criterion as references for their performance, such as, corporate governance structures, human capital management, stakeholder relations, environmental protection and corporate social responsibility (Lo and Sheu 2007, p.345). Thus, for e-business sustainability business requirements can be classified into three groups:

3.6.2.1 Economic requirements for business value (EcVR2)

Economic requirements for business value are to add some economic value to the business directly or indirectly if they are fulfilled. It has been mentioned by Harmon and Auseklis (2009) that business value is evidenced by increases in revenue or market position that derive from meeting customer requirements, providing customer savings, and making investments in innovation that advance the industry as a whole. Dyllick and Hockerts (2002, p.133) emphasise that to be economically sustainable a firm needs to manage several types of economic capital: financial capital (i.e., equity, debt), tangible capital (i.e., machinery, land, stocks), and intangible capital (i.e., reputation,

inventions, know-how, organisational routines). These economic value requirements are different than the economic value requirements of customer explained in the section EcVR1 in the sense that those economic requirements are demanded by the customers to maximise the product or service value and these economic requirements (EcVR2) are identified by the businesses to be fulfilled to achieve the planned targets. For example, increase of sales and/or profit and/or liquidity, cost effective infrastructure, risk and crisis management, replacing the employees with more efficient machinery, reducing costs by implementing more efficient supply chain management systems, saving of time and energy, organisational reputation, etc. (Wang and Hong 2007; Labuschagne, Brent and van Erck 2005; Hoggarth, Reidhill and Sinclair 2004; Mihelis et al. 2001) add some sort of economic value to the businesses. Generally, the ultimate goal of adding economic value to business is to pass the savings to the customers in the competitive market and to maximise the economic sustainability.

3.6.2.2 Social requirements for business value (SoVR2)

Social requirements for business value are to add some value to the society from business's point of view if they are fulfilled. Types of social values are discussed in the section on SoVR1. These value requirements (SoVR2) reflect what social value the business is planning and willing to deliver to the customer's society in time regardless of the customer's demand. For building societal value, Nelson (1998) proposes an approach based on three elements: (i) efficient and ethical pursuit of core business activities, such as, creating local jobs, paying taxes and royalties, implementing social human resource policies, etc. (ii) social investment and philanthropy, such as, offering training program to the community, running employee volunteering schemes, business education projects, sponsoring community development trusts, civic improvement, etc. and (iii) contribution to the public policy debate, such as, supporting progress for good governance including anti-corruption initiatives and human rights standards, contribution to the social policies including education, training, local economic development, employment management, etc. These requirements eventually add value indirectly to the customers' society but instead of demanded by the customers these are selected by the businesses to achieve certain business goals. Adding social value by the businesses can be a part of different types of business goals depending on the business nature. Part of the goals can be simply for the wellbeing of the society, or can be for the competition in the market. For instance, to add some social value global firm Fortis commit to work to fight illness and disease, promote education, aid and protect children, and prevent homelessness and hunger through participation in community-

based programs such as sponsorships, donations, and employee volunteer programs (Snider, Hill and Martin 2003). Lever Bros Ltd. uses few principles to focus on social value, such as, emphasising on employees' personal development, training, health, and safety; improving well-being of the society at large; using world class expertise base human safety to ensure consumer safety; improving living conditions of its employees, etc. (Zairi and Peters 2002). Researchers found social responsibility actions can have substantial positive impact on the organisation by (i) helping to build corporate reputation, (ii) attracting and retaining a motivated workforce, (iii) reducing operating costs, (iv) reducing regulatory oversight, (v) building a strong community relationship, and more (Kotler and Lee 2005).

3.6.2.3 Environmental requirements for business value (EnVR2)

There are many empirical studies (e.g., Nakao et al. 2007; Russo and Fouts 1997; Konar and Cohen 2001) that show that a firm's environmental performance does have a statistically significant positive relationship with its financial performance. According to Denton (1994), adding environmental value can be a competitive advantage for the businesses since businesses can differentiate themselves by creating products or processes that offer environmental benefits. To be competitive in the market businesses need to act environmental friendly these days. A number of organisations confronted with sustainability challenge while improving their productivity, reducing costs, and enhancing benefits; however, their lack of expertise in environmental sustainability has caused in many forms of waste, unused resources, energy inefficiency, and pollution (Wati and Koo 2011). As mentioned in the section EnVR1 above, there are number of ways how businesses can minimise the impact on the environment and gain competitive advantages simultaneously. By implementing environmental friendly operations businesses may achieve cost reductions, too. For example, minimum use of environmentally-toxic chemicals, reduced contaminations, recycling of materials, improved waste management and reuse or recycling of waste, using fuel efficient machineries, minimize packaging, using recycled water, etc. reduce the impact on the environment and at same time they may reduce the costs of the businesses. Businesses themselves identify these environmental value requirements based on the environment they are operating and their aim to achieve some goals by fulfilling these requirements. In the section on EnVR1, we discussed the environmental value requirements demanded by customers; however, these environmental value requirements are identified by businesses for their different business goals that they aim to achieve in time. For example, one of the principles of Lever Bros Ltd. is to take

great care to minimize the environmental impact of all their operations- from raw material procurement, product design, manufacture and distribution- to use and disposal (Zairi and Peters 2002).

3.6.3 Dimension 3: Sustainability Requirements for Process Value

While sustainable consumption targets consumers, sustainable production or sustainable process is related to companies and organisations that make products or offer services (Veleva and Ellenbecker 2001). Every business processes value for the customers by transforming inputs (raw materials, information, money, etc.) into output to be delivered to the its customers. If the output or the processes of producing the output lack any efficiency, businesses find it difficult to sustain the profitability. Even though customer satisfaction can be obtained effectively and efficiently for some time by fulfilling various customer requirements, an organisation still cannot ensure future profitability if it lacks value creating capability (Wang and Hong 2007). For example, the businesses may achieve higher customer satisfaction by fulfilling all the customer requirements but inappropriate allocation of the resources and inefficient processes may lead to the failure in the competition. Sustainable production is a process that can be defined as the creation of goods and services using processes and systems that are non-polluting; energy efficient, and natural resources conserving; economically sustainable; safe and healthy for employees, communities, and consumers; and socially and innovatively rewarding for all working people (Veleva and Ellenbecker 2001; Lowell Center for Sustainable Production 1998). Similarly, Bakshi and Fiksel stated that a sustainable process is one that constrains resource consumption and waste generation (environmental value) to an acceptable level, makes a positive contribution to the satisfaction of human needs, (social value) and provides enduring economic value to the business enterprise (Bakshi and Fiksel 2003, p.1350). Therefore, every business must have efficient value creating processes to be competitive in the market. Thus, process value requirements are the requirements that need to be fulfilled to have an efficient value creating process within the existing business processes. According to Arlbjorn and Haug (2010), every business process should be defined with customer value in mind. In short, to deliver a complete value to the customer the organisation must have an efficient value process system and to have an efficient value process system all value requirements aspects of sustainability (economic, social, and environmental) must be fulfilled. More scholars, such as, Bryson and Lombardi (2009), Tugnoli et al. (2008), Bakshi and Fiksel (2003), Azapagic et al. (2006), Jawahir et al.

(2009) also cited the importance of social and environmental aspects of process along with the economic aspect. Process value requirements are identified from the gap between what is being achieved and what need to be achieved from the existing value processes. More clearly, these value requirements are not demanded or identified by the customers rather they are identified by the business itself by looking at what amount of value it is currently producing and what amount of value it is supposed to produce to safeguard the interest of all the stakeholders. For example, inaccurate or slow manufacturing of a product or service by employee or machinery, untimed delivery, inefficient processes caused by lack of training, social misconducts, unproductive waste management, unplanned pollution (air, water, sound) management, etc. and any other inaccuracies within the existing processes which can be corrected without or with very low efforts and/or investments are identified as value requirements. Common steps for optimising business processes which are analysing, designing, implementing and evaluating can be followed to have an efficient value creating process within the organisation.

Now, the distinction between the business value requirements and the process value requirements must not be confused. Although some elements of the process value requirements may fall under the business value requirements but all process value requirements do not fall under the category of business value requirements or all business value requirements do not fall under the category of process value requirements. For example, reduction of costs in process value requirements means the only costs which are directly related to the processing; whereas reduction of costs in business value requirements means all the costs (HRM, Financial, maintenance, etc.) required to run the business. Some of the social and environmental value requirements could be just the automatic output of the existing processes which are not part of the business value requirements. Thus, based on the discussion above process value requirements can be grouped into the following three types:

3.6.3.1 Economic requirements for process value (EcVR3)

Economic requirements for process value are mainly related to the financial structure, productivity, cost of the process, and cost savings within the existing process which are aimed to be transferred to the customers later. Though business managers are responsible for allocation of fund and resources, strong financial structure of the process division (availability of enough funds to process managers) is sometimes crucial for achieving sustainable business process. In reality, decisions of business

managers regarding process do not always exactly match with the decisions of the process managers. But process managers are more responsible and accountable for processes than business managers. Thus, process managers need to have the flexibility to make decisions about the processes for achieving sustainability. Again, this additional value (cost savings) is not demanded by the customers, instead the process managers identify those value creating inefficiencies within the existing processes and try to rectify them which result in some sort of economic benefits for the organisations. Later on, those economic benefits can be passed to the customers as economic value by the organisations. For example, employing skilled workers, keeping up with the up-to-date technologies, providing adequate amount of training, using efficient energies, using efficient supply chain management systems, etc. can increase the efficiency of the value processes that can certainly add some economic value to the organisation that can be transferred to the customers, if required. Financial structure of the process division (Labuschagne, Brent and van Erck 2005), productivity of the processes (Figge et al. 2002), security of the processes (Alam et al. 2007), process costs, and risk and crisis management of the processes (Lo and Sheu 2007) are some more examples of economic value requirements of process cited by the researchers.

3.6.3.2 Social requirements for process value (SoVR3)

Present expectation by each society is that every business should act honestly and ethically. Social value requirements for process are derived from how the process can impact on or contribute to the society it is operating. Value for the society can be of different types: basic value, ethical value, voluntary value, etc. To identify these social value requirements process managers look at the whole value process of the organisation and see whether there is any scope to reduce the negative impact on the society or to add some value to the society they are operating within the existing value process systems. Sometimes the businesses even do not hesitate to make some extra investment or to give some extra effort if there are chances to add some social value. In the sections 3.6.1.2 (SoVR1) and 3.6.2.2 (SoVR2), we have already explained about what the social value is and their examples. SoVR3 is different from SoVR1 and SoVR2 in the sense that SoVR1 requirements are demanded by the customers, SoVR2 requirements are identified by the business managers from the overall business that they can deliver to the customers, and SoVR3 requirements are identified by the process managers but they are identified within the current value creation process so that they can be fulfilled and delivered. For instance, educating disadvantaged children, organising skills training for unemployed people, employing disabled people,

sponsoring social events, organising social gathering, organising awareness programs, etc. through process division can add value to the society; and most of these requirements can be easily fulfilled by the businesses without or with a little efforts and/or investments. Nelson (1998) argues that by crating local jobs, giving access to the poor, offering training programs to the community, implementing social human resource policies significant social value can be added. Social development at local and national level (Tanzil and Beloff 2006), non-discrimination and freedom of association (Epstein and Wisner 2001), labour practices and benefits (Lo and Sheu 2007), fulfilment of products and services requirements (Delai and Takahashi 2011) are some of the social value requirements that can be fulfilled by the process division.

3.6.3.3 Environmental requirements for process value (EnVR3)

For achieving sustainability, it is important to design sustainable processes by the business although translating the general principles of sustainability into design practice is not always simple (Azapagic, Millington and Collett 2004). To design sustainable processes and to minimize the impact of existing value processes on the environment these value requirements need to be fulfilled. To fulfil these requirements the businesses try to find and implement all the necessary steps within the existing processes that will stop or reduce the chances of effecting the environment, and thus, adding some value to the environment. Opitz et al. (2014) accentuate that the green business process is essential for sustainability which is the sum of all IS-supported management activities that help to monitor and reduce the environmental impact of business processes in their design, improvement, implementation, or operation stages, as well as lead to cultural change within the process life cycle. Haigh and Griffiths (2008) investigate the impact of IS/ICT on the resource consumption, and hence, the environmental sustainability of operational processes. Similar to SoVR3 mentioned above, these environmental value requirements for process are also identified within the current value process system by the process managers so that they can be fulfilled and can start adding more value. EnVR1 requirements are demanded by the customers and EnVR3 requirements are identified by the business managers but EnVR2 are identified by the process managers to add value to the business process by increasing the efficiencies in the processes. For example, leakage of water/oil/heat, incompetent waste management, inefficient disposal and recycling of materials, unplanned pollution (air, water, sound) management, uncontrolled ecosystem stress, heating and lighting inefficiency, etc. will result in incompetency in the value processes for the businesses. Hence, businesses may get rid of these inefficiencies and add value to the value creation

processes by fulfilling these environmental value requirements. Environmental performance of suppliers (Epstein and Wisner 2001), waste disposal and land pollution (Sakao, Watanabe and Shimomura 2003), usage of materials (Veleva and Ellenbecker 2001), impact on air by the process activities (Epstein and Wisner 2001), process related fuel and power consumption (Vinodh and Chintha 2011) are exemplified by the researchers as the environmental value requirements for achieving sustainability.

3.6.4 Gaps in Blended Value Research

The following points summarises the research gaps and the importance of blended value requirements in developing an integrated model for e-business sustainability:

- As mentioned earlier (see Section 3.6.1), scholars argue that classification of different types of customers is very important in maximising the value delivery to the customer (Chan and Wu 2005). Because if the customers segments are not identified efficiently and all customers are weighed equally then there is greater risk of getting misleading customer value requirements (Mazur 2003). Similarly, classification of different types of value requirements for different types of customers is essential for delivering customer value efficiently as value requirements for a particular product or service may vary depending on the customer segments and the contexts. It is argued that for the sustainability of the business consideration of social and environmental value requirements of customer is important along with the economic value requirements (Epstein and Wisner 2001). But literature shows that most of the researches in this domain consider the economic, social, and environmental value of customer in a standalone fashion and not in integrated way. Few of the studies include more than one value requirements of customer (economic and social, or social and environmental, or economic and environmental) but studies with inclusion of all three value requirements is scarce. For example, some scholars mainly focused on economic requirements of customer (e.g., Levesque and McDougall 1996; Bauer, Staat and Hammerschmidt 2003; Johansson and Andersson 2012; Chan, Yim and Lam 2010; Agarwal, Rastogi and Mehrotra 2009; Netseva-Porcheva 2011), some other scholars mainly concentrated on social requirements of customer (e.g., Labuschagne, Brent and van Erck 2005; Vinodh and Chintha 2011; Poon and Lee 2012; Biswas, Dewan and Quaddus 2014), whereas some other scholars focused on environmental requirements of customer (e.g., Figge et al. 2002; Bovea and Vidal 2004; Munoz and Sheng 1995; Haigh 2004; Haigh and Griffiths 2008; Elliot 2009, 2011). Thus,

research gap exist for the development of an integrated model for the sustainability of e-business that considers all three value requirements (economic, social, and environmental) of customer.

- As stated earlier (see Section 3.6.2), along with the value requirements of customer, value requirements of business need to be carefully considered for the sustainability of e-business since fulfilment of only customer requirements does not guarantee the future profitability. Similar to the value requirements of customer, businesses need to prioritise their value requirements for achieving sustainability based on the three dimensions of sustainability. Literature reveals that significant correlations exist between social and environmental performance of the business and the economic growth (Lo and Sheu 2007). A number of studies can be found that deals with economic value requirements of business (e.g., Dyllick and Hockerts 2002; Wang and Hong 2007; Hoggarth, Reidhill and Sinclair 2004), social value requirements of business (e.g., Snider, Hill and Martin 2003; Kotler and Lee 2005; Nelson 1998), and environmental value requirements of business (e.g., Denton 1994; Wati and Koo 2011; Zairi and Peters 2002) in a standalone fashion. Study that integrates all three value requirements (economic, social, and environmental) of business for the sustainability is rare. In most cases, economic value requirements are considered from business value perspective, and social and environmental value requirements are considered from customer value perspective. Therefore, development of an e-business model is essential that integrates all three value requirements of business for sustainability.

- Literature shows that for achieving sustainability, sustainable process is essential (Veleva and Ellenbecker 2001). As discussed earlier (see Section 3.6.3), even though customer satisfaction can be obtained for some time by fulfilling customer requirements, a business still cannot ensure long term profitability if it lacks efficient value process (Wang and Hong 2007). Hence, sustainability of process is another vital requirement for achieving sustainability by the businesses and e-businesses. Moreover, there is strong correlations between sustainable process and economic value creation for the business (Bakshi and Fiksel 2003). But consideration of only economic value creation through process is not enough for e-business sustainability. Many scholars (e.g., Bryson and Lombardi 2009; Tugnoli, Santarelli and Cozzani 2008; Azapagic, Millington and Collett 2006; Jawahir et al. 2009) have cited the importance of social and environmental aspects of process along with the economic aspect in this regard. But most of the existing empirical

studies in this research domain mainly deal with the environmental aspect of process. A few of them includes economic aspect of process but social aspect is almost entirely ignored. Moreover, economic, social, environmental aspects of process for sustainability are considered in a standalone fashion. But integration of these three aspects is essential for achieving sustainability by the businesses.

From the above discussion it is clear that a number of studies are available that stress the importance of business value perspective of sustainability whereas a number of other studies concentrate on customer value perspective of sustainability and process value perspective of sustainability. What has been realised from this is that focusing only on the customers' demand is not enough to be competitive regardless of whether the demand is economic, social, or environmental. As mentioned above, customer satisfaction can be obtained effectively and efficiently for some time by fulfilling various customer requirements but still an organisation cannot ensure future profitability if it lacks value creating capability. Thus, to be competitive and to maintain the sustainability a firm must consider value requirements (economic, social, and environmental) from all three dimensions: customer value, business value, and process value. It is also clear from the above discussion that each of the value elements (customer value, business value, and process value) must include all three dimensions of TBL to achieve overall sustainability of the business. But so far, no such study is available in the literature that integrates all these elements. Therefore, based on the three dimensional value requirements of sustainability elements (blended value requirements) further research is required that will be directed developing a model which will be sustainable and simultaneously will safeguard the interests of all the stakeholders (i.e., customer, business, society, and environment).

3.7 THEORETICAL FOUNDATIONS

This research develops a model for e-business sustainability by integrating value requirements of customer, value requirements of business, value requirements of process, and organisational capabilities. More clearly, the research identifies and optimises mitigation strategies for improved sustainability performances that fulfil the value requirements of stakeholders based on prioritised value requirements and organisational resource constraint. The theoretical foundation of this study has been developed by combining the notion and principles of theoretical frameworks applicable to the sustainability performance of the business. In this regard, the theories reviewed are Stakeholder Theory (Freeman 1984), Triple Bottom Line (TBL) (Elkington 1994),

and Resource-based View (RbV) (Wernerfelt 1984). The following discussion demonstrates how these theories incorporate with the sustainability of the business including the examples of studies in which they were successfully employed.

3.7.1 Stakeholder Theory and Sustainability

It is argued that the firms' motivation to invest in sustainability activities comes from the domain of stakeholder theory (Argandoña 1998; Harvey and Schaefer 2001). A comprehensive study by Blum-Kusterer and Hussain (2001) also discovered that the major drivers for the company's social and environmental performances are external stakeholders (e.g., customers), internal stakeholders (e.g., employees), regulations, and technology. The stakeholder theory has been advanced and justified in the literature on the basis of its descriptive accuracy, instrumental power, and normative validity.

Stakeholder theory was proposed by Freeman in 1984 in which he defined a stakeholder as "any group or individual who can affect or is affected by the achievement of the firm's objective" (Rowley 1997; Clement 2005). By the period of 1990s, this theory has gained vast research attention with it being cited by more than 100 journals (Donaldson and Preston 1995). According to stakeholder theory the firm is seen as having responsibilities to a wider set of groups than simply shareholders (e.g., Hubbard 2009; Freeman 1984; Brown and Fraser 2006; Reich 1998). The theory says that managers should make decisions that take into consideration of the interests of all the stakeholders in a business which include all individuals or groups who can substantially affect, or be affected by, the welfare of the firm - individuals or groups who can substantially affect, or be affected by, the welfare of the firm (Jensen 2001). The focus of stakeholder theory is articulated in two core questions: (i) what is the purpose of the firm? This encourages managers to articulate the shared sense of the value they create, and what brings its core stakeholders together; and (ii) what responsibility does management have to stakeholders? This pushes managers to articulate how they want to do business-specifically, what kinds of relationships they want and need to create with their stakeholders to deliver on their purpose (Freeman, Wicks and Parmar 2004).

Unlike in the past, today's businesses are experiencing growing pressure from the stakeholders and the concerns of stakeholders are diverse in nature. Freeman (1984) argues that without mitigating the various types of pressures from the stakeholders (customers, suppliers, governments, competitors, pressure groups, etc.), a firm cannot maximise value (Jensen 2001). Therefore, businesses need the capacity to ensure that

their strategies fulfil value requirements of all the stakeholders including its customers and the firm itself. In line with this, it can also be advocated that management needs to identify the optimal strategies to fulfil all the value requirements.

As the time passes the attention and interest of all stakeholders is converging towards sustainability of the organisation in terms of economic, social and environmental factors (Wheeler, Colbert and Freeman 2003). At the organisational level, a sustainable business has been defined as one that meets the needs of its stakeholders without compromising its ability also to meet their needs in the future (Hockerts 1999; Hubbard 2009). Businesses are now developing tactics to manage increasing responsibilities driven by stakeholder pressure (Waddock, Bodwell and Graves 2002). A sustainable organisation try to maximise economic, social, and environmental performance for a sustainable and value based stakeholder relation (Perrini and Tencati 2006) and try to integrate sustainability in the strategy to meet stakeholder demands and to operationalize the strategies (Aragón-Correa and Sharma 2003). Hence, it can be summed up that for the sustainability of the business stakeholder theory indicates the development of a business model or framework that recognizes the value requirements of multiple stakeholders including customer value requirements and business value requirements. Since this study deals with the value requirements customer, business, and process, Stakeholder theory has been considered appropriate for this study for developing the theoretical framework.

Scholars have used stakeholder theory in their various studies to show the effectiveness and applicability of the theory in sustainability studies. For instance, Roberts (1992) utilised this theory to explicitly test the stakeholder influences as determinants of the level of corporate sustainability activity; Ruf et al. (2001) employed stakeholder theory for empirically investigating the relationship between change in corporate sustainability performance and financial performance; Garvare and Johansson (2010) developed a model of stakeholder management by using stakeholder theory and expands upon the relationship between organisational sustainability and global sustainability; Roca and Searcy (2012) employed this theory to explore the triple bottom line indicators disclosed in corporate sustainability reports; Movassaghi and Bramhandkar (2012) utilised this theory to examine the financial performance of a select sample of corporations from around the world who were repeatedly selected for inclusion in the DJSI for their exemplary sustainable business practices. This study employs this theory to explore and mitigate sustainability requirements for customer value, business value, and process value for achieving e-business sustainability.

3.7.2 Triple Bottom Line (TBL) and Sustainability

Triple Bottom Line (TBL) is also based on Stakeholder Theory, but it takes a much wider perspective of the stakeholders affected by the business; and it is based on the concept that a business should assess its performance in relation to stakeholders, including local communities and governments, and not just those stakeholders with whom it has direct, transactional relationships, such as, employees, suppliers and customers (Hubbard 2009, p.180). The contemporary research is concentrating on how TBL firms define resources and create capabilities for turning those resources into value for all their stakeholders including society and the planet (Glavas and Mish 2014).

The key statement of sustainable development is held by *Our Common Future*, which defined it as "… development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, p.8). The significance of *Our Common Future* is aligned with the concept of TBL proposed by Elkington (1994), a new corporate philosophy built on the concept of sustainability that takes into consideration not only the conventional economic bottom line but also considers indicators that measure social and environmental impact (Stoddard, Pollard and Evans 2012). According to Elkington's proposal a fundamental element of TBL is that corporate performance should be motivated not only to benefit its shareholders but all of its stakeholders, including groups, such as, the local community within which business operations are conducted (Stoddard, Pollard and Evans 2012). Some argue that in TBL theory, finding a common unit of measurement for social, economic, and environmental performance is one challenge. But this issue can be observed as a strength since it allows a user to adapt the general framework to the needs of different entities (businesses or non-profits), different projects or policies (infrastructure investment or educational programs), or different geographic boundaries (a city, region or country) (Slaper and Hall 2011). Moreover, the TBL is able to be case specific or allow a broad scope - measuring impacts across large geographic boundaries - or a narrow geographic scope like a small town; and a case specific TBL would measure the effects of a particular project in a specific location, such as, a particular community (Slaper and Hall 2011). The TBL approach, therefore, emphasise on how corporations manage and balance all three responsibilities (economic, environmental, and social) and attempts to reconcile these inter-related spheres of activity for a more balanced view of overall corporate performance (Jamali 2006, p.812).

More recently, this TBL sustainability framework has been adopted by many businesses and non-profit organisations to evaluate their performance, and a similar approach has gained currency with governments at the federal, state and local levels (Slaper and Hall 2011, p.4). Scholars argue that balancing social and environmental goals ensures long-term profitability (Hart and Milstein 2003; Porter and Kramer 2011; Dao, Langella and Carbo 2011). The organisations are adopting TBL perspective of sustainability as a proactive and strategic tool for value creation. According to the scholars, the stock price, the profits, and the entire business could suffer if the businesses do not deliver against all three bottom lines as mentioned in TBL (Norman and MacDonald 2004). Sustainability practices are now beyond legal and regulatory requirements, and organisations are now integrating sustainability practices to manage reputation risk, to ensure long-term financial excellence and to achieve competitive advantage (Aras and Crowther 2009; Brønn and Vidaver-Cohen 2009).

The TBL concept has been, and remains, a useful tool for incorporating sustainability into the business agenda (McDonough and Braungart 2002). Considerable endorsement has been achieved by the concept as giant corporations, such as Shell and British Petroleum, have adopted it and various government agencies at all levels are now implementing TBL for sustainability practices (Vanclay 2004). Strong encouragement to accept the TBL concept has also been given by the World Business Council for Sustainable Development - a coalition of 160 international companies (Holliday, Schmidheiny and Watts 2002a). The Global Reporting Initiative (GRI) and the sustainability metrics of the Institution of Chemical Engineers (IChemE) also concentrate on the TBL concept for balancing the complex relationships between economic, environmental and social needs in a manner that does not compromise future needs (Delai and Takahashi 2011; GRI 2011; IChemE 2005).

A number of researchers from different disciplines have employed TBL in their sustainability studies. For example, Pope et al. (2004) used TBL to conceptualise sustainability assessment by arguing that 'assessment for sustainability' firstly requires that the concept of sustainability be well-defined. Hubbard (2009) utilised TBL for measuring the organisational sustainable performance. He states that by taking both the widest stakeholder perspective and by considering impacts on future generations, the TBL is a possible candidate for organisational sustainable performance measurement. Kleindorfer et al. (2005) used the perspectives of TBL concept to define sustainable operations management. Maxwell and Vorst (2003) employed the concept to develop sustainable products and services. TBL concept was also used to manage

and measure the sustainability performance and develop strategies for ICT based organisations (e.g., Erek 2011; Erek et al. 2009). This study employs this theory in identifying three dimensional (economic, social, and environmental) e-business sustainability requirements for customer value, business value, and process value. This theory is also used to prioritise the sustainability value requirements and to develop the mitigation strategies for e-business sustainability.

3.7.3 Resource-based View (RbV) and Sustainability

Sustainability of an organisation is an inimitable resource that creates distinctive competitive edge in the industry. Such capability can be resonated with the unique resource proposition aligned with the Resource-based View (RbV) of Warnerfelt (1984). The RbV is one of the most dominant theories in management that is used to explain how firms are successful in the marketplace (Barney 1991; Glavas and Mish 2014). This is a promising contemporary theory that combines strategic insights on competitive advantage and organisational insights on firm existence. According to this view, capabilities or available resources of a business has strong influence on what that business can or cannot do. The view has been successfully utilised to connect different business practices to a firm's competitive advantage (Pullman, Maloni and Carter 2009).

RbV was introduced by Wernerfelt's (1984) in his conceptual article entitled "*A Resource-Based View of the Firm*" which was selected as one of the most influential papers published in the Strategic Management Journal (Priem and Butler 2001). Then Barney (1986; 1991), Rumelt (1984), Dierickx and Cool (1989), Bates and Flynn (1995), Powell (1992), Bowen and Wiersema (1999) and other scholars have contributed to the subsequent development of the RbV. The RbV is articulated and applied through two primary lenses: firstly, it addresses firm's resources (input into the production process, such as, skills of the employees, patents, brand names, capital equipment, etc.); and secondly, it focuses on a firm's dynamic capabilities (the capacity for a team of resources to perform some task of activity) (Newbert 2007; Glavas and Mish 2014). Traditional economic assumptions that states that resources are homogeneous and perfectly mobile is rejected by the RbV, instead, it argues that resources are heterogeneously distributed across firms and are imperfectly transferred between firms (Barney 1991; Watjatrakul 2005; Grant 1991). According to this view, firms can achieve above-normal returns if they can utilise their existing resources to

sustain competitive advantage by using opportunities in the market or neutralizing threats from competitors (Barney 1986; Barney 1991; Watjatrakul 2005).

The RbV argues that the firm achieves sustained competitive advantage by deploying its bundle of resources and capabilities which are unique and internal to that firm. More clearly, capabilities and resources that are rare, valuable, and difficult to imitate can provide critical sources of sustainable competitive advantage (Wernerfelt 1984; Barney 1991). A business develops competitive advantage by not only acquiring but also developing, combining, and effectively deploying its physical, human, and organisational resources in ways that add unique value and are complex for competitors to replicate (Colbert 2004; Barney 1991). Since competitors have limited or no access to the competitive resources or capabilities, the sustained advantage over competitors depends on the degree to which a firm's resources are inimitable and non-substitutable. However, an organisation's competitive advantage cannot be sustained if many organisations possess them or other organisations can imitate the valuable resources that give it competitive advantage (Watjatrakul 2005). In consistent with the arguments of RbV, research shows that adopting sustainability strategy assists firms in gaining sustained competitive advantage (Hart and Milstein 2003; Porter and Kramer 2006). Sustained competitive advantage comes from the fact that capabilities that assist firms involve in sustainability efforts are rare, non-substitutable, and causally ambiguous, characteristics that make them difficult to imitate (Dao, Langella and Carbo 2011). Therefore, based on the RbV, it is argued that organisations need to develop and utilise such tangible and intangible resources and capabilities that can fulfil all the sustainability value requirements for unique competitiveness.

Every theory has its limitations and RbV is not different. The RbV has received criticism in mainly three areas: the vagueness of terminology associated with the RbV, the tautological nature of some of the views underlying assumptions, and methodological issues. But most of the scholars have ignored these limitations and employed RbV in many of their studies of various topics, such as, managerial actions and prescriptions, innovation and advantage, organisational learning, strategy formulation, strategy implementation and evaluation, social responsibility, environmental analysis, human resource management, resource and performance, and more (Priem and Butler 2001). For example, Cumps et al. (2006) assert that business-ICT alignment can become a unique capability for a business as the alignment competences satisfy both conditions of resource heterogeneity and resource immobility. Moreover, ICT capabilities cannot be easily imitated and thus have the potential to create improved business

performance (Bharadwaj 2000; Zhu and Kraemer 2002) through adopting sustainability. Hart (1995) exemplifies that strong relationships between the firm and the natural environment aspect of sustainability can be used as competitive advantage; and according to Pullman et al. (2009), potential strategies for the relationships can be minimising emissions, effluents and wastes; minimising the life cycle cots of the products; minimising environmental burden of firm growth and development. By linking sustainability to strategic human resource management Ehnert (2009) shows how sustainability in human resource management can be utilised for 'social value creation' as well as 'economic value creation' leading to the creations of sustainable competitive advantages. RbV is employed in this research for optimising strategies to mitigate blended value requirements for e-business sustainability. Mitigation strategies are optimised based on the prioritised blended value requirements and organisational resource constraint.

3.8 CONCEPTUAL FRAMEWORK

It has been argued by the scholars that long-term profitability is best served by balancing it with social and environmental goals (Hart and Milstein 2003; Porter and Kramer 2011; Dao, Langella and Carbo 2011). Scholars presage that if the businesses do not deliver against all three bottom lines as mentioned in TBL, the stock price, the profits, and the entire business could suffer (Norman and MacDonald 2004).

To be sustainable organisations need to ensure that their strategies fulfil the value requirements of all stakeholders including its customers and the firm itself. In this regard, Stakeholder Theory asks the management of the business to maintain a balance among the conflicting interests and claims of stakeholders. If a balance cannot be ensured, organisational sustainability will be questioned.

Literature shows that adopting sustainability strategy assists firms in delivering sustainable values and gaining sustained competitive advantage (Hart and Milstein 2003; Porter and Kramer 2006). Enabling sustainability strengthens organisational competitiveness by enabling its unique resource capabilities (Starik and Kanashiro 2013). But resource availability or capability plays an important role in implementing sustainability strategies. Businesses that can manage to align business and ICT using their unique mix of company-specific resources create a resource-based view alignment capability that can lead to a sustainable competitive advantage (Cumps et al. 2006).

Previous studies have confirmed that e-business has changed the way we do business nowadays. Since e-business relies on ICT, the positive and negative impacts of ICT on society and environment have been given the greater attention recently by the scholars. Stakeholders of the business now are not pleased only with the economic benefits, instead, they demand dynamic balance among the three mutually inter dependent elements, which are economic efficiency, protection of ecosystems and natural resources, and consideration of social wellbeing. As stated in Section 3.3, empirical studies have already confirmed the importance of relationships between e-business and sustainability (Waage, Shah and Girshick 2003).

Literature review also reveals that in addition to the identification and selection of blended value requirements, development and selection of appropriate mitigation strategies or design requirements for mitigating the blended value requirements is very crucial for achieving sustainability. According to Kulatilaka and Venkatraman (2001), many e-businesses fail because they have taken the dive into the ICT without considering some crucial factors for their strategic and operational success. That is why Borges et al. (2009) advocate, companies must develop a strategic plan for ICT to improve the company's e-business capabilities of any kind. Given the recognised role of ICT resources in enabling business capabilities, it is arguable that ICT resources should be critical in enabling firms to develop capabilities to address sustainability issues, deliver sustainability values to stakeholders, and gain sustained competitive advantages (Dao, Langella and Carbo 2011). Pullman et al. (2009) argue that development of sustainability strategies are important as they could allow businesses to not only differentiate their products but also earn above normal returns that would apply to both economic and other sustainable performance criteria. Thus, sustainability issue has to be a core part of the e-business strategy. According to Glavas and Mish (2014), a firm's sustainability is manifested in the strategies and operating practices that it develops to operationalize relationships with and impacts on stakeholders and the natural environment. Businesses may need to engage in wide ranging activities, such as, re-designing business processes and changing business culture, to develop capabilities of the company to address sustainability issues (Hart and Milstein 2003). For instance, a key contribution of companies to sustainability is the reduction of pollution (Holliday, Schmidheiny and Watts 2002a) and this key contribution of companies happens through strategies that reduce the impacts on air, water, and land (GRI 2011). Assuring sustainability in the organisation also requires strategies like 'constant vigilance' from planners, managers, and others (Goldsmith and Brinkerhoff

1990, p.229). A few studies attempt to focus sustainability issues; however, there is a dearth of study on developing strategies and capabilities to achieve sustainability of e-business. Moreover, none of the studies show how strategies can be optimised for sustainability based on the firm's resource capability. Thus, further study is required to bridge the knowledge gap analogous to optimal strategies for e-business sustainability based on organisational resource capability.

As stated earlier in Section 3.3 that literature is still silent on e-business sustainability. The review of literature reveals that though 'sustainability of ICT' or 'e-business sustainability' is a contemporary research problem, insight on this issue is very limited (Melville 2010). It is also mentioned earlier that only a limited number of studies are available in the literature which partially relate to the topic of 'e-business and sustainability' aspects, such as , 'environmental impact of e-business and ICT' (e.g., Yi and Thomas 2007; Haigh and Griffiths 2008; Elliot and Binney 2008; Melville 2010; Houghton 2009; Chen, Boudreau and Watson 2008; Haigh 2004), 'e-business and sustainable development' (e.g., Yi and Thomas 2006), 'Green IT/ICT' (e.g., Wati and Koo 2011; Jenkin, McShane and Webster 2011; Dao, Langella and Carbo 2011), 'ICT/IS and sustainability' (e.g., Erek et al. 2009; Schmidt et al. 2009; Waage, Shah and Girshick 2003; Hilty 2008), 'ICT and sustainable development' (e.g., Hilty and Hercheui 2010; Watson, Boudreau and Chen 2010; Hilty, Seifert and Treibert 2005; Fuchs 2008) of which most of them are conceptual. A few more studies can be found in the literature around the topic 'ICT and sustainability', but none of them clearly states how their conceptual framework can be implemented successfully for improved sustainability performance in the context of e-business which can mitigate the blended value requirements along with the consideration of organisational resource constraint.

The literature review and discussion above (Section 3.2 to Section 3.8) clearly establishes the importance of e-business sustainability and fulfilment of blended value requirements. In this circumstance, therefore, such a model needs to be developed for e-business sustainability which will mitigate the blended value requirements to meet the stakeholders' demand by developing and optimising strategies based on the organisational capability. This research aims to develop a model for e-business sustainability based on the fulfilment of blended value requirements. In developing the model, this research also considers organisational resource capability for optimising mitigation strategies. The initial research model is presented and discussed in the following section (Section 3.9).

3.9 INITIAL RESEARCH MODEL

Based on the above literature review, conceptual framework, and discussion above (Section 3.2 to Section 3.8) an initial research model (Figure 3.3) has been developed to achieve the research objectives. The research model is divided into two main parts: 'Part A' and 'Part B'. Mitigation strategies are developed and optimised in 'Part A' based on the blended value requirements; and hypotheses are developed and tests are conducted in 'Part B' to see the impact of optimised mitigation strategies on the sustainability outcome.

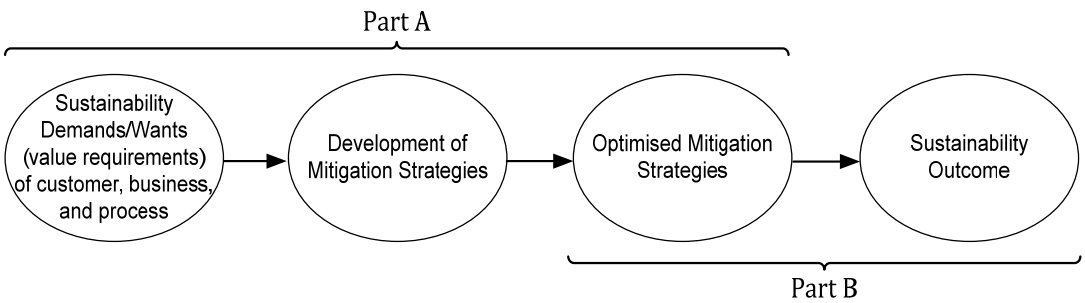


Figure 3.3: Initial overall research model

The initial research model posits that to achieve overall sustainability of e-business each element of the blended value requirements (economic, social, and environmental value requirements of customer; economic, social, and environmental value requirements of business; and economic, social, and environmental value requirements of process) need to be considered and mitigated.

For the mitigations of blended value requirements the strategies need to be carefully developed. Because of the organisational limitations, prioritisation of blended value requirements based on the demand and outcome of the sustainability elements is essential while developing the mitigation strategies.

Since multiple value requirements can be impacted or mitigated fully or partially by a single strategy, the identified mitigation strategies need be optimised based on how many value requirements are impacted by each strategy and to what extent. In addition, since every e-business has resource limitations, consideration of organisational resource constraint is necessary while optimising these strategies. Moreover, implementations of simultaneous strategies may result in some savings for the e-business. Therefore, consideration of savings from the simultaneous

implementations of strategies may influence the decision of identifying optimal strategies for sustainability.

3.10 SUMMARY

This chapter has been presented with the literature review which addressed the various aspects of the relevant research. The chapter discussed the previous studies relevant to sustainability of business and e-business. Then it addressed and discussed three dimensional requirements regarding e-business sustainability followed by the blended value requirements. The theoretical grounding of the study has been postulated through the reviews of relevant theories: TBL, Stakeholder Theory, and RbV. Relying on the literature review and the theoretical foundations a conceptual framework was developed. Finally, based on the conceptual framework a preliminary research model was developed which is further fine-tuned and contextualised based on the field study.

CHAPTER 4

RESEARCH METHODOLOGY AND DESIGN

4.1 INTRODUCTION

A review of relevant literature is presented in Chapter 3 that laid the groundwork for developing a conceptual model of this study. This chapter is aimed at providing an overview of the research approach utilised within this research domain, which leads to the selection of an appropriate research-approach for guiding the research.

Most of the scholars in the area of e-business/IS/IT sustainability have employed qualitative method (Daniel et al. 2004; Haigh 2004; Melville 2010; Watson, Boudreau and Chen 2010; Dao, Langella and Carbo 2011; Elliot and Binney 2008; Elliot 2011; Waage, Shah and Girshick 2003). However, for the purpose of systematic empirical investigation of phenomena via statistical, mathematical or numerical data quantitative research is also essential. Moreover, quantitative research can be enriched by the contribution from qualitative research (i) by identifying salient variables to be examined; (ii) by facilitating the sampling design; and (iii) by helping to explain the quantitative findings. According to Gorard and Taylor (2004), a combination of both qualitative and quantitative methods, which is referred to as the 'mixed method' research has been identified as a "key element in the improvement of social science, including education research" (p.7) with research strengthened by the use of a variety of methods (Mackenzie and Knipe 2006). Therefore, to understand the research topic, to validate and understand the conceptual model, and to obtain and analyse data, a combination of both qualitative and quantitative methods, or 'mixed method' (Babbie 2004) was applied in this research.

To addresses the rationale and the justification of the mixed method in the current research, the research paradigm is discussed at the beginning of this chapter. Then, the definition and research design of the mixed method is discussed. In the following section, the research process is described which includes data collection phases for qualitative and quantitative analyses. The final section offers a summary of the chapter.

4.2 RESEARCH PARADIGM

Research refers to a systematic investigation (Burns 1997) or inquiry whereby data are collected, analysed, and interpreted in some way in an effort to "understand, describe,

predict or control an educational or psychological phenomenon or to empower individuals in such contexts" (Mertens 2005). A conceptual framework is provided by a research paradigm (Bogdan and Biklen 1998) which reflects how a research is designed, how data is collected, interpreted, and how the findings are presented. Thus, a paradigm can be viewed as a set of basic beliefs, which guide the action of the researchers to recognize their role in the research process with a disciplined enquiry (Guba 1990; Guba and Lincoln 1994). There are three underlying paradigm in the domain of IS research that researchers can select in order to guide a particular research. These are positivist, interpretivism, and critical research (Orlikowski and Baroudi 1991; Mingers 2001, 2003; Onwuegbuzie and Leech 2007).

Positivist paradigm is sometimes referred to as 'scientific method' or 'science research' (Mertens 2005) and "reflects a deterministic philosophy in which causes probably determine effects or outcomes" (Creswell 2003, p.7). In the research, if there is evidence of formal propositions, quantifiable measures of variables, formulation of hypothesis, hypothesis testing, and drawing of inferences about a phenomenon from the sample to a stated population then the it can be called as positivist research (Orlikowski and Baroudi 1991). Mertens (2005, p.12) asserts that although qualitative methods can be used within this paradigm, quantitative methods tend to be predominant. Positivists aim to test a theory or describe an experience "through observation and measurement in order to predict and control forces that surround us" (O'Leary 2004). The positivist approach believes that every scientific concept or research idea can be objectively observed and measured and no scientific concept or research idea is so abstract that it cannot be measured or observed (Hessler 1992). The positivist researcher perceived that “the data and its analysis are value-free and data do not change because they are being observed” (Krauss 2005, p.760). In other words, positivist paradigm is associated with the quantitative research method where hypotheses formulation and hypothesis testing is essential (Creswell 2003; Johnson and Onwuegbuzie 2004).

The second view of a paradigm in conducting research is the interpretivist paradigm. Interpretivist research tries to obtain an understanding of phenomena (Smith 1983) and to see all things as 'becoming'. Researchers in this paradigm tends to rely upon the "participants' views of the situation being studied" (Creswell 2003, p.8) and recognises the impact on the research of their own background and experiences. As interpretivists are more concerned to understand individuals' perceptions of the world, they assume that the personal nature of social constructs can be extracted and refined through the

interaction of researchers and the research subject (Guba and Lincoln 1994). Therefore, interpretivist researchers see the reality and thus have to plunge into the actor's mind by feeling, hearing and observing how the actor interprets a thing (Schwandt 1994). In contrast with the positivist paradigm, the interpretivist researchers see all things as 'becoming' as opposed to 'being' (Krauss 2005). In terms of research design, qualitative research is normally adapted by the interpretivist researchers.

The third paradigm is called critical analysis. This paradigm generally focuses upon the opposites, conflicts, and contradictions (Myers 1997). The rigor of this type of research is evaluated in terms of quality standards that are very different from those of the positivist paradigm but which are congruent with the standards of the interpretive paradigm. In terms of research design, critical analysis mostly follows the qualitative approach though quantitative approach is increasingly becoming prominent.

The variation in usage of these underlying paradigms within IS research is reported by Dwivedi (2007). In 1991, a study by Orlikowski and Baroudi's (1991) found that most of the studies (96.8%) used positivism paradigm, only 3.2% employed interpretive epistemology, and none of the (observed) studies employed critical analysis epistemology. However, later in another study Mingers (2003) found that 75% of the information systems research employed a positivist approach, 17% used interpretivist and only 5% were critical research.

The research paradigm and research method of this study were determined by its objective, nature, and research context. The positivist paradigm was considered as the appropriate paradigm for this study as this research provides evidence of hypotheses, quantifiable measures of variables, hypotheses testing, and the drawing of conclusions about a phenomenon from the sample to a stated population. Within positivist paradigm the mixed-method (Babbie 2004) approach was employed in this research.

There are some important reasons for employing mixed-method approach in this research. The research domain of e-business sustainability is very new and is far away from maturity. Though a limited number of research can be found on sustainability of IT/IS/ICT, research on e-business sustainability is very rare. For this reason, theoretical factors and variables of this study were needed to be borrowed from other similar established sustainability studies, such as, sustainable IT, sustainable IS management, green IT, environmental ICT, and more. Since the banking industry uses ICT intensively, it will be quite optimistic assumption that those factors can effectively

be utilised to deal with e-business sustainability in the context of banking industry. Almost all the previous studies and major models in this research area have been conducted in the context of developed countries and attracted less attention by the developing and under developed countries like Bangladesh. But the proposed research models must be tested for its application in the wider world. Also it needs to be tested in the third world countries like Bangladesh to ensure that the model is an adequate reflection of the environment being studied. Therefore, considering the cultural and environmental differences, the construct and dimensionality represented in the existing literature might not be appropriate in non-western applications (Singhapakdi et al. 2000). Moreover, the sustainability of e-business in the service (banking) industry is likely to be different than that in other industry (e.g. manufacturing). Therefore, the widely acceptable factors need to be confirmed by a group of representatives involved in the banking industry. This confirmation process can be completed by qualitative study.

However, using only a qualitative approach raises the issue of transferability of the data. Since there are only a limited number of people involved in the qualitative study, the generalization of the findings cannot be proposed (Mustamil 2010). Employing only qualitative study may generate social desirability bias, too (Podsakoff et al. 2003; Meade, Watson and Kroustalis 2007). Thus, a quantitative study is essential. The rationale for a quantitative study is very strong for this study. Since the customers, strategic managers, and process managers of a company have their own perceptions, perspective, expectation, and experience, the perspectives on e-business sustainability issue can be very subjective. In addition, there are a number of other factors that contribute to such decision. Furthermore, conducting field study interviews of a large number of respondents that can represent the whole industry is time consuming, effort-driven, and not an effective way. A quantitative survey study could produce results in an efficient manner.

To ensure the appropriateness of the selected method for this study special attention was given in adapting a suitable paradigm. It is noted that in the existing e-business/ ICT sustainability research, most of the paradigms that have been used were interpretivist (qualitative) paradigm and only a very few of them have employed the positivist (quantitative) paradigm. This circumstance might create an incompatibility between theory and practice. Therefore, a mixed method was adopted for this study based on the above mentioned reasons.

4.3 CASE STUDY APPROACH

"A case study approach is not a method as such but rather a research strategy" (Hartley 1994, p.209), depending on the "choice of object to be studied" (Stake 2000, p.435). "In general, case studies are the preferred strategy when 'how' and 'why' questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context" (Yin 1994, p.1). Both Yin (1994) and Eisenhardt (1989) agree that the case study contributes uniquely to our understanding of individual, organisational, social, and political phenomena. According to Yin (1994, p.3), "the case study allows an investigation to retain the holistic and meaningful characteristics of real-life events, such as individual life cycles, organisational and managerial processes, neighbourhood change, international relations, and the maturation in the industries". As this study is concerned with the understanding of 'real-life events' within the organisational change process, the case study approach was considered as the appropriate method for this research.

In determining the correct use of a case study strategy Yin (1994, p.4) raised three conditions: (i) the type of research question posed; (ii) the extent of control an investigator has over actual behaviour events; and (iii) the degree of focus on contemporary as opposed to historical events. Case studies can be both qualitative and quantitative, based on the explanatory basis and nature of the question. According to Stake (2000), a case study can be used for four distinct purposes, which are: (a) Intrinsic case study (study is undertaken for a better understanding of a particular case); (b) Instrumental case study (a particular case is examined to provide insight into an issue); (c) Collective case study (a number of cases are studied jointly in order to enquire into the phenomenon, population, or general condition); and (d) Teaching (generally used to illustrate a point, a condition, a category, for instruction). This study uses a case of a commercial bank to exemplify the application of developed model for e-business sustainability. Since this study examines a particular case to provide insight into the issue of e-business sustainability, principles of 'instrumental case study' were employed in developing the research design of this study.

4.4 RESEARCH METHOD

This research adopted a combination of both qualitative and quantitative methods which is commonly referred to as 'mixed method' (Tashakkori and Teddlie 1998). Mixed method has been defined as "a type of research design in which QUAL and QUAN

approaches are used in types of questions, research methods, data collection and analysis procedures, and/or inferences" (Tashakkori and Teddlie 2003, p.711). Greene et al. (1989, p.25) defined the mixed method as "studies that include at least one quantitative method (designed to collect numbers) and one qualitative method (to collect words), where neither type of method is inherently linked to any particular inquiry paradigm". The rationalization for employing mixed method is to provide more in-depth understanding of the research problems and questions than the use of a single method by itself (Creswell 2003). This is due to the fact that each method, either qualitative or quantitative, has its own limitations. More specifically, mono-method study will "inevitably yield biased and limited results" (Greene, Caracelli and Graham 1989, p.2). Moreover, combination of both methods provides cohesive and coherent outcomes as each method has its own strength to provide relevant data (Hohenthal 2006). In this regard, Greene and Caracelli (1997) assert that the results from one method can facilitate the development of the other method, as well as the explanation of their findings. That is why mixed methods researches are considered competent in the full spectrum of research methods and approaches to select the best paths for answering the research questions (Teddlie and Tashakkori 2012). It is also believed that the combination of quantitative and qualitative data provides a very powerful mix (Babbie 2010). The strong foundation for a theoretical background is provided by the quantitative method, whereas real insights into the real issues for real people are provided by the qualitative methods. Thus, both methods are capable of strengthening research results and contributing to the knowledge on e-business sustainability.

According to the literature, there are four major types of the mixed method research design: (i) the triangulation design; (ii) the embedded design; (iii) the explanatory design; and (iv) the exploratory design (Creswell 2003). The first design (triangulation) proposes that the researcher should collect and compare the data from both qualitative and quantitative methods to "validate or expand quantitative results with qualitative data" (Creswell 2003, p.62). Both qualitative and quantitative data is collected in the second design (embedded) but one of the data types plays a supplemental role within the overall design (Creswell 2003, p.68). The collection and analysis of quantitative data followed by the subsequent collection and analysis of qualitative data is proposed by the third design (explanatory) (Creswell 2003, p.72); and the fourth design (exploratory) starts with qualitative data, to explore a phenomenon, and then builds to the second, the quantitative phase (Creswell 2003, p.77).

It is important to reflect upon the objectives of the current research to determine the appropriate mixed method to be adopted. As discussed in Chapter 1, the main aim of this research is to explore the antecedent factors of e-business sustainability and their mitigation approaches using optimised strategies. The initial model (Figure 3.3) of this research is proposed in Chapter 3 based on the previous theoretical background and frameworks. This model must be tested in terms of its applicability and validity in order to provide sufficient justification to explain the associated attributes. Therefore, a field study using semi-structured interviews is exercised. Finally, a survey is carried out to test the comprehensive model to ensure its generalizability and to improve its explanatory power. The details of the process are in the next section. Based on the description of the process, and the objectives of the research, the QUAL-QUANT research design is adopted which is more related to exploration. This design allows the data from both qualitative and quantitative methods to be compared and merged during the analysis to increase the feasibility of the research. Triangulation design has been accepted as the most common approach in mixed methods (Creswell 2003).

4.5 OVERVIEW OF THE RESEARCH PROCESS

As mentioned above, this research employed the mixed method approach. The research process for this study is divided into a number of phases. The whole research process of this study is diagrammatically exhibited in Figure 4.1.

The first step of the research process is the review of current literature and studies to identify the issues, key landmarks and gaps in the area of e-business sustainability. This stage of the study explores the potential key variables in this research area in order to develop a conceptual initial research model. Every possible and available knowledge repositories were used for literature review including journals, books, seminar proceedings, working papers, and case studies.

In the second step, a preliminary research model on e-business sustainability was constructed based on the review of the existing literature. The evaluation and evolution of the initial model was a continuous process refined by current publications.

In the third step of the research process, qualitative field study through interviews was conducted with six managers (strategic and IT) and five customers (corporate and retail) of the case bank (i) to search and identify concepts and procedures that might

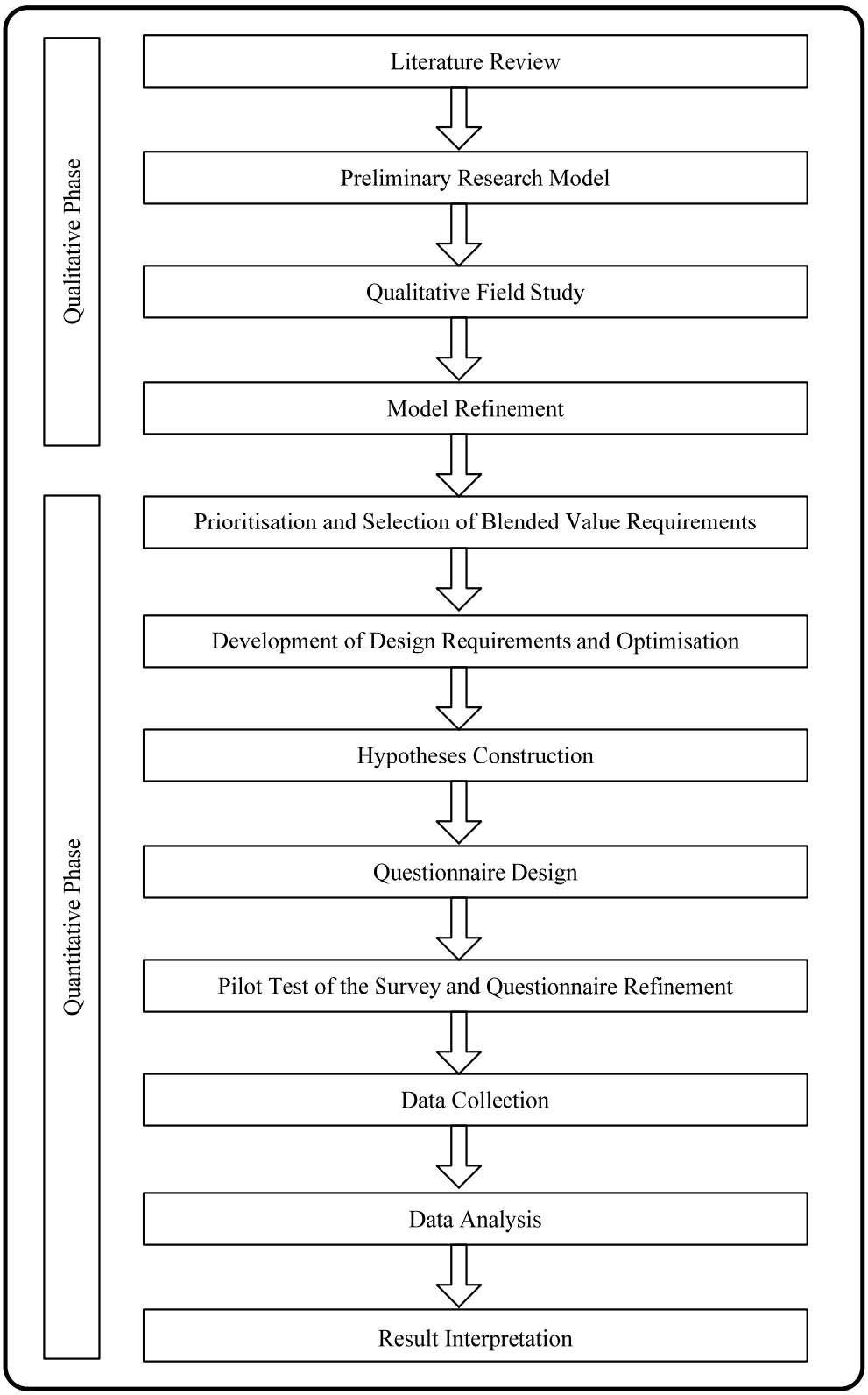


Figure 4.1 The sequential presentation of the research approach

not be reported or acknowledged in the literature review, and (ii) to evaluate the worthiness of the concepts identified in literature review.

The preliminary model that was developed in step one was refined in the fourth step based on the results from qualitative data analysis and the literature review. In this step, essential additions of items or constructs, as well as elimination of the redundant constructs and items were completed. Then the research model was finalized.

The fifth step of the research process prioritises the blended value requirements by interviewing customers (corporate and retail), strategic managers, and IT managers of the case bank. AHP was used for prioritising the blended value requirements.

Based on the prioritised blended value requirements, mitigation strategies were developed in step six through conducting interviews with the strategic managers of the case bank. Then those mitigation strategies were prioritised employing QFD analysis and were optimised employing non-linear quadratic integer programming.

In step seven, the hypotheses were constructed based on the final research model, optimised mitigation strategies and their contributions to the prioritised blended value requirements. A total of seven hypotheses were developed. The relevant theories from the literatures were used for guiding the hypotheses construction.

A tentative questionnaire was developed in the next step (eight) based on the seven hypotheses that were constructed in step seven. The available instruments developed in the past literature were used for the measurements in the questionnaire. There were a total of 53 measurement items and 6 constructs that were subjected to a pre-test for the validity and reliability before conducting the survey.

Before widely conducting the survey, the tentative questionnaire was pre-tested and refined. These processes were completed in step nine. For pre-testing process, a total of 8 questionnaires were distributed among three groups of people (researchers, general people, and potential respondents) as suggested by Frazer and Lawley (2000). The objective of the pre-test is to check the expertise in the relevant field in order to improve the content validity. Then based on the feedback from the pre-test necessary changes were made to refine the tentative questionnaire. After the refinement the questionnaire was finalised to be distributed among the respondents for survey.

In step ten, the data was collected for quantitative analysis. The data was collected from the branch offices of the case bank. A total of 225 respondents were targeted and 219 valid responses were collected. The number of valid responses satisfied the required number of data required for the analysis.

Data collected in the above step was analysed in the next step (eleven). Data received through survey was analysed using SPSS (Statistical Package for the Social Sciences) and PLS (Partial Least Square) based SEM (Structural Equation Modelling) (Chin 1998a; Barclay, Higgins and Thompson 1995). The SPSS was employed for producing descriptive statistics of the data and PLS for testing data validity and the hypotheses.

In the final step of the research process, the results were interpreted both from the qualitative and the quantitative data analysis.

4.6 QUALITATIVE FIELD STUDY

As mentioned earlier, a preliminary research model on e-business sustainability was constructed based on the review of the existing literature. Initial research model (Figure 3.3) includes identification and contextualisation of blended value requirements. Because of the exploratory nature of this part of the research the qualitative method is considered as the most appropriate. In the qualitative phase of this research the field study approach was adopted as the research method (Zikmund et al. 2013). The reason for employing this approach is to search for and identify blended value requirements related to e-business sustainability in the context of Bangladesh that might not have been identified in the literature review. The power of qualitative research lies in its emphasis on discovery, insight, and understanding from the perspectives of those being studied. Thus, it offers the maximum potential of making a significant contribution to the contemporary knowledge and practice in the real world (Mustamil 2010). The comprehensive qualitative study is presented in Chapter 5.

4.6.1 Sample Selection

Zikmund (2013) confirms that convenient sampling procedure is the appropriate procedure in business research. Thus, this procedure was initially used as the sample selection for the field study. In selecting the sample, it was made sure that respondents were heavily involved with the case bank either as a customer or as an employee. Strategic and IT managers of different levels were used as samples for business value requirements information and process value requirements information. Similarly, both corporate and retail customers were selected for customer value requirements information.

4.6.2 Data Collection

For the collection of qualitative data, semi-structured in-depth interview technique was used. This method is commonly used by social scientists for collecting data in qualitative research. The key benefits of using interviews in qualitative data collection are the capacity to generate in-depth data and flexibility to use it with eases anywhere (King 1994). Rubin and Rubin (2011) advised that a semi- structured interview is appropriate to explain the answers from the initial questions. To provide a structure for the data collection interview guidelines were first developed which was constructed by integrating the constructs from the initial research model. Three different sets of questions were developed for qualitative study for interviewing three types of respondents: customers, strategic managers, and process managers. The interview questions for customers focus on the sustainability value requirements (economic, social, and environmental) of customers. Similarly, questions for interviewing strategic managers concentrate on the sustainability value requirements of business and questions for interviewing process managers concentrate on the sustainability value requirements of process. Since the participants involved in these interviews were not from English background, they were given option to use either English or Bengali (Bangladeshi language) during the interviews for responding to the questions. The complete interviews were recorded with permission and were converted from the voice recording into text (interview transcript). Then the interview transcripts were translated from Bengali to English. The details of the interviews are presented in Chapter 5 in the field study section of this research.

4.6.3 Data Analysis Technique

For this study, content analysis method was used for qualitative data analysis (Quaddus and Xu 2005). The main reason for undertaking content analysis technique was to extract necessary factors and variables of the study. The content analysis process involves identifying the categories related to research, sorting the occurrences into categories, and counting the occurrences of each of the categories. Two phases of analysis were employed namely 'inductive phase' and 'deductive phase' to get the quantitative elements for the research. All the blended value requirements produced by the analysis and the literature review were justified as per rule of the qualitative study. The findings from the analysis were compared and combined to the initial research model (see Chapter 3) to develop the comprehensive research model.

4.6.4 Model Refinement and Comprehensive Research Model

To develop the final research model the initial proposed model was refined after the qualitative data analysis was completed. Utilising the outcome of the field study, field study research models were developed in order to refine the initial model. To establish the field study models and to determine the links between them, similar variables and factors were combined into one using an integrated technique. Thus, a new comprehensive research model for e-business sustainability was developed by comparing factors and variables in terms of their similarities and differences, and by determining the links between the initial research model and relevant literature. The comprehensive model consists of two prone analyses: 'Analysis Part 1' and 'Analysis Part 2'. Mitigation strategies development and optimisation based on QFD analysis are completed in 'Analysis Part 1', and hypotheses development and tests are completed in 'Analysis Part 2'. Both of these analyses are quantitative in nature. Chapter 6 is presented with the 'Analysis Part 1' and Chapter 7 is presented with the 'Analysis Part 2'.

4.7 ANALYSIS PART 1: BLENDED VALUE REQUIREMENTS SELECTION, MITIGATION STRATEGIES DEVELOPMENT, AND OPTIMISATION

This section describes the QFD based research analysis which is quantitative in nature. Blended value requirements selection, mitigation strategies development, and optimisation using non-linear quadratic integer programming method are completed in this section.

After completing the qualitative study, the blended value requirements for e-business sustainability were identified and categorised. Since all the blended value requirements were not equally important to the case bank, they needed to be prioritised according to their importance for achieving sustainability. Therefore, all the blended value requirements were prioritised using AHP for QFD analysis (Park and Kim 1998). After prioritisation process, mitigating strategies were developed for the prioritised blended value requirements. Then, strategies were optimised using QFD analysis and non-linear quadratic integer programming methods. Data required for mitigation strategies development and optimisation is collected by conducting field study with the strategic managers of the case bank. The details of blended value requirements selection, mitigation strategies development and optimisation using QFD analysis and non-linear

quadratic integer programming methods (Park and Kim 1998) are presented in Chapter 6. The steps used for the analyses are discussed below:

4.7.1 Prioritisation of Blended Value Requirements using Analytic Hierarchy Process (AHP)

QFD analysis requires the identified blended value requirements to be prioritised according to their importance. AHP (Analytic Hierarchy Process) is one of the widely used techniques used for prioritising preferences. For example, Javagli et al. (1989) and Ta and Har (2000) used AHP to assess customer preferences for bank selection. Accordingly, this research used AHP to prioritise the blended value requirements. The details of AHP process is described below.

4.7.1.1 Sample Selection and Data Collection

The data necessary for prioritisation process is collected by conducting field study with the customer and strategic managers of the case bank. Since blended value requirements include customer value, business value, and process value, selection of participants was made based on the beneficiary of value types and the position of the participants. Thus, customers, strategic managers, and process managers of the case bank were selected as the participants for data collection.

4.7.1.2 Analytic Hierarchy Process (AHP)

AHP, developed by Saaty (1977; 1980), is an established multi-criteria decision making approach that employs a unique method of hierarchical structuring of a problem and subsequent ranking of alternative solutions by a paired comparison technique. AHP is a powerful and widely used multi-criteria decision-making technique for prioritising decision alternatives of interest (Park and Kim 1998). It allows decision-makers to model a complex problem in hierarchical structure showing the relationships of the goal, objectives (criteria), sub-objectives, and alternatives. This study uses AHP to prioritise the blended value requirements for QFD analysis. AHP is frequently used in the QFD process, for example, Georgiou et al. (2008), Han et al. (2001), Das and Mukherjee (2008), Lu et al. (1994), Armacost et al. (1994), Park and Kim (1998), Mukherjee (2011), Köksal and Egitman (1998), Bhattacharya et al. (2005), Hanumaiah et al. (2006), Lam and Zhao (1998), Chan and Wu (1998), Han et al. (2001), Xie et al. (1998), Wang et al. (1998) and others.

Modelling with hierarchy or tree is not a new concept. The developer of AHP, Saaty, proposed that AHP has some unique modelling features that deserve attention. Chowdhury et al. (2012), Das and Mukherjee (2008), Zhang et al., (1998), Lu et al., (1994), Armacost et al., (1994), and many more scholars applied the AHP to determine the degree of importance of customer requirements. Through weighting and synthesizing of different levels, AHP provides the best solution as perceived by the decision makers. AHP enables decision makers to derive ratio scales priorities or weights as opposed to arbitrarily assigning them. Therefore, AHP allows incorporating objective and subjective considerations in the decision process (Forman 1983). According to other scholars, the strengths of AHP is lied on its robust and well tested method of solution and its capability of incorporating both quantitative and qualitative elements in evaluating alternatives (Das and Mukherjee 2008). Furthermore, it is believed that AHP is a compensatory decision methodology since alternatives that are efficient with respect to one or more objectives can compensate by their performance with respect to other objectives (Forman and Selly 2001). It is noted that AHP does not optimise, it provides 'satisfactory' solutions. To analyse a hierarchy, AHP has two distinct phases: weighting and synthesizing.

In this current application, this research approach used a Decision Support System (DSS) based on AHP, which is known as "Expert Choice 11" (Expert Choice Inc. 2004). It is noted that weighting and synthesizing schemes are handled by the Expert Choice software. In synthesizing, all the pairwise comparisons are completed by the user. The rest are done by this DSS software. Expert Choice is very user-friendly software with excellent graphic features. Therefore, all the blended value requirements were weighted and synthesised using "Expert Choice 11" software package to get actual blended weight of each of them.

4.7.2 Development and Selection of Mitigation Strategies

This section explains the sample selection and data collection processes for mitigation strategies development.

4.7.2.1 Sample Selection and Data Collection

After completing the AHP analysis for prioritising the blended value requirements, the literature was reviewed and the managers who are involved in decision making of the company were selected for developing and selecting the strategic initiatives for the mitigation of those selected value requirements; and for determining the mitigation

impact of each strategy on the blended value requirements. A total of 3 strategic managers from the top management of the case bank were selected for these tasks. Non-probability sampling or convenience sampling was employed in this regard (Babbie 2010) as this technique provides the means to approach the participants more conveniently (Cavana, Delahaye and Sekaran 2001). The managers were asked to develop and select the strategies (MS) for the mitigation of those value requirements.

4.7.2.2 Mitigation Strategies Development

To develop the initial mitigation strategies corresponding to the blended value requirements, the relevant literature was thoroughly reviewed. Then the participants were contacted and requested to sit together along with the researcher for a discussion to select appropriate strategies for the mitigation of all selected value requirements. After an extensive discussion with the participants on the blended value requirements specific mitigation strategies were selected. Each of those strategies were then justified by the field study data and literature review.

4.7.3 Determining Optimal Mitigation Strategies using Quality Function Deployment (QFD)

This phase of the research deals with the 'Part A' of overall research model (see Figure 3.3 in Section 3.9). Mitigation strategies are developed and optimised in this phase of the research based on the prioritised blended value requirements.

4.7.3.1 Sample Selection and Data Collection

For the optimisation of mitigation strategies, a total of 3 strategic managers from the top management of the case company were selected as the respondents by employing non-probability sampling or convenience sampling (Babbie 2010). convenience sampling method was adopted as it provides the means to approach the participants more conveniently (Cavana, Delahaye and Sekaran 2001). The respondents were used to identify the degree of relationships between the mitigation strategies, and to decide about the approximate relative costs of implementing the strategies individually and simultaneously including the cost savings.

4.7.3.2 Finalising Blended Value Requirements for QFD Analysis

It is revealed from the field study analysis and discussion of the participants that some of the blended value requirements in the prioritised list are same or very similar to

some other value requirements. The participants also agreed on the fact that some of the blended value requirements can be mitigated by the same strategies. Moreover, it is also normal that some of the value requirements may carry very little weight compared to their similar value requirements in the prioritised blended value requirements list. Therefore, it was decided that if any of the value requirements is carrying low weight and it's signifying other value requirement is carrying greater weights, and if they can be mitigated by the same strategy, then value requirement/s with low weight will not be considered and the value requirement/s with greater weight will be considered with other unique value requirements for the QFD analysis.

4.7.3.3 Overview of QFD

QFD was laid out in the late 1960s to early 1970s in Japan by Akao (1990). QFD is based on collecting and analysing the voice of the customer that help to develop products with higher quality and meeting customer needs (Delice and Güngör 2010). After introducing the concept of QFD in the US through auto manufacturers and part suppliers (Sullivan 1986), many US firms, such as Procter & Gamble, Raychem, Digital Equipment, Hewlett-Packard, AT&T, ITT, GM and Ford, applied QFD for improving communication, product development, and measurement of processes and systems (Ansari and Modarress 1994). The popular application fields of QFD are product development, quality management and customer needs analysis; however, the utilisation of QFD method has spread out to other manufacturing fields in time (Chan and Wu 2002). Recently, companies are successfully using QFD as a powerful tool that addresses strategic and operational decisions in businesses (Mehrjerdi 2010). This tool is used in various fields for determining customer needs (Stratton 1989), developing priorities (Han et al. 1998), formulating annual policies (Philips, Sander and Govers 1994), manufacturing strategies (Crowe and Cheng 1996; Jugulum and Sefik 1998), and environmental decision making (Berglund 1993). Chan and Wu (2002) and Mehrjerdi (2010) provide a long list of areas where QFD has been applied. The basic concept of QFD is to convert the Value Requirements (VRs) into product design or engineering characteristics, and subsequently into parts characteristics, process plans and production requirements; and each conversion uses a matrix, called the house of quality (HoQ), for identifying value requirements and establishing priorities of mitigation strategies to satisfy the value requirements (Park and Kim 1998). Therefore, it can be used to analyse customer needs, business needs, and process needs. QFD, in this approach, will be applied as the main tool to analyse customer value requirements, business value requirements, and process value requirements for determining optimal

mitigation strategies based on the technical ratings and the correlations of the strategies to satisfy the blended value requirements for the sustainability of the businesses.

In QFD modelling, 'value requirements' are referred as WHATs and 'how to fulfil the value requirements' are referred as HOWs. The process of using appropriate HOWs to meet the given WHATs is represented as a matrix. Different users build different QFD models involving different elements but the most simple and widely used QFD model contains at

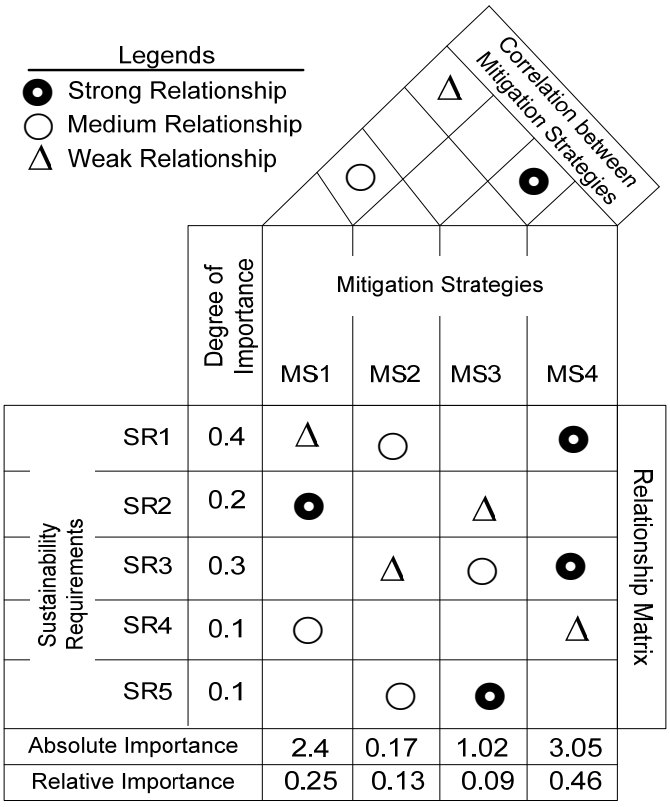


Figure 4.2: A basic QFD layout [adapted from Park and Kim (1998)]

least the value requirements (WHATs) and their relative importance, technical measures or mitigation strategies (HOWs) and their relationships with the WHATs, and the importance ratings of the HOWs. At least five sets of input information is required in a basic QFD model: (i) WHATs: attributes of the product as demanded by the customers, (ii) IMPORTANCE: relative importance of the above attributes as perceived by the customers, (iii) HOWs: design attributes of the product or the technical descriptors, (iv) CORRELATION MATRIX: interrelationships among the mitigation strategies, and (v) RELATIONSHIPMATRIX: relationships between WHATs and HOWs

(strong, medium or weak)(Mukherjee 2011) (see Figure 4.2). The following steps are followed in a QFD analysis:

Step 1: Identification of value requirements or problems of organisations that are termed as WHATs;
Step 2: Relative importance ratings of WHATs are determined;
Step 3: Mitigation strategies (HOWs) are generated;
Step 4: Relationships between WHATs and HOWs are determined;
Step 5: Correlation between mitigation strategies (HOWs) are determined;
Step 6: Initial technical ratings of HOWs are determined;
Step 7: Final technical ratings of HOWs are determined. Lastly, based on the rankings of weights of HOWs the mitigation strategies are selected.

4.7.3.4 QFD Computation: Relationship Matrix Analysis

In QFD process, the relationship between a blended value requirement and a mitigation strategy is described as *Strong, Moderate, Little,* or *No* relationship which are later replaced by values (e.g. 9, 3, 1, 0) to give the relationship needed to calculate the absolute importance (AI) of the strategies. Thus, as shown in Table 4.1, the absolute importance of each mitigation strategy can be determined by the following equation:

$$\boldsymbol{AI_j} = \sum_{i=1}^{n} \boldsymbol{W_i}\, \boldsymbol{R_{ij}} \qquad \forall_j, \quad \boldsymbol{j = 1, \dots\dots, m} \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(2)}$$

Where,

$\boldsymbol{AI_j}$ = Absolute importance of $\boldsymbol{j}$ th mitigation strategy;

$\boldsymbol{R_{ij}}$ = relationship value between the $\boldsymbol{i}$ th sustainability requirement (WHAT) and $\boldsymbol{j}$ th mitigation strategy (HOW);

$\boldsymbol{W_i}$ = weight of the $\boldsymbol{i}$ th sustainability requirement (WHAT) which are derived from AHP calculation;

$\boldsymbol{i}$ = number of sustainability requirements ($\boldsymbol{i = 1, \dots\dots, n}$);

$\boldsymbol{j}$ = number of mitigation strategies ($\boldsymbol{j = 1, \dots\dots, m}$);

In Table 6.8 (Chapter 6), customer value requirements, business value requirements, and process value requirements are considered as part of the blended value requirements. The importance weights of the blended value requirements needed to be calculated, which was done using AHP analysis in Section 6.2, and the relationship weight of the value requirements with the mitigation strategies need to be based on the impact of the each strategy on each value requirements.

According to the QFD matrix the absolute importance of the first mitigation strategy (MS_1) can be determined by the following equation:

$$\boldsymbol{AI_1 = W_1R_{11} + W_2R_{21} + \ \ldots\ldots + W_nR_{m1}}$$

Similarly, the absolute importance (AI) of the ***m***th mitigation strategy (MS_m) can be determined by the following equation:

Table 4.1: QFD relationship matrix

Value Requirements		***AHP Weight***	MS_1	MS_2	.....	MS_m
CRs	*Blended Value Requirements*	W_1	R_{11}	R_{12}	.....	R_{1m}
		W_2	R_{21}	R_{22}	.....	R_{2m}
		⋮	⋮	⋮	⋮	⋮
		⋮	⋮	⋮	⋮	⋮
BRs		⋮	⋮	⋮	⋮	⋮
		⋮	⋮	⋮	⋮	⋮
		⋮	⋮	⋮	⋮	⋮
		⋮	⋮	⋮	⋮	⋮
PRs		⋮	⋮	⋮	⋮	⋮
		⋮	⋮	⋮	⋮	⋮
		⋮	⋮	⋮	⋮	⋮
		W_n	R_{m1}	R_{m2}	.....	R_{nm}
A. I.			AI_1	AI_2	....	AI_m
R. I.			RI_1	RI_2	....	RI_m

***Note**: A.I. = Absolute importance; R.I.= Relative importance; MS= Mitigation strategies; CR= Customer value requirements; BR= Business value requirements; PR= Process value requirements;* AI_m = *Absolute importance of* MS_m ; RI_m = *Relative importance of* MS_m .

$$\boldsymbol{AI_m = W_1R_{1m} + W_2R_{2m} + \ \ldots\ldots + W_nR_{nm}} \ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \ (3)$$

Thus, the relative importance (RI) of the first mitigation strategy can be determined by the following equation:

$$\boldsymbol{RI_1 = \frac{AI_1}{\sum_{d=1}^{m} AI_d}}$$

Where,

$\boldsymbol{RI_1}$ = relative importance of the first mitigation strategy (MS_1) ;

$\boldsymbol{AI_1}$ = absolute importance of the first mitigation strategy (MS_1) ;

Similarly, the relative importance of the $\boldsymbol{m}$th mitigation strategy can be determined by the following equation:

$$\boldsymbol{RI_m} = \frac{\boldsymbol{AI_m}}{\sum_{d=1}^{m} \boldsymbol{AI_d}} \quad \text{.....} \quad (4)$$

Where,

$\boldsymbol{RI_m}$ = relative importance of the $\boldsymbol{m}$th mitigation strategy (MS_m) ;

$\boldsymbol{AI_m}$ = absolute importance of the $\boldsymbol{m}$th mitigation strategy (MS_m) ;

The relative importance of all other mitigation strategies can be determined by following the Equations (2), (3) and (4). Based on the example of first mitigation strategy weight in Equations (3), we can determine the absolute importance weights of all other mitigation strategies.

4.7.3.5 Ranking of Mitigation Strategies by QFD Analysis

As shown above, using Equations (2), (3) and (4) the initial technical ratings, absolute importance, and relative importance of all mitigation strategies can be calculated (see Table 4.1). Based on the absolute importance and relative importance, all the mitigation strategies can be prioritised and ranked. Along with the prioritisation weights of the strategies, cost of implementations and cost-savings from simultaneous implementation of strategies are required for optimisation. Roof matrix analysis and cost analysis were used to obtain cost of implementations and cost-savings from simultaneous implementation of mitigation strategies.

4.7.3.6 Roof Matrix Analysis

Although the relationship matrix of QFD obtains information about relationships between blended value requirements and mitigation strategies, the correlation information between the mitigation strategies was not used in calculating priorities of the mitigation strategies and in determining appropriate mitigation strategies for the value requirements yet. According to Park and Kim (1998), since some strategies are in fact highly correlated with others, for example, change in the level of one strategy affect the levels of the other strategies collaterally, it is necessary to devise a mechanism for accommodating the dependencies of strategies in calculating importance ratings of strategies, and to incorporate the correlation between the strategies into the decision process of determining appropriate strategies subject to some organisational constraints, such as, costs. For example, there may be cost savings in implementing

more than one strategies, if they are highly correlated. For example, the roof matrix shown in Figure 4.2 indicates that there is strong relationship between mitigation strategy 3 (MS3) and 4 (MS4), and there is moderate relationship between mitigation strategy 1 (MS1) and 2 (MS2). Therefore, development of a correlation matrix is necessary to identify the relationships between mitigation strategies and their simultaneous implementations savings.

4.7.3.7 Cost Analysis

For the optimisation process the information about relative cost for each mitigation strategy implementation is required. As mentioned above, not only the relative cost of each strategy but also the cost-savings from simultaneous implementations are required. Data regarding strategy implementation costs and cost-savings from simultaneous implementations were collected by conducting field study. Strategic managers of the case bank were used to determine the approximate relative costs of implementing the strategies. They were also asked to estimate the cost-savings from simultaneous implementations of the mitigation strategies.

4.7.4 Optimisation Using Non-linear Quadratic Integer Programming Method

4.7.4.1 Optimisation Model

While choosing the strategies to implement, the conventional QFD approaches do not consider the trade-offs between the results obtained from the selected strategies and the use of organisational resources, such as cost and time, for the strategies. But it is important to consider organisational resources and constraint for implementing any strategy. Therefore, the need for considering the amount of organisational resources to be used for implementing the strategies was stressed by King (1989). Through optimisation process the most appropriate strategies can be determined based on the importance ratings, cost of implementation, cost-savings, and budget.

To determine the optimal mitigation strategies the importance level of each strategy subject to budgetary constraint including cost-savings were processed and analysed by adopting quadratic integer programming [for the details of quadratic integer programming, see Salkin (1975)]. In this regard, the (0, 1) integer programming model for maximising objective function value can be formulated as follows:

$$Max \int (x) = \sum_{i=1}^{n} AI_i x_i$$

s.t. $\sum_{i=1}^{n} c_i x_i - \sum_{j=1}^{n} \sum_{i>j}^{n} s_{ji} x_j x_i \leq B$ ..... (5)

$x \in X$ and $0, 1$

where,

AI_i = absolute importance of MS_i ;

x_i = 0 - 1 decision variable for MS_i (i.e., if MS_i is selected x_i = 1; if MS_i is not selected x_i = 0);

c_i = cost of implementing MS_i ;

x = a decision variable vector, $\{x_i\}$, i =1, ..., n ;

s_{ji} = savings from simultaneously implementing mitigation strategy j (MS_j) and strategy i (MS_i);

B = Budget available for implementing mitigation strategies.

It is noted that in the optimisation problem above (5), maximising objective function value (OFV) is equivalent to maximising the absolute importance (AI) and minimizing the expected cost. Hence, our optimisation problem is an extension of Park and Kim (1998). In this optimisation process, the objective is to determine the appropriate mitigation strategies by maximising the objective function value based on:

- the costs of the strategies,
- the savings from the simultaneous implementation of strategies, and
- the limited budget.

The objective function value, cost of the strategies, savings from the simultaneous implementation of these strategies, and the limited budget can be obtained from the above functional notation and their explanations.

4.7.4.2 Sensitivity Analysis

Sensitivity analysis is a systematic study of how the outcome to a decision model changes as the assumptions are altered. This analysis is conducted to see the 'what-if' scenarios. Sensitivity analysis is important as it helps to obtain complete understanding of the dynamics of the decision problem and identify the important elements in it. Due to some reason, if the case bank cannot afford to approve the required budget mentioned above, the optimisation results will very. For this reason, sensibility analysis is required for the implementation of mitigation strategies. Using the above optimisation model (Section 4.7.4.1), sensibility analysis with budget constraint can be performed.

4.7.4.3 Optimisation with Mandatory Implementation of Mitigation Strategies

It is not unlikely that company may consider some of the mitigation strategies as top priority while implementing them with limited budget. Since the optimisation model considers cost and cost-saving in addition to the importance level, some strategies may not be included in the optimised strategies list until the budget is not increased to a certain amount. In that scenario, optimisation with mandatory implementation of strategies will be necessary. The above model (Section 4.7.4.1) can also be used for optimisation with mandatory implementation of the mitigation strategies.

4.7.4.4 Comparison with the Knapsack Model of Wasserman

It is commonly addressed that most practical QFD problems involves some degree of dependencies among mitigation strategies, and therefore, it is important to identify and consider the savings of costs associated with the simultaneous implementations of mitigation strategies (Park and Kim 1998). Gary Wasserman (1993) was one of the first to introduce a model (Knapsack model) which can be used to assist in cost trade-off decisions during the QFD planning effort. But the model that was proposed by Wasserman (1993) does not take cost-savings from simultaneous implementations into account [please refer to Wasserman (1993) for details of solving the Knapsack model]. He proposed the Knapsack model with a simple linear cost constraint function to select the most pertinent strategies under a limitation of a given target cost. In this regard, the proposed optimisation model by this research is compared with the Knapsack model. This proposed model identifies and considers the savings from simultaneous implementations of mitigation strategies. This section demonstrates how this optimisation model (Section 4.7.4.1) is more efficient and productive than the 'Knapsack' model by comparing between the optimised outcomes.

4.8 ANALYSIS PART 2: HYPOTHESES DEVELOPMENT AND TESTS

After determining the optimal strategies for mitigating the blended value requirements to achieve e-business sustainability, the next phase of the research is to confirm (or reject) the sustainability outcome by the optimal strategies. This phase of the research deals with the 'Part B' of overall research model (see Figure 3.3 in Section 3.9). A quantitative method is considered as the most appropriate method for this phase of the research. For this purpose, hypotheses and questionnaire development, pre-test of the questionnaire, empirical pilot study, quantitative data analysis using PLS based SEM is

completed in this section. The steps employed in this phase of the research were justified by the literature.

4.8.1 Hypotheses Development

Multiple hypotheses were developed in this stage of the research based on the contributions of the strategies on mitigating the blended value requirements. In other words, hypotheses were developed based on the relationships of the mitigation strategies with the e-business sustainability outcome of the company. The relationships were determined based on the impacts of optimal strategies on the prioritised blended value requirements for achieving sustainability. Economic strategies are optimised for economic sustainability outcome. Similarly, environmental strategies are optimised for environmental sustainability outcome and social strategies are optimised for social sustainability outcome. Thus, economic strategies are expected to have positive impacts on economic sustainability outcome, environmental strategies are expected to have positive impacts on environmental sustainability outcome, and social strategies are expected to have positive impacts on social sustainability outcome. Based on the literature and QFD analysis, it was revealed that some strategies have impacts on more than one type of sustainability outcome. For example, implementing social strategies have impact on the economic sustainability outcome in addition to the social sustainability outcome which is consistent with the literature (e.g. Nussbaum 2009; Kotler and Lee 2005; Stanwick and Stanwick 1998). Therefore, hypotheses were developed for each type of strategies and their impacts on the sustainability outcome.

4.8.2 Questionnaire Development

A questionnaire was designed to test the research hypotheses presented in the quantitative research model. The questionnaire was developed to explore the important factors and to test the relationships between the blended value requirements and their corresponding optimal mitigation strategies. This research adopted the close-ended questions during designing the survey and used Likert scale to measure all the dimensions. It has been reported that during the past 15 years or more, the use of SEM has mainly relied on the Likert scale (Byrne and Stewart 2006). According to Hair et al. (2006), there are two choices available while selecting the scale categories: odd number and even number. Using a central 'neutral' point many studies used seven-point Likert scale. However, usage of central point is recommended when it is perceived that some portion of the respondents is likely to feel neutral about the issue being examined. Therefore, this study uses six-point Likert scale to avoid the

central tendency error of the respondents. Central tendency error occurs when respondents answer a middle choice 'neutral' or 'neither agree or disagree' without really meaning that.

4.8.2.1 Development of measurement instrument

It is important to note that a construct, also known as latent variable, is a hypothesized and unobserved concept that can only be measured by observable or measurable variables (Bollen and Lennox 1991). Thus, to empirically test the structural relationships between the exogenous constructs and the endogenous constructs the measurement instruments were developed at this stage. The indicators of the constructs were principally developed from existing literature. To develop and contextualise the constructs and their relationships the opinions of respondents gained from the field study were also used. The detailed discussion of the hypotheses development and questionnaire design is provided in Chapter 7.

4.8.3 Pre-Analysis Test of the Questionnaire

To identify any error in the survey instrument a pre-test was conducted prior to conducting the actual quantitative survey. To test the validity and to ensure the consistency, the questionnaire was investigated carefully through pre-analysis test. The main purpose of this test is to examine the appropriateness of the questions and to see whether the respondents find difficulty in understanding the items or whether they prefer a different presentation style of the survey instrument. In addition to that, the test was intended to find the length of time in answering the questionnaire.

4.8.4 Sample Selection

Sampling is defined as a technique that uses a small number of units of a given population as a basis for drawing conclusions about the whole population (Pedhazur and Schmelkin 1991). According to Rawstorne et al. (2000), any study dealing with mandatory adoption should consider the sample from one large group instead of having samples from many organisations occupying different positions using different systems. This research is also conducted in a context where employees are instructed to follow sustainability guidelines. In this stage, to get perceptions from different points of view, five employees from each of the bank branches were used as the respondents for data collection. For this purpose, (i) branch managers; (ii) branch deputy managers; (iii) branch accounts managers; (iv) branch customer service managers; and (v) branch

information technology personnel were considered as the samples. A total of 219 sample was collected by employing convenience sampling method.

The nationwide survey was conducted among the branch offices of the case bank. With the permission from the head office of the bank, a number of branch offices were contacted before physically visiting them for data collection. Most of the branches and the respondents were attended physically by the researcher with the questionnaire. However, about 15% of the data could not be collected physically since some of the branch offices of the bank are located in the remote areas of the country. In those cases, questionnaire was mailed or faxed to the managers before having a teleconference with them by phone. In case of any question or confusion from the respondents, the researcher was available through teleconference. Once the questionnaires were completed by them, they were mailed to the researcher directly.

4.8.5 Data Collection

As mentioned above, most of the data was collected physically by the researcher and some was collected through fax and mail. Then data were examined closely for the analysis stage. It was found from the collected raw data that there were some missing values, meaning that the respondents either refused or overlooked the answer. Responses considered to be invalid or incomplete were discarded from the analyses. A total of 225 samples were collected of which 219 samples were considered usable for the analysis. Data collected from the respondents were input to MS-Excel spreadsheet immediately.

4.8.6 Response Rate

A major difficulty of the research survey is the low response rate (Krosnick 1999). Thus, to increase the response rate, a technique called Total Design Method (Dillman 1978, 1991) was employed in developing the questionnaire. This development process includes using non-technical general statements and avoiding any technical jargons (Kitchenham and Pfleeger 2002). Moreover, a cover letter of the questionnaire and offer to obtain the summary of the study was provided to improve the response rate.

4.8.7 Data Organisation

To produce clean and valid data for the research analysis, the questionnaires was reviewed to find out any errors in the form of invalid input, missing values, or blank questionnaires (Alreach and Settle 1995; Jackson 2008). Carrying out of these

processes is very important to organise data for research. Questionnaires with more than 8% missing values were not considered for the data analysis.

4.8.8 Empirical Pilot Study

A pilot study using Partial Least Square (PLS) analysis was conducted based on the usable samples to test the validity of the questionnaire and to rectify any measurement-problem. Using convenience sampling method (Babbie 2010), a total of 40 respondents were considered for the test. Convenience sampling method was used as it provides the means to approach the participants more conveniently (Cavana, Delahaye and Sekaran 2001). Based on the feedback from the study some minor modifications were made to the questionnaires. The objective of conducting the pilot study was not to analyse the full model rather to examine the descriptive statistics. A quick reliability analysis using Cronbach's alpha was also performed for the study to see the internal consistency of the constructs. Thus, the main intension of conducting this test was to get a synopsis of the applicability of the data in this research, and not to assess the structural or measurement model.

4.8.9 Non-Response Bias

Non-response to questionnaire surveys may potentially bias results, as those who respond to such questionnaires may differ in some systematic way from non-respondents (Hill et al. 1997, p.203). It is assumed in the data analysis of this study that there is no difference between the distributions or the opinions between respondents and non-respondents in terms of their socio-demographic characteristics. However, a major portion of the data was collected physically and rest of the data was collected through mail. Therefore, Mann Whitney U test (Siegel 1956) was conducted to make sure that there was no presence of non-response bias in the collected data.

4.8.10 Analysis of Quantitative Data

This research employed a Partial Least Square (PLS) based Structural Equation Modelling (SEM) approach (Chin 1998a; Hair, Ringle and Sarstedt 2011; Henseler, Ringle and Sinkovics 2009) for the quantitative analysis to test the hypotheses developed from the relationships between the optimal mitigation strategies and the e-business sustainability outcome. In this study, SEM is preferred as it is distinguished from other multivariate techniques by two main characteristics: (i) its capability to estimate multiple and interrelated dependence relationships, and (i) its ability to

represent unobserved concepts in these relationships and account for measurement error in the estimation process. SEM can estimates a series of separate, but interdependent, multiple regression equations simultaneously by specifying the structural model used by the statistical program. SEM has a unique ability to simultaneously examine a series of dependence relationships (where a dependent variable becomes an independent variable in subsequent relationships within the same analysis) while also simultaneously analysing multiple dependent variables (Shook et al. 2004, p.397). This approach is justified both practically and theoretically through improving statistical estimation, better representing theoretical concepts, and accounting for measurement error (Hair et al. 1998). This approach is a generalisation of both regression and factor analysis (Rigdon 1998).

Structural equation modelling techniques, such as, LISREL or PLS are referred as the second-generation data analysis techniques and either of these two could be used to analyse the research model of this study. Both LISREL and PLS deal with causal modelling and work by simultaneously assessing the reliability and validity of the measures of the theoretical constructs and estimating the relationships among these constructs or variables (Barclay, Higgins and Thompson 1995). However, PLS was chosen over LISREL for this study because it is better suited for causal modelling when the sample size is relatively small and when the researcher is primarily concerned with prediction of the dependent variable (Hulland 1999; Teo, Wei and Benbasat 2003; Birkinshaw, Morrison and Hulland 1995). Pinto et al. (2008, p.160) have articulated that avoiding any normal distributional assumption of the observed variables, the sample size required in PLS is much smaller, and it can handle both types of measurement models, that is, reflective and formative. There has been evidence that the ability to model latent constructs under non-normality conditions and handling analysis with small sample sizes makes PLS popular among the researchers in recent years (Compeau and Higgins 1995; Chin 1998b; Chin 1998a). Mahmood, Bagchi, and Ford (2004) also confirmed that the PLS technique demands minimum requirements on measurement scales, sample sizes, and residual distributions. Moreover, PLS is appropriate when the primary objective of the research is the explanation of the model variance for one or more constructs and when the research focus is on theory development. Since the existing literature on e-business sustainability is very limited, the proposed research model in this research does not stand on strong theory. Therefore, the focus of this research is more on theory building, rather than testing the fit of strong theory-based model. Furthermore, Alpert et al. (2001) stated that

formative indicators can be best analysed using PLS, and not by using the more common structural equation technique of LISREL. Since this research is comprised of formative indicators capability of PLS to handle formative indicators and constructs was one of the greatest incentives for employing this technique.

Based on the reasoning stated above PLS has been deemed as the most appropriate data analysis tool for the quantitative study of this research. This study uses PLS to establish the relationship between constructs and to test the hypotheses. Thus, the data collected in this study were analysed using the PLS technique utilising the SmartPLS version 2.0.M3 (Ringle, Wende and Will 2005) computer software which is available online (http://www.smartpls.de/).

4.8.11 Nature of Constructs Identification

Literature was reviewed to identify the nature of the constructs that are going to be used for quantitative analysis. A number of scholars (e.g., Bollen and Lennox 1991; Chin 1998a; Diamantopoulos and Winklhofer 2001; Jarvis, MacKenzie and Podsakoff 2003) have provided criteria for determining the nature of the constructs. To determine the nature of the constructs, whether reflective or formative, the thumb rules provided by Jarvis et al. (2003) and Roberts and Thatcher (2009) were employed.

4.8.12 Partial Least Squares (PLS) Procedures

There are two steps involved in PLS analysis: (i) assessment of the outer (measurement) model, and (ii) assessment of the inner (structural) model. The objective of the first step is to examine the validity and reliability of the measurements of the constructs. This step mainly involves dealing with the relationships between the observed variables and the constructs (Igbaria, Guimaraes and Davis 1995). Items that represent the observed variables, measure the constructs. The measurement model analysis leads to the calculations of loadings that provide the researcher with an indication of the strength of the measures. In the second stage, the inner model or structural model is assessed to test the proposed hypotheses. This step is mainly concerned with the relationships that exist between the paths in the model (Igbaria, Guimaraes and Davis 1995). The results from this step provide the researcher with an indication of the strength and direction of the theoretical relationship. The detail explanation of the analysis in presented in Chapter 7.

4.8.12.1 Assessment of measurement model

The main focus of the measurement model assessment is the reliability and validity of the measures used to represent each construct, and ideally, this portion provides an evaluation on how accurate (i.e., reliable) the measures are (Chin 2010, p.670). This study has identified only formative constructs, and consequently, two parameters were examined in this first step as suggested by Petter et al. (2007) and Hair et al. (2011) to assess construct validity and evaluate reliability. The parameters are items' weights/loadings and variance inflation factor (VIF).

Assessment of measurement model PLS is processed by conducting simple correlations of the measures with their respective construct. The calculated correlation leads to an item loading which gives an indication of the item's strength. In PLS, item reliability can be assessed by evaluating: (i) the loading score for the reflective items or (ii) the weight score for the formative items. According to Hair et al. (2011), indicator's absolute importance for its construct, i.e., loadings, should also be evaluated in addition to considering the significance of the indicator's weight. Indicator of a research model should be retained to preserve content validity even if weight and loading are not significant (Bollen and Lennox 1991). Elimination of formative indicators carries the risk of changing the theoretical perspective of the constructs (Nunnally and Bernstein 1994).

To ensure the absence of multicollinearity VIF statistic is used to determine that correlation between the formative measures are not too high (Petter, Straub and Rai 2007; Diamantopoulos and Winklhofer 2001). According to the traditional rule of thumb, multicollinearity is a concern if the VIF is higher than 10. However, for formative measures scholars suggest VIF values greater than 3.3 indicate high multicollinearity (Diamantopoulos and Siguaw 2006).

4.8.12.2 Assessment of structural model

The primary evaluation criteria for the structural model are the R^2 measures and the level and significance of the path coefficients (Hair, Ringle and Sarstedt 2011). Assessing of structural model involves examining the hypothesised relationships between latent constructs in the research model (Santosa, Wei and Chan 2005). The assessment process comprises evaluating the (i) percentage of variance explained or R-square (R^2) which traditionally is called regression score, and (ii) path coefficient (β) that indicates the strength of the relationships between constructs and the statistical

significance of t-value which tells whether the relationship between constructs is significant (Mustamil 2010).

R^2 values indicate the predictive power of the proposed research model (Barclay, Higgins and Thompson 1995; Santosa, Wei and Chan 2005). Therefore, R^2 values can determine the explanatory power of a component of the model by indicating the amount of variance in the construct which is explained by its corresponding independent constructs. The R^2 values of the endogenous variables, produced by the bootstrap method, allow for assessment of the model's explanatory power (Chin 1998a). The well accepted value of R^2 is 0.1 or above (Teo, Wei and Benbasat 2003; Rai, Patnayakuni and Seth 2006).

The individual path coefficients of the PLS structural model can be interpreted as standardized beta coefficients of ordinary least squares regressions. The non-significant paths or the paths that show signs contrary to the hypothesized direction do not support a prior hypothesis, whereas significant paths that show the hypothesized direction empirically support the proposed causal relationship (Hair, Ringle and Sarstedt 2011).

4.9 SUMMARY

This chapter discussed the methodology of the research and research paradigm employed in this study. This study used a mixed-method approach in which a qualitative method was applied first followed by quantitative phases. In the qualitative phase, the constructs and variables of the initial research model were validated and enhanced in a field study. There are two phases in the quantitative part. In the first part, the blended value requirements were prioritised and mitigation strategies were developed to be optimised. In the second phase, hypotheses were developed and a quantitative test was conducted to examine how the optimised strategies really contribute to the fulfilment of blended value requirements.

CHAPTER 5

FIELD STUDY AND COMPREHENSIVE RESEARCH MODEL

5.1 INTRODUCTION

A qualitative field study was undertaken first to study the strategic management, the process management, and the customers (corporate and retail) of the case bank to identify the blended value requirements. Field study was also conducted for data collection to be used for prioritisation process, mitigation strategies development, and optimisation which is explained in Chapter 6. Thus, the focus of this phase of the research is to explore, identify, and validate the important blended value requirements.

As mentioned earlier, this research is conducted on the banking industry of Bangladesh and a specific bank within the industry is used as the case company. But the literature support for developing initial research model was compiled dominantly based on the premise of study on western context. Therefore, the field study was essential to ensure that the model is legitimate and applicable in this particular research context. The field study also aimed to dig deeper with a view to explore the pervasiveness of the research model. Semi-structured interviews with decision makers from the top management, decision makers from the process management, retail customers, and corporate customers of the organisation were used to conduct the field study. Thus, important blended value requirements are explored from the interview data. The interview data involving researcher's notes and micro-audio tape were transcribed verbatim into electronic transcripts. Content analysis was then performed on the transcripts to extract the important blended value requirements. These findings are used to confirm and enhance the initial research model.

The following sections of this chapter consist of the overview of the field study followed by the findings of the content analysis using a combination of inductive and deductive approaches. Results of the study are then presented and interpreted in detail in the form of factors and variables. Then the research model is developed to compare with the initial model. Finally, a refined and comprehensive research model is established based on the field study findings and the initial research model.

5.2 OVERVIEW OF THE FIELD STUDY

5.2.1 Interview Questionnaire Development

Interview questions were developed to explore and identify the important blended value requirements. To integrate the three main aspects of the blended value requirements, economic value, social value, and environmental value for customer, business, and process, a total of fifteen questions were designed for each of the respondents. Five questions to explore about the economic value, five questions to explore about the social value, and five questions to explore about the environment value conceive by customer, business, and process respondents. Table 5.1 shows the topics with the relevant questions respectively.

Table 5.1: Topic, issues and related questions in the field study

Topic	Question no.	Descriptions of the question
Economic value	1	For customer: Perception or understanding about the economic value for customer provided by the e-business of the bank. For business: Perception or understanding about the economic value achieved and achievable by the e-business of this bank. For process: Perception or understanding about the economic value achieved and achievable by the e-business process of this bank.
	2	For customer: The economic values that they expect from the e-business services of this bank. For business: The economic values that they want to gain from the e-business of this bank. For process: The economic values that they want to achieve from the e-business processes of this bank.
	3	For customer: The most important and least important economic values for them from the e-business services. For business: The most important and least important economic values from the e-business. For process: The most important and least important economic values from the e-business processes.
	4	For customer: The main barriers in delivering the important economic values to them by the e-business services of this bank. For business: The main barriers in achieving the important economic values by the e-business of this bank. For process: The main barriers in achieving the important

		economic values by the e-business process of this bank.
	5	For customer: The possible ways to enhance the economic value for customer by the e-business services of this bank. For business: The possible ways to enhance the economic value of the business by the e-business of this bank. For process: The possible ways to enhance the economic value of the processes by the e-business of this bank.
Social value	1	For customer: Perception or understanding about the social value for customer provided by the e-business of the bank. For business: Perception or understanding about the social value delivered and deliverable by the e-business of this bank. For process: Perception or understanding about the social value delivered and deliverable by the e-business process of this bank.
	2	For customer: The social values that they expect from the e-business of this bank. For business: The social values that they want to deliver by the e-business of this bank. For process: The social values that they want to deliver by the e-business processes of this bank.
	3	For customer: The most important and least important social values for them from the e-business services. For business: The most important and least important social values from the e-business of this bank.. For process: The most important and least important social values from the e-business processes of this bank..
	4	For customer: The main barriers in delivering the important social values to them by the e-business of this bank. For business: The main barriers in delivering the important social values by the e-business of this bank. For process: The main barriers in delivering the important social values by the e-business process of this bank.
	5	For customer: The possible ways to enhance the social value for customer by the e-business of this bank. For business: The possible ways to enhance the social value of the business by the e-business of this bank. For process: The possible ways to enhance the social value of the processes by the e-business of this bank.
Environmental value	1	For customer: Perception or understanding about the environmental value for customer provided by the e-business of the bank. For business: Perception or understanding about the

		environmental value delivered and deliverable by the e-business of this bank. For process: Perception or understanding about the environmental value delivered and deliverable by the e-business process of this bank.
	2	For customer: The environmental values that they expect from the e-business of this bank. For business: The environmental values that they want to deliver by the e-business of this bank. For process: The environmental values that they want to deliver by the e-business processes of this bank.
	3	For customer: The most important and least important environmental values for them from the e-business of the bank. For business: The most important and least important environmental values from the e-business of this bank. For process: The most important and least important environmental values from the e-business processes of this bank.
	4	For customer: The main barriers in delivering the important environmental values to them by the e-business services of this bank. For business: The main barriers in delivering the important environmental values by the e-business of this bank. For process: The main barriers in delivering the important environmental values by the e-business process of this bank.
	5	For customer: The possible ways to enhance the environmental value for customer by the e-business of this bank. For business: The possible ways to enhance the environmental value of the business by the e-business of this bank. For process: The possible ways to enhance the environmental value of the processes by the e-business of this bank.

The first topic is to explore about the economic value for customer, for business, and for process. Questions 1, 2, 3, 4, and 5 were designed in this regard. Question 1 and question 2 ask the respondent about their perception or understanding about the economic value and their expectation in this regard. Customers were asked about the economic value for customer provided by the e-business of the bank and business

respondents were asked about the economic value achieved and achievable by the e-business and e-business process of this bank. Question 3 was designed to investigate about the most important and least important economic values from their (customer, business, process) own point of view. Similarly, question 4 was designed to identify the main barriers in delivering and in achieving the important economic values; and question 5 was designed to get ideas about the possible ways to overcome those barriers to enhance the economic value.

The second topic explores the social value for customer, for business, and for process. Similar to economic value five questions were designed to investigate about the social value from customer's, business's, and process's point of view. The first and second questions were designed to investigate their perception or understanding about the economic value and their expectation in this regard. Question 3 was designed to identify the most important and least important social values from their own point of view. Question 4 asks about the main barriers in delivering and in achieving the important social values. Correspondingly, question 5 asks about the ideas to overcome those barriers for the improvement of the social value.

The third and final topic is to investigate environmental value for each type of respondents, namely customer, business, and process. Again, there are 5 (five) questions to explore this topic. The first question was designed to investigate their perception or understanding about the environmental value. The second was designed to investigate their expectations about environmental value from the e-business of the bank. The third question asks about the most important and least important environmental values from the e-business of this bank based on their understanding. The fourth question asks about the main barriers in delivering the important environmental values; and the fifth question investigates the possible ways to enhance the environmental value by overcoming those barriers. An in-depth idea about the variables and components of value based sustainable e-business model was obtained based on the answer and feedback from the respondents. Additionally, the relationship among the components and variables was comprehended which are widely discussed in the later sections. A complete set of questions for the field study is included in Appendix **A**. It is worth mentioning that these questions were subjected to Curtin's ethical requirements.

The pilot study is useful to test the understanding ability and applicability of the questions in interview guide. Therefore, a pilot study was completed before conducting

the final interview. The pilot study is also useful to discover any other issues related to the questions. Three participants comprising two potential participants and one researcher who is also pursuing his PhD research at the same institution in a similar field, took part in the pilot study. As per the feedback of the pilot study all the questions seemed relevant; and as per their suggestions the question of the most important and least important sustainability values from the e-business of this bank for customer, business, and process was added. Then, the interview questions were finalised considering the suggestions from the pilot study participants. Once the questions were finalised, the next step was to conduct the final interviews. The final interviews were conducted with 3 (three) strategic decision makers, 3 (three) top process managers, 3 (three) retail customers, and 2(two) corporate customers of the case bank.

5.2.2 Sample Selection

Selection of interview participants was processed based on the beneficiary of value types and the position of the participants. According to the research model there are three types of values, which are customer value, business value, and process value. To select customer value respondents a total of five customers of the case bank were chosen of which three were retail customers and two were corporate customers. For the selection of business value respondents, three decision makers from the strategic level of the case bank were selected; and for process value respondents top three decision makers form the IT Division of the case bank were selected. Based on personal contacts all interviewees were selected. Therefore, non-probability sampling or convenience sampling was employed in this regard (Babbie 2010). Moreover, this technique provides the means to approach the participants more conveniently (Cavana, Delahaye and Sekaran 2001). A copy of the interview questions with a detailed information sheet about the study objectives was provided for the easy understanding of the interviewees. The participants took part in this study voluntarily. Table 5.2 shows the demographic information of the interview participants and the organisation types they were affiliated with.

5.2.3 Participants' Description

Through convenience sampling a total of eleven respondents were chosen for the field survey who were related to the case bank. Careful attention was given while selecting the respondents to make sure that feedback about all the elements of blended value (economic, social, and environmental value for customer, business, and process) are received. Therefore, customers, strategic decision makers, and process decision makers

of the case bank were selected as the respondents of the field study. Table 5.2 shows the profiles of the participants in this study. Among the respondents D1, D2, and D3 were retail customers; D4 and D5 were corporate customers; D6, D7, and D8 were business strategic managers; and D9, D10, and D11 were process managers.

Table 5.2: Participants' description

Participant	Company	Position	Respondent Type
D1	University	Senior Lecturer	Retail customer of the case bank
D2	University	Assoc. Professor	
D3	Trading business	Sales Manager	
D4	Manufacturing business	Chairman	Corporate customer of the case bank
D5	University	Vice Chancellor	
D6	Case bank	Senior Asst. Vice President	Strategic managers of the case bank
D7	Case bank	Asst. Vice President	
D8	Case bank	Vice president	
D9	Case bank	Deputy Head of IT	Process managers of the case bank
D10	Case bank	Head of IT	
D11	Case bank	Deputy Head of Mobile Banking	

5.2.4 Data Collection

After determining the sample selection interviewees were approached through telephone to take their interview schedule and eventually to participate in the field study. The response from the interviewees was encouraging as 11 of them out of 14 agreed to participate in interview and to set a 1 hour 10 minutes to 1 hour 30 minutes time schedule for interview. Once oral consent was affirmed, the confirmation letter about the date and time of interview and a brief idea about the interview were sent to them. The interviews were scheduled as per convenience of the interviewees to ensure less disruptions and interruptions in their working schedule. Along with the letter the participant information sheet and consent form were sent to them. The consent form explicate that their participation is fully voluntary and will be kept confidential. This document was signed by the participants before the interview took place. The interviews were recorded with the permission of the participants and notes were taken throughout the interview. The duration of the one-to-one interview session was 1 hour and 15 minutes on an average. It was observed that the interviewees were at ease

during the sessions and they willingly answered all the questions posed to them. To make sure that the senses and tunes of the interview are reflected properly the data were transcribed immediately after interview. Since the interviews were conducted mostly in Bengali language much care and attention was given during the data transcription to maintain the participants' original meaning. Regarding this matter, participants were contacted again for further confirmation and validation.

5.2.5 Data Analysis

Scholars, for instance, Huberman and Miles (2002), suggest a number of techniques for performing qualitative data analysis. Content analysis is a useful technique in analysing qualitative data which requires considerably more than just reading to see what is there (Patton 2005). It has also proven to be a good technique and widely applied in previous research; for example, Xu and Quaddus (2005) successfully made use of it to examine the applicability of the qualitative data to transform into quantitative data for statistical analysis. Moreover, content analysis involves the examination of data in a systematic and replicable fashion (Wilkinson 2000). Content analysis method was used for the analysis and examination of data collected from the field study in this research. The classification of value requirements into different categories (economic, social, and environmental) was also completed in this phase.

The content analysis method can be used in various ways (Siltaoja 2006). To fulfil the objective of the exploratory study this particular study employs the two-step process of inductive and deductive analysis (Berg 2008) to scan and endorse the themes and sub-themes from the raw data (see Figure 5.1).

The first phase of the content analysis is the inductive phase. This phase consist of exploring themes, sub-themes, factors, sub factors and variables. It involves open coding, axial coding and selective coding (Cavana, Delahaye and Sekaran 2001; Neuman 2010). The interview contents were coded very carefully and a number of free nodes were identified containing individual concepts. Afterwards tree nodes were developed from a set of relevant tree nodes having similar concepts. Each tree node thus considered prospective construct. The findings were frequently reviewed and checked to ensure reliability. Revision and double-check help to identify any missing theme or sub-theme and also to check whether the classification of them was done appropriately.

For each respondent, an individual chart of value requirements was developed on the basis of findings under each themes and sub-themes. Therefore, a total of 11 charts of

sustainability requirements were developed for all the participants. After developing individual charts a comparison was performed among the charts to determine the most significant constructs and dimensionality. Based on the comparison a chart encapsulating all construct and dimensionality was developed. The first phase of the qualitative data analysis was finalised at this stage. Second phase of the content analysis, deductive analysis phase, begins once the first phase is completed. This phase is crucial in the sense that the findings from the field study and the initial model were reviewed again. There are three steps involved in this stage.

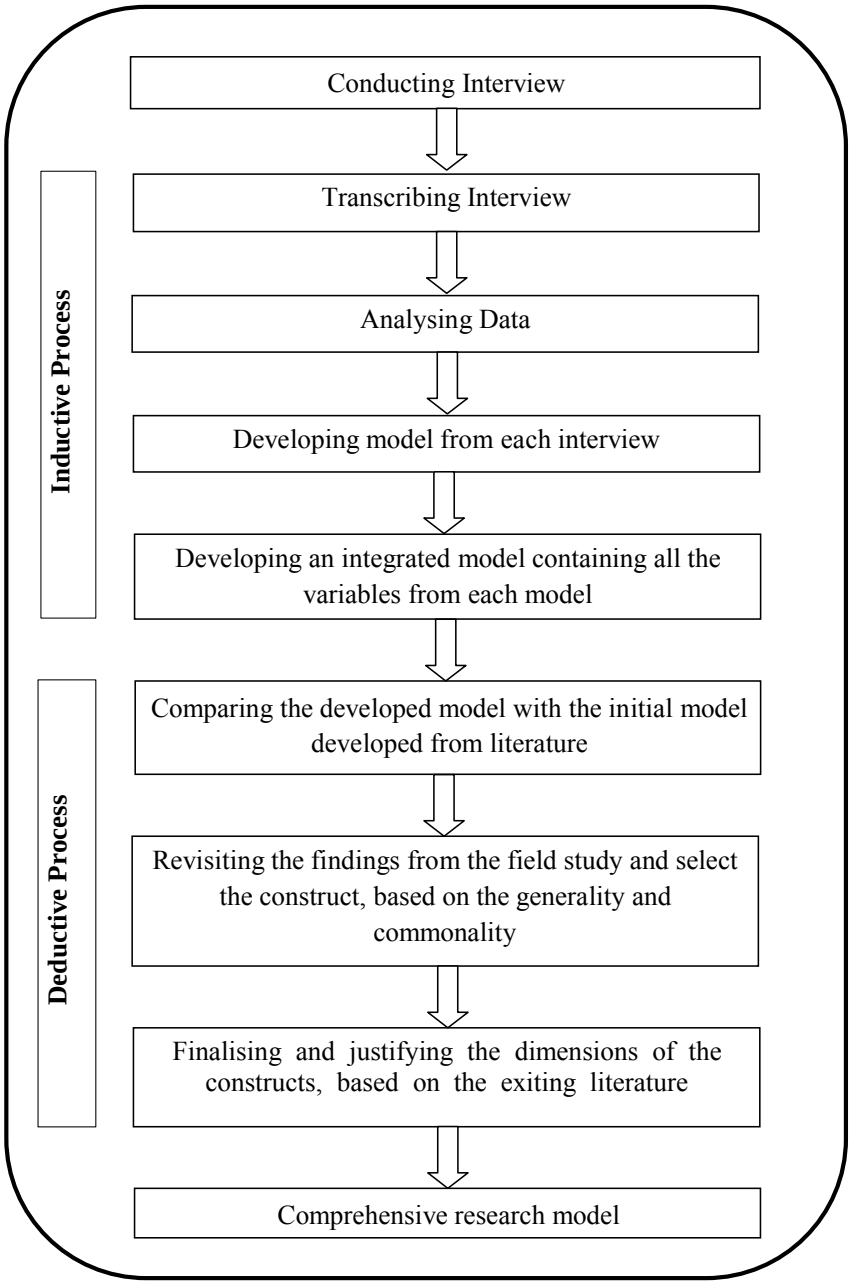


Figure 5.1: Data analysis process of the field study [adapted from Mustamil (2010)]

In the first step, the field study findings and the initial model were compared to assess the significance of the value requirements (constructs and variables). In the second step, the findings from the field study were revisited and the constructs were selected based on the commonality. Finally, in the third stage of this phase field study findings were justified to finalise the constructs based on the literature review carried out. Eventually, a comprehensive research model for this study was developed which is shown in Figure 5.5. The comprehensive research model consists of two main parts: (i) Mitigation strategies development and optimisation for mitigating identified blended value requirements, and (ii) Hypotheses development and tests. In this field study, blended value requirements are identified, explored, and confirmed. Mitigation strategies development and optimisation is presented in Chapter 6 and hypotheses development and tests are shown in Chapter 7.

5.3 FINDINGS OF THE FIELD STUDY (First Stage: Inductive Analysis)

On the basis of the first stage of content analysis this section explicates the findings of the field study. Since blended value consists of sustainability values for customer, business, and process, the findings are stated in three subsections: (i) findings in line with the sustainability value (economic, social, and environmental) for customer; (ii) findings related to the sustainability value for business; and (iii) findings in line with the sustainability value for process.

5.3.1 Blended Value Factors and Variables

Instead of economic value in early days, customers now want to know what total value they are going to receive from the businesses. Businesses now try to "create organisations, institutions and market mechanisms capable of maximising economic value as well as social and/or environmental value" (Emerson 2003). These environmental, social, and economic values cannot be fully achieved only by fulfilling the requirements of businesses or customers. Therefore, to achieve sustainability, value propositions of the businesses must include customer value, business value, and process value to produce and deliver the complete sustainable value. From the content analysis of the interviews it was comprehended that customers are mainly concerned about their sustainability values, the strategic managers are concerned about the business values and in the same way, process managers are mainly concerned about the sustainability values of the process. Based on the discussion in Chapter 3

(Literature Review) it can be summed up that the sustainable value requirements of a business can be categorised into 9 (nine) groups as follows:

a) Sustainability requirements for customer value:
    1. Economic requirements
    2. Social requirements
    3. Environmental requirements

b) Sustainability requirements for business value:
    4. Economic requirements
    5. Social requirements
    6. Environmental requirements

c) Sustainability requirements for process value:
    7. Economic requirements
    8. Social requirements
    9. Environmental requirements

5.3.1.1 Sustainability Requirements for Customer Value

5.3.1.1.1 Identifications of economic requirements for customer value

This economic value requirement indicates any of the customer's value requirements which is somehow economically related directly or indirectly to the product or service that is to be delivered to the customer. In other words, these requirements mean all types of economic benefits that the customers are looking for. Among all the identified economic value requirements 'service costs', 'time to get the service', 'quality of the service' and 'security of the service' were commonly identified by all five customer respondents (N=5). 'Service costs' is consists of all the charges for getting the e-banking services by the customer including online account keeping fees, ATM card and transaction fees, online transfer fees, and all the hidden charges. For example, participant 4 enumerated about the service costs as follows,

> *"E-banking fees and charges, time to receive the services, accuracy of the service, and quality of the service is important to me. I think time is most important aspect that matters most for me."*

'Time to get the services' was identified as another important factor for e-banking services. It includes, time to locate the service points (ATM, FastTrack, Mobile outlet), time to process the services at ATM and Internet banking site, and waiting time at the

branches for services associated with the e-banking. Participant 5 stated that,

> *".... I would want to save time, energy, and money of my organisation by saving time and energy of my employees. Time and energy saved from the banking activities will be used for cost saving which can be used for other purposes."*

Since most of the customers of the bank are mid-to-low income earners, cost of the services is a major factor for them. It was realised from the field study that customers considers charges and profits/benefits of the services when selecting the bank for e-banking services. Hidden charges were mentioned commonly by all the respondents (N=5). In this regards participant 3 said,

> *".....hidden costs, such as, application fees, account service fees, etc. which means the exact costs of the services are not given by the e-services. So we get confused about the costs and cannot decide whether to go for that service."*

Similarly, participant 5 summarised the economic value as follows,

> *"Among important economic values, to me, fees and charges, time to process the services, time to get attention, time to acknowledge about the services processed, quality of the services, and profit rates they are giving are important. We also want special profit rates when we keep large volume of money with them."*

Security is another important issue that was mentioned by all of the respondents (N=5). Since law and order of the country is not fully enforced, everyone is concerned with the level of security the company is capable of providing to the customer. Moreover, illiteracy rate of the population of the country makes it difficult for most of them to understand about the technological side of the security issue. Therefore, they want full security warranty of all the e-banking services provided by the bank. In line with the security of the services, as an instance, participant 1 opined that,

> *"They have a good security feature which I like is the SMS banking. .....security is one of the main priorities for me when it comes to the e-banking."*

Respondents have also emphasised on 'Customer service excellence' (N=5) issue. They have complained about the friendliness of the employees at the branch when they go for any e-banking related services. They demanded more seating spaces at the branches and air conditioned environment at all of the ATM and FastTrack booths. In line with this issues, participant 4 stated,

> *"They can have more spaces inside the office for the customers and employees; more air ventilation; more cleanliness including the toilets. In the peak-hours the*

branches become very crowded and not enough space to accommodate everyone."

Among other identified key economic value requirements 'simplicity (complexity level) of the services' and 'potential value added services' (N=4) are remarkable. As explicated by the respondents, among simplicity of the services 'simplicity of using the e-banking services', 'user-friendly interfaces', and 'simplified walk-out facility' are very important. Participant 4 elucidated on this issue as,

> *"...the bank should consider simplified shifting of our banking services to another branch when we move our offices or go to another bank. Generally, we have to go through complex processes if we want to move to another branch or another bank."*

Among 'potential value added services' 'priority services', 'online processing of FDR and third-party payment', and 'extra financial services (e.g., tax statements, financial calculators, etc.)' were strongly cited by the respondents. For example, regarding 'Priority services' respondent 1 quoted,

> *"This bank still does not have priority service option like some of the other banks here. By providing priority banking service they could provide some special services for more valuable customers."*

According to the respondents this bank can add some more value for the customer if they or their system could calculate all the profits and losses for tax purpose for every account of the customer. The same respondent pointed out about this matter as,

> *"In developed countries they have all the account information available at anytime including account type, debit, credit, total interests paid and received during that financial year. Anything like that from this bank would save our time significantly."*

Table 5.3 illustrates the list of economic value requirements of customers. It can be clarified from the table that most of the economic value requirements were commonly mentioned by the customers, both retail and corporate.

5.3.1.1.2 Identifications of social requirements for customer value

Today's customers are interested to see the contribution or impact of the product or service or operations of the business organisations to the society they are living. Any value contribution by the business for the customer's society is considered as the social

value for the customer. It was revealed from the interviews that there are different dimensions of social value requirements; some of them are directly related to the products and services (e.g., accountability of the products and services, customer service excellence), while some others are not (e.g., human rights, contribution to the community).

Table 5.3: Economic requirements for customer value

Factor	Variable	Respondent				
		1	2	3	4	5
Economic requirements for customer value	Total time needed to get the services by the customer (e.g., access time, process time)	y	y	y	y	y
	Costs of the services for customer (e.g., card fee, ATM fee)	y	y	y	y	y
	Quality of the services for customers (e.g., accuracy, efficiency, support)	y	y	y	y	y
	Simplicity of the services and complexity level (e.g., service complexity, interfaces)	y	y	y	y	y
	Potential value added services for customers (e.g., tax statement, priority service, weekend banking)	y	-	y	y	y
	Profit and benefits for the customers (e.g., FDR rates, loan interest rates)	y	y	y	y	y
	Security of the services for customers (e.g., service security, physical security)	y	y	y	y	y
	Customer service excellence (e.g., friendliness, more spaces, ACs)	y	y	y	y	y

'Accountability of the products and services' was strongly cited by all the respondents (N=5). Privacy of information of the customers was identified as the main concern. Although most of the customers believe that current condition of maintaining privacy of information in the bank is influenced by the culture of the country, still all of the respondents want the bank to be stricter about this issue to improve the condition. Physical safety of using the services was recognised as another concern within the accountability of the products and services. Regarding the privacy of information participant 2 explicated,

> *"Privacy of information is a common issue here with every bank. They do not think twice while giving one's information to others, especially when it comes to spouse or partner. Even if I say I am his or her elder brother they give the information very easily. Every bank here should follow the developed countries to bring the international standard about this issue { ... }. They can even use the e-banking services to bring the awareness about privacy among the employees and the customers."*

In line with the issue of physical safety participant 3 stated,

> *"The ATM booths locations are chosen without thinking about the safety of the customers. Because some of the ATM booths I have seen in risky and complex locations. For example, hard door, stairs need to be climbed to reach the ATM machine … "*

'Employment and benefits' issue was emphasised commonly by all the respondents (N=5). Job creation through e-banking services, job security, competitive salary package, health benefits for the employees and their families, training and education for the employees are identified as the main concerns by the customers. According to participant 1, health and safety management of the employee will increase the productivity of the banks since sickness of the employee will be significantly reduced. Even if a family member of the employee is sick the employee's productivity will be hindered. He quoted,

> *" …. bank's motivation for the society, job creation and job security, education and learning for the employee and society, health and safety for the employees and the customers, { … } are important to me.*

All of the respondents have mentioned about the 'compliance of legislation and code of conducts' by the bank. They demanded full compliance of government legislation and elimination of corruption and bribery at all stages of the operation of the bank.

Table 5.4: Social requirements for customer value

Factor	Variable	Respondent				
		1	2	3	4	5
Social requirements for customer value	Employment and benefits (e.g., job creation, job security, health benefits)	y	y	y	y	y
	Accountability of products and services for customer (e.g., privacy, safety)	y	y	y	y	y
	Human rights of employee (e.g., Non-discrimination, Freedom of association)	y	y	y	y	y
	Compliance of legislation and code of conduct (e.g., legislations compliance, corruption and bribery)	y	y	y	y	y
	Contributions to local community development (e.g., local employment, local supplier)	y	y	y	y	-
	Contributions to social development at national level (e.g., learning and education, quota for disable/ handicapped, social messages)	y	y	y	-	y

Bank's 'contribution to social development at local (N=4) and national levels' (N=4) were highlighted by all the customers. Employing locally and using locally supplied

goods are specified for the social development of the local community. For the development at national level, learning and education for the society, female encouragement and quota for disable/handicapped in the employment process, political contribution, and creating awareness by sending social messages through e-banking media and advertisements were identified by most of the respondents. Based on the above quotation and the content analysis, Table 5.4 is presented to illustrate the social value requirements of customer for sustainability.

5.3.1.1.3 Identifications of environmental requirements for customer value

From the content analysis of the interviews it was realised that customers nowadays do not just look at the economic value of the product or service, they also want to know whether that product or service or the supplier of that product or service cause any impact on the environment. They also want to know, if there is any impact, then whether it is positive or negative, and to what extent. According to the opinion of the respondents 'energy resources' (N=5) matter should be dealt with high importance when it comes to the environmental value. All of the respondents have emphasised reducing the usage of power and fuel. Regarding this issue participant 2 provided these points:

> *"The use of generators which is polluting air and sound can be reduced by using less ACs. Less use of generators will also save fuel. They should use energy efficient generators. Nowadays energy and pollution rated generators are available in the market."*

Participant 5 added to this subject as,

> *"They can also arrange transport for the employees so that fewer cars are used. If they cannot organise transport they should encourage employees to use public transport instead of individual transport. That will save fuel, money, and the environment."*

Reduced use of AC and lights, shut down of some ATM booths in the off-peak hours, and use of fuel efficient generators are also strongly suggested by the respondents to reduce the energy usage. One of the respondents has asked the bank to introduce the 'ratings system' for the branch offices based on the energy consumption. They have also advised the bank to invest on the renewable energy for the same subject. Along with the energy resources, organisation's impact on the 'air resources' was cited commonly by the respondents (N=4). Since the electricity supply is not enough for any business in

the country, there is frequent load-shedding every day. Participant 4 illustrated,

> *"..... they should reduce using the generators which produce huge smoke and makes sound and vibration. If you go to banks area and if there is no electricity, then it is an intolerable situation for the public."*

Therefore, to run the uninterrupted business most businesses use generator for power supply including the banks. But all of the respondents believe that air pollution from the generators can be minimised by reducing usage of AC and by using efficient generators that produce less. Usage of public transport by the employees of the bank was also suggested by the respondents.

'Usage of materials' by the bank was recognised as one of the important environmental factors by all the respondents (N=5). Usage of materials by the bank mainly includes paper and printing related chemicals, such as, ink, cartridge, etc. According to participant 5,

> *"They should go for paperless documents in the offices as much as possible. Still whatever the amount of paper needed to be used internally they can go for recycled paper to reduce the impact on the environment."*

With respect to the issue of usage of materials the respondents opined that rewarding programs should be introduced to the employees to motivate them for environmental sustainability. For instance, the program will reward the employees for using less paper and less printing.

Respondents agreed on the fact that "environmental policy and management' of the organisation is very important for achieving sustainability (N=4). They also agreed that it is very important for the top management to organise regular meetings with the lower level employees to pass the messages and the awareness. In that way the top management can show how seriously they are considering these issues. For the environmental policy and management most of the respondents stressed on the strategies of the company for eco management, more training of employees about environmental values, rewarding systems for eco management, and green ratings of offices based on the environmental values.

Regarding 'environmental legislation compliance' most of the respondents (N=5) opined that to achieve sustainability compliance of environmental legislation is compulsory. But unfortunately, no bank in the country is following the environmental

legislation fully. Participant 2 elucidated about this matter as,

> *"There is a guideline from the central bank about green use of ICT. I don't think they are following that guideline at al. They are also not following the environmental legislation which they should. To be environment friendly this bank should follow that guideline and legislation completely..."*

Among other significant environmental requirements of customer environment friendly disposal of digital wastes (N=5) and commitment for future generations (N=5) were identified by the respondents. Commitment for future generations includes funding for environmental enhancement projects , use of solar technology, and use of e-media create awareness about environmental value (global warming, ozone depletion, and environmental pollution) among the employees and clients. According to the respondents, bringing awareness to the employees and to the customers about environmental issues through e-banking facilities is the most important task this bank can perform easily.

Table 5.5: Environmental requirements for customer value

Factor	Variable	Respondent				
		1	2	3	4	5
Environmental requirements for customer value	Usage of energy resources by the organisation (e.g., AC and lights usages, renewable energy, peak & off-peak usage)	y	y	y	y	y
	Organisation's impact on air resources (e.g., pollution free generators, AC usage, public transport)	y	y	y	-	y
	Usage of materials (e.g., paper usage, cartridge usage)	y	y	y	y	y
	Organisation's impact on land resources (e.g., digital wastes)	y	y	y	y	y
	Proper environmental policy and management (e.g., strategy, employee training, 'green rating)	y	y	-	y	y
	Compliance of environmental legislation	y	y	y	y	y
	Organisation's commitment for future generations (e.g., funding for environmental projects, use of solar technology)	y	y	y	y	y

It is revealed from the field study that the computer monitor screen can be easily used to send the important environmental messages among the employees. A summary of the identified environmental value requirements for customer from the field study is demonstrated in Table 5.5.

5.3.1.2 Sustainability Requirements for Business Value

5.3.1.2.1 Identifications of economic requirements for business value

Economic requirements of business value are to add some economic value to the business directly or indirectly if they are fulfilled. For example, location of the firm, cost effective infrastructure, increase of sales and/or profit, replacing the employees with more efficient machinery, reducing costs by implementing more efficient supply chain management systems, saving of time and energy, etc. add some sort of economic value to the businesses. From the content analysis of the field study it was revealed that profitability, reputation, economic performance, productivity, costs, readiness for risk and crisis management, taxes, and investments for potential benefits were commonly highlighted by the respondents. Table 5.6 shows the economic value requirements commonly identified by the business respondents.

Table 5.6: Economic requirements for business value

Factor	Variable	Respondent		
		6	7	8
Economic requirements for business value	Profitability, Liquidity, and Investment Capability	y	y	y
	Economic performance of the company including share performance, market growth, and ROI	y	y	y
	Overall productivity of the business for cost efficiency (e.g., enhanced processes, efficient and productive fund management)	y	y	y
	Readiness for risk and crisis management (e.g., crisis management, disaster management)	y	y	y
	Taxes paid to all taxing authorities	y	y	y
	Cost of goods, material, and services consumed (e.g., setup and maintenance costs, network link costs, power costs)	y	y	y
	Potential benefits for the business from overall improvements (e.g., market growth, productivity)	y	y	y
	Reputation of the organisation (intangible capital)	y	y	y
	Customer relationship management (e.g., service desk and ACs at the branches and booths, training for corporate customers)	y	y	-

Regarding the 'profitability, liquidity, and investment capability' of the company participant 7 insisted that although the bank's main economic value is profit but now this economic value, in banking business, is not limited or restricted only within the profit. In line with this issue he quoted,

> *"In economic value we consider profit maximisation, more sales, more customers, asset marketing, liability marketing and more."*

Participant 6 and participant 8 also stressed on the 'profitability, liquidity, and investment capability' issues. Participant 6 explicated,

"By economic value of the bank we understand that our profitability, equity, and liquid assets have to be strong. {.....} you will find our presence is within the top 5 banks of the country with sound financial health. {.....} liquidity and solvency are two very important matters in banking business. Because of this recent global recession a number of banks in this country are in liquidity problem. But we did not have to face such problems since our liquid asset is quite strong and healthy."

All of the business respondents agreed that 'reputation of the organisation' is a crucial factor in banking industry (N=3). The respondents mentioned two types of reputations for the banking industry: reputation for technological excellence and reputation for social cause activities. According to the respondents, this bank holds very strong reputation for having largest ATM network in the country and for allocating the largest amount of money in private sector for social cause activities. Participant 6 enumerated about this matter as,

"Trust and reputation plays very crucial role in this industry. With implementation of the e-banking services our reputation has gone up significantly. Almost anyone in the country now knows that we have the largest ATM network. People also know about this bank because of our social cause activities (scholarships, treatment, etc.)."

'Economic performance', which is comprised of technological investment, return-on-investment, revenues, and market share and growth, was considered as another important economic value requirement for business (N=3). The respondents opined that share performance is influenced by the external factors, and for that reason it cannot be controlled by the company. But to run the e-business successfully return-on-investment has to be regular. To them, if the return-on-investment is not good concurrent investment in technology becomes difficult. Participant 7 illustrated as,

"Return on investment is very important for our business. Return on our investment in e-service is good so far."

Another significant economic values requirement highlighted by the business respondents is the 'cost of goods, materials, and services' (N=3). In consistent with this value requirement the respondents have the same opinion that a major portion of the total budget of the e-business is spent for the cost of goods, materials, and services. This cost includes e-banking setup and maintenance costs (ATM, Mobile network, Internet, etc.); network link costs rented from third parties (two links); power costs (electricity, generator, IPS); and consumption costs of materials (paper, cartridge, etc.).

Since e-businesses run mainly on the technological platform, readiness of the organisation for risk and crisis management is very important (N=3). The respondents concurred that risk and crisis management is very crucial in e-business. It was discovered from the interview that this bank maintains mirror servers located in three different locations. If one server fails then the second one is activated; and if the second one is also fails then the third one is activated. In this regard, participant 8 explained,

> *"For crisis management of e-banking we have Disaster Recovery System (DRS) which is fully online. If we have any problem with our main software, the DRS handle the systems immediately to make the software come back online instantly. We also have a risk management unit to handle general risks and to assess the risk of loan investment we have another asset risk management unit."*

Productivity is the key for cost efficiency, according to the respondents of the organisation. They agreed on the fact that productivity increased significantly since the implementation of the e-services in the bank (N=3). Internal communication was enhanced drastically, internal and external processes were quicker (saving of time and effort), and most importantly, the fund management become far more efficient and productive than before. Participant 6 quoted on this issue as,

> *"Our internal communication also enhanced as well as the productivity through the implementation of these e-services. Now we do not have to send documents and letters in hard copies which was consuming more time; instead now we send them electronically."*

The same respondent also emphasised on the efficient and productive fund management resulted from the e-banking services as,

> *"Fund management is another important issue that I should mention in productivity. Before online banking facility we had to carry money from one branch to another physically. But now we can transfer our funds around the country in seconds. Also, we had a lot of problems with fund management for our largest ATM network but now it is very easy for us since money can be collected from any branch office."*

Capability to handle and satisfy future customer needs is very essential when it comes to the 'potential benefits for the business from overall improvements' by the business (N=3). According to the respondents, regular investment is vital to increase the market share. Therefore, along with the investment capability, the company also need to find

out the possible means of increasing market share. This bank in this regard has developed the largest ATM network in the country, and already installed infrastructure for internet and mobile banking facility to increase the market share. Participant 7 explicated about this issue as,

> *"E-banking services increased our capability to handle and satisfy more customers. Even the daily limit of our customer service is increased significantly because of the enormous time savings. Our technological platform is ready to handle almost triple the number of customers we have today."*

Respondents also emphasised on the 'customer relationship management' issue (N=2). 24/7 banking access and customer support is essential according to the respondents. The bank has set up service desk and ACs at the branches and booths, both at ATM and at FastTrack to facilitate the customer service as it influences the customer relationship. Training for the corporate customers is also organised to enhance the relationship with the customers. Since law and order of the country is not at the optimum level, the bank has also provided a security guard at every ATM and FastTrack booth for the customer's peace of mind. Participant 7 quoted about this matter as,

> *".....we are giving security to the customers when they come to the branch physically. Also, we have 1 security guard and panic alarm option at every ATM station. We also have fire alarm in case if there is a fire and Air Conditioner at every ATM. Since there are frequent disruptions in electricity service, we have provided 1 IPS machine at every ATM station to ensure uninterrupted comfortable service for the customers."*

Among other economic requirements the respondents commonly brought up the issue of paying taxes to all the taxing authorities (N=3). They agreed that the total amount of tax paid by the organisation as part of banking industry has substantial impact on the economic health of the business. About the tax, participant 8 quoted,

> *"Note that we need to pay taxes on the operating profits and banks are required to pay 45% taxes on the operating profit."*

It was realised from the content analysis of the interviews that not only the common economic factors, such as, profitability, economic performance, costs, productivity, are important but also the investment for potential benefits and the reputation of the organisation have significant influence on the economic value of e-business.

5.3.1.2.2 Identifications of social requirements for business value

These social value requirements reflect what social value the business is planning and willing to deliver to the customers' society regardless of the customers' demand. These requirements eventually add value indirectly to the customers' society but instead of demanded by the customers these are selected by the businesses to achieve certain business goals. The respondents repeatedly mentioned that the top management of the organisation has high focus on technology. To them, this technological improvement is not only for the business but also for the country. The other important objective of the bank is to cover maximum population of the country within the banking and technological advancement. About this issue participant 8 pointed out as,

> *"We are providing these services not only for the business but also to help the society and the country. {.....} A large portion of our population is not covered within the financial systems. With this huge set up, this bank aims to bring that excluded population within the banking systems."*

Respondents commonly identified the 'labour practice and benefit' issue (N=3). They commonly stated that the e-banking services are creating huge number of jobs locally and nationally. According to them, training is vital for the employment and every employee is given enough training. The organisation has its own training institute for this purpose. 'Health benefits for the employees and their families' is also given importance as stated by the respondents. Participant 7 elucidated in this regard as,

> *"We have our own medical team and do regular medical check-up for every employee every year for free. We also give family treatment allowance to each employee. Even when employees take treatment from other treatment providers they get some discounts according to our arrangements."*

Among other benefits, competitive salary package with bonuses, rewarding and promotion, low turnover rate were mentioned by the respondents. The same participant also stated,

> *"....we have a grading system and yearly bonus. The bonus is calculated based on the grades the employees get."*

'Maintaining product and service responsibility' was recognised as another significant matter by the respondents (N=3). Product and service responsibility is mainly comprised of privacy of information and safety of using the e-banking services. Most of the respondents opined that the issue of privacy of information is influenced by the

culture of the country to some extent. In this regard participant 6 explained,

> *"Privacy of information is very strict in this bank. We have strict instruction for the employees not to give accounts information over the phone. But still if the employee knows a customer well then sometimes they provide the information. {....} I think it is bit cultural."*

'Legislation and code of conduct compliance' was another imperative issue according to all of the respondents (N=3). To them, full compliance of government legislation and code of conduct is difficult in the country context since most of the competitors are not complying. But this bank recognises this factor as important social value and is trying to follow the legislation and code of conduct as much as possible.

'Local community development' (N=2) and 'social development at national level' (N=3) are also in the list of social value requirements mentioned by the respondents. For the local community development the bank is employing locally for ATM and Mobile banking. A range of activities were pointed out by the respondents for the social development at national level. Among them 'technological access and learning of the society', 'use of e-banking media for creating awareness about social issues (dowry, child marriage, acid violence, etc.)', and 'inclusion of rural and illiterate population in e-banking' were commonly identified. Participant 8 explained,

> *"....our ATM and Mobile banking facilities already made our customers learn these new technologies. This is a big part of learning and growth of the society. We have a special terminal or counter in every branch and FastTrack booth where any customer can come, learn, and query about any technology."*

He added,

> *"Our main aim is to bring everyone of the country under the umbrella of banking systems and also the technological advancements."*

The respondents also commonly identified 'non-discrimination and freedom of association' as an important social value requirements by all the respondents. The respondents agreed on the fact that there must not be any discrimination in the employment process and freedom of association of the employees is just part of human rights. Regarding this matter participant 8 quoted,

> *"Maintaining non-discrimination in the organisation is essential and we do not have any discrimination in our employment procedures."*

Regular payment of 'government taxes' was commonly recognized as another significant social value requirement for the organisation. The summary of the identified social value requirements are listed in Table 5.7.

Table 5.7: Social requirements for business value

Factor	Variable	Respondent		
		6	7	8
Social requirements for business value	Labour practices and benefits (e.g., job creation, employee training, competitive salary, health benefits)	y	y	y
	Maintaining products and services responsibilities by the bank (e.g., privacy of information, safety of the e-services)	y	y	y
	Legislation and social code of conduct compliance	y	y	y
	Non-discrimination and freedom of association	y	y	y
	Local community development (e.g., local employment)	y	y	-
	Government taxes	y	y	y
	Social development at national level (e.g., technological access and learning, inclusion of unbanked population, using e-media for creating awareness)	y	y	y

5.3.1.2.3 Identifications of environmental requirements for business value

About environmental requirements of business, all of the respondents have opined that implementations of environmental friendly operations not only save the environment but also facilitate businesses to achieve cost reductions. For example, power and fuel consumption (N=3) and usage of materials (N=3) were commonly identified in this regard. To save fuel and power consumption replacement of old ACs with the energy efficient ACs in the offices and shut down of the PCs and monitors during the after-hours, and use of fuel efficient generators were suggested by the respondents. Participant 6 stated in this regard as,

> *"Our head office is sending information regularly to all the offices about how to reduce the usage of power, the usage of paper, the usage of printer, etc. "*

Participant 7 explained that the central bank has already introduced the "Green Banking" policy and asked all the banks to follow as much as possible. This policy from the central bank not only covers the fuel and power consumption issue but also all other environmental issues. The participant quoted,

> *"About green banking, BB has asked us to follow a new policy on Green Banking from January, 2012. It is not mandatory yet, but we are asked to follow as much as possible."*

According to him, the bank is trying its best to follow this policy. He added on this issue as,

> *"....we asked all of our employees to keep the air conditioning temperature to 25 degree, use lights (gloves) as less as possible, shutting down computers and monitors while leaving the office."*

It was assured by the participant 8 that the bank has already taken measures to reduce the consumption of fuel and power. For example, the head-office of the bank has published guidelines about maintaining temperature of the ACs in all the offices. He pointed out,

> *"....from the head office we have a published strict guideline about maintaining temperature of the ACs in all the offices. {....} We have a power management guideline for all the branch offices. That guideline explains how to manage power in peak and off-peak hours."*

He also explained that the guideline clearly says how much power can be consumed in each sectors (lights, Fans, ACs, etc.) and in total. Everyone is highly advised to minimise the consumptions of power in high consumption sectors.

Regarding the 'usage of materials' the participants commonly agreed that the usage of paper and cartridges was significantly reduced since the implementation of the e-banking features. Now, almost all of the internal communications are done through e-medias (e.g., email). Participant 8 elucidated,

> *"Still we couldn't be fully paperless but we are following the steps for green banking. We have already reduced the usage of papers significantly. For example, 99.9% of our internal notices and circulars now sent through the computer network systems, so far less paperwork; now customers are not asking for paper statements frequently since they can check online or by SMS."*

The participants commonly emphasised on 'air pollution' by the bank (N=3). Since there is a huge deficiency of the electricity supply the bank needs to use generators frequently for the uninterrupted service. The generators are used in almost all the offices including the branches. According to participant 6,

> *"Electricity is a big problem here in this country. We are using too much generators only because of the power problem. Generators are consuming fuel, polluting the air, and also responsible for noise and vibration pollutions."*

Participants also commonly agreed that installation of efficient generators which produces less smoke and creates less noise will minimise the impact of the pollution. Participant 7 quoted,

> *"...when we buy a generator we try to look for environment friendly ones which uses gas rather than fuel, generates less smoke (filtered), make less sound and vibration..."*

Replacement of the generators by powerful IPS where possible and use of public transport by the employees were also recommended by the participants. It was acknowledged by the business respondent that still the employees of the bank are not fully aware of the impact of the normal and digital wastes on the land. The knowledge of most of the employees in this regard is to an extent where they can just differentiate between normal wastes and digital wastes, but do not know the impact on the environment. Participant 6 stated,

> *"Our employees know that it is bad to throw the digital wastes in the normal bins. But they do not know the exact impact of those materials on the environment."*

For the collection of digital wastes, all the offices of the bank are asked by the head office to send all the digital wastes to the IT division. The IT division collects all the wastes and try to recycle them where possible. Otherwise, they just dispose them. But since the bank doesn't have a separate recycling or disposing plant or unit for the wastes the disposal procedure is not always environment friendly.

About 'internal environmental policy and management' (N=3) the participants agreed on the fact that this bank is ahead of other banks in the country in disseminating the information about the environmental values among the employees and the customers. Presently, the bank's employee training program includes a part called 'green banking' which is about environmental values. The central bank also organises training programs periodically on 'green banking' in which employees of this bank are encouraged to participate. Participant 7 explained about this issue,

> *"Our employee training includes information about green-banking. Even Bangladesh Bank has arranged to provide training on 'green banking' and our employees are attending that training in groups every 2 months."*

The respondents identified the 'commitment for future generations' by the bank as another important environmental value requirement (N=3). The bank sends environmental messages to the customers using e-banking media, such as, Internet

banking site and mobile SMS. The bank is also planning to use solar energy in the near future to reduce the dependence on and the usage of fuel and power. The bank has already taken steps to analyse the costs in implementing the solar energy. Participant 6 elucidated on this issue,

> *"Still we are not successful in implementing the solar energy because of the initial setup costs. We are still aiming to use the solar energy in the near future once the cost matches with our requirements."*

Table 5.8: Environmental requirements for business value

Factor	Variable	Respondent		
		6	7	8
Environmental requirements for business value	Total consumption of fuel and power (e.g., fuel efficient generators, energy efficient AC)	y	y	y
	Contribution to air pollution by the organisation (e.g., IPS instead of generators, use of public transport)	y	y	y
	Usage of materials by the organisation (e.g., paper usage, printing cartridge usage)	y	y	y
	Land pollution by the organisation (e.g., digital waste management)	y	-	y
	Environmental legislation compliance (e.g., started complying 'green banking policy')	y	y	y
	Internal environmental policy and management of the organisation (e.g., green training for employee)	y	y	y
	Commitment for future generations (e.g., installing solar energy for ATM booths, environmental messages through e-medias)	y	y	y

Participants also mentioned that though the bank is not directly involving in the environmental projects but it is patronising the groups and bodies who are working for the environment by providing them funds. Based on the above quotation and the content analysis, Table 5.8 is presented to illustrate the environmental value requirements identified by the participants.

5.3.1.3 Sustainability Requirements for Process Value

5.3.1.3.1 Identifications of economic requirements for process value

Economic value requirements for process requirements are generally linked to the cost savings of business process. Among all the economic value requirements financial structure including investment capability, process costs (cost of goods, material, and services), productivity of the processes, risk and crisis management of the processes, security of the processes including data security, and investments for potential benefits from technological improvement were commonly identified by the respondents. Table

5.9 lists all the economic value requirements for the process of the bank.

Table 5.9: Economic requirements for process value

Factor	Variable	Respondent		
		9	10	11
Economic requirements for process value	Financial structure of the process division (e.g., IT investment capability, revenue through e-banking)	y	y	y
	Process related costs (e.g., e-banking setup and maintenance, human resource costs, material consumption)	y	y	y
	Productivity of the processes (e.g., employee efficiency, internal process efficiency, efficient fund management)	y	y	y
	Risk and crisis management of the processes (e.g., crisis management unit, disaster recovery management)	y	y	y
	Security of the processes including data security	y	y	y
	Potential benefits for the process from technological improvements (e.g., technological investments, capability to handle future customers, up-to-date e-banking infrastructure)	y	y	y
	Meeting additional customer requirements (e.g., ease of access to banking, cleanliness of the ATM booths and branches)	y	y	y

According to the respondents, IT investment capability, revenue, and return-on-investment are considered as the backbone of the 'financial structure' of the bank (N=3). Although the bank allocates a significant portion of the budget for IT investment, still scopes for more investments exist through which e-banking services could be improved. Participant 10 quoted,

> *"If we had more funds we could buy more sophisticated softwares and hardware, provide better services for the customers. {....} we have a limit for the investment for every sector including in technology."*

The amount of revenue increased tremendously since the installation of the ATM network and introduction of Internet and mobile banking services which helped to increase the market share of the bank significantly. Revenues collected through e-banking services are low cost, too. Since deposit is regarded as the crucial element of the banking business, participants commonly emphasised on revenue aspect. Participant 9 explicated,

> *"....through e-banking services the accessibility to the bank by the customers increased to a significant amount which ultimately increased the transactions and the customers; and that means increased revenue. Mostly, these deposits are low cost deposits from ATMs."*

The rate of return-on-investment was also pointed out by the participants as one of the important element economic value requirement. Participants expressed their view positively on the return-on-investment. They stated that return on technological investments takes some more time since the initial investment or the setup cost is very high but the return rate is high. According to participant 11,

> *"The initial invest on this technology is very high and I think it will take some time to get the returns on investment. But our customer base is growing very rapidly; and hopefully, we will be able to meet our target before the estimated time."*

Another imperative economic value requirement recognised by the respondents is 'process cost' (N=3). Process costs mainly includes e-banking setup and maintenance costs (ATM, mobile banking, Internet banking, data centre), network link costs (two links), consumption of materials costs, power costs (electricity, generator, IPS), and human resource costs (salary, training, turn-over). With regards to process costs participant 10 enumerated,

> *"Our main costs are infrastructure set up cost, the day-to-day operational cost, manpower cost, power cost, the communication maintenance cost, the SMS technology cost, and the IVR set up and maintenance cost. The depreciation of all the machineries is also huge."*

Along with the process costs the participants expressed their concern about the 'process security' (N=3) among other economic value requirements. According to the participants, a major portion of the process costs is linked to the security of the process. To meet the security requirements the bank needs to buy high quality software and hardware which are comparatively expensive. Participant 10 quoted in this regard,

> *"We are using chip technology in the cards to ensure security like developed countries. We had to invest more than any other banks here to go for this safe technology."*

For the 'risk and crisis management of the process' (N=3) the bank maintains two mirror site of the data centre. A separate unit is maintained by the bank only for crisis management and disaster recovery management. All the respondents emphasised on the importance and costs of risk and crisis management of the process. To them, though it is essential to maintain proper arrangement for risk and crisis management of the process, it is expensive. With regard to the cost of risk and crisis management participant 11 stated,

> *"...for crisis and disaster management we need to maintain mirror sites which*

costs us a lot of money."

In addition to the core e-banking services there are some requirements which are delivered to the customers by the process division to meet customers' additional demands, such as, cleanliness of the ATM booths and branches, ease of access to the e-banking services, and more quality of the services. It can be deduced from the interviews with the process respondents that the meeting of these additional requirements are regarded as important social value requirements.

All of the participants advocated the importance of the 'productivity of the processes'. To them, implementation of the e-banking services has increased the productivity significantly by increasing the efficiency of the employees, efficiency of the internal processes, and by facilitating centralised and efficient fund management. In line with this participant 10 illustrated,

> *"Since the implementation of the e-banking services productivity has been increased enormously inside the bank. Huge amount of time and efforts are now saved with e-services if compared to the traditional banking system. Before the introduction of e-services we had to do everything manually, with pen and paper."*

'Investment for potential benefits' to increase the market share is another important economic value requirement identified by all the respondents. This investment is allocated mainly for the technological improvements of the e-banking services. For example, the bank has installed the country's largest ATM network through which a significant amount of market share was acquired. In line with this, investments to increase the capability to handle future customers, and to setup and maintain up-to-date e-banking infrastructure to meet international standard are pointed out by the respondents.

5.3.1.3.2 Identifications of social requirements for process value

Similar to the social value requirements of business the main social value requirements of process identified by the respondents are labour practices and benefits (N=3), product and service requirements (N=3), local community development enhancement (N=2), social development enhancement at national level (N=3), non-discrimination and freedom of association (N=3). Job creation in the society through e-banking services was recognised as one of the significant social value requirement. According the respondent 9,

"Among social values, you can consider all the employments; the electronic services that we are providing to the society; starting of new era of ATM technology that this bank started before other banks and then contribution of other banks to the society through the ATM service for market competitiveness...."

After discussion with the process respondents it was revealed that employees do not get enough training to deal with the e-banking systems; rather, they learn by working. Therefore, all of the respondents emphasised on training of the employees for more efficiency. With regards to this matter respondent 11 quoted,

"Our overall training is good; but I think little more training of all the employees could give us more efficiency and accuracy."

Health and safety benefit of the employees and their families is another important concern expressed by the participants. About health and safety participant 9 explained,

"About health and safety of the employees, we have good environment (building with central AC and generator). We try to provide as healthy environment as possible for our employees. {....} Yearly we get a free health check up from the company even if we do not have any disease. We also have arrangement with some good hospitals where we get discounts and extra facilities when we go for treatment."

Participant 11 added to this matter as,

"If the employees get sick frequently it is loss for the company. {....} They get free yearly medical check-up for free. They also get medical allowances and discount offers from health providers for their families."

Besides competitive salary package and rewarding of the employees, internal practices of honesty and morality among employees is also valued by the participants. Participant 11 quoted in this regard,

"...every employee is taught about the social values, moral values, respect for each other, and environmental values."

Fulfilment of 'product and service requirements' is comprised of maintaining privacy of information and providing physical safety of the services according to the participants. To them, physical safety of the services is linked to the security of the products and services. Therefore, the bank tries to provide as much safety as possible for the customers. For example, security guards at the ATM ad FastTrack booth. To maintain the privacy of information the process employees need to perform a very crucial role.

Since the process employees (IT Division) are fully involved in dealing with the sensitive information of all the customers, they need to be very careful and honest to uphold the customers' trust.

'Non-discrimination of the employees' and 'freedom of association' are considered vital social requirements by the strategic management of the bank. Every offices of the bank including the IT Division need to comply with these requirements. These requirements can be clarified from the quotation of participant 11 which is mentioned below:

> *"There is no discrimination in the recruitment process here. The positions are open to everyone."*

Participant 9 opined with the above quotation as,

> *"Our recruitment is open to all around the country. {...} There is no geographic or religious discrimination in choosing the applicant."*

The respondents assure that although most of the process employees are male, there is no discrimination in the recruitment process of the bank. According to them, in average, female employees are not much interested in doing process level jobs. Respondent 9 mentioned in this regard,

> *"Although we do not have any female employees here there is no gender discrimination in employment. We even hired 2 female employees once. One of them left after working first week; another one left just after getting a better job."*

The process division of the bank employed a number of people locally to teach the uneducated customers how to use the ATM and mobile banking services. Moreover, the security guards for the branches and ATM booths are also employed locally. According to the participants, 'local community development' needs to be ensured for the national development. Participant 10 quoted in this regard as,

> *"I believe that we are creating maximum jobs in the banking industry of this country since we have second largest number branches and highest number of ATM booths. Besides data centres, a number of people are employed at those branches and ATM booths locally."*

For the enhancement of the social development at national level and to meet the social value requirements of the organisation the process division is conducting some valuable activities, such as, teaching illiterate and unbanked community (garment workers and hawkers) how to use advanced technology (ATM and mobile banking), organising and delivering e-banking services for rural and uneducated people,

providing free internet booths at the colleges, and using e-media creating awareness about social issues. Respondent 10 expressed his thoughts about this as,

> *"By bringing these new technologies we are not only providing the services but also we are making them getting knowledge about those technologies and learning how to use them.{...} I think these are the great values that we have created for the society."*

Participant 9 also agreed on the fact that the installation of the country's largest ATM network and mobile banking services by this bank are great social values. He added to the above statement as,

> *"Not only the society is getting the valuable services but also they are learning how to use these services. So, we are making them learn to use new technologies. People around the country who even did not know how to fill up a deposit slip now use ATMs efficiently."*

The respondents also pointed out that they try to use the suppliers who do not harm the society in any way. Therefore, from the above statements it can be justified that enhancing social development at national level is an important agenda for the process division of the bank. From the above quotation and content analysis a consolidated picture of the social value requirements of process can be obtained from Table 5.10.

Table 5.10: Social requirements for process value

Factor	Variable	Respondent		
		9	10	11
Social requirements for process value	Labour practices and benefits (e.g., job creation, employee training, health benefits)	y	y	y
	Fulfilment of products and services requirements by process (e.g., privacy of information, physical safety at service points)	y	y	y
	Non-discrimination and freedom of association	y	y	y
	Local community development enhancement (e.g., Employing locally in the branches and ATMs: *branch, mobile, ATM guard*)	y	y	-
	Social development enhancement at national level (e.g., services for rural and uneducated people, community teaching, free internet booths, using e-media creating awareness)	y	y	y

5.3.1.3.3 Identifications of environmental requirements for process value

Process managers of the bank reported that they started thinking and taking initiatives about the environmental values recently. For example, the banking is currently thinking of establishing 'green banking cell' at the head office to look after the

environmental impact of the business process. The managers are now more concerned than before about the environmental pollutions. Participant 9, for instance, quoted,

> *"Not only the neighbours around our offices but also us, who do not like the heat, sound, vibration, and smoke generated by the generators."*

Shortage of electricity supplied is mainly blamed for excessive generator use which causes significant air and noise pollutions. The respondents mentioned that the process division is considering replacement of old generators with the efficient ones which consumes less fuel and causes less pollution. Besides 'impacts on air' (N=3), the respondents also showed the importance of awareness about the 'waste disposal and land pollution' (N=3) and the 'usages of materials for processing' (N=3) by the process division. Participant 9 also pointed out regarding these issues as,

> *"We still do not have any efficient waste management or formal guidelines for disposing toxic wastes but soon we will have. {...} In our green training employees are asked to reduce paper works and increase softcopy documents. For example, a number of office notices now are delivered through emails."*

Participant 10 added to this by quoting,

> *"For disposal, we are having a committee in the head office who collect all the digital wastes and send to our process division."*

It was clear from the interviews of the process managers that the usages of paper and cartridge were reduced substantially since the installation of online banking. The process employees are asked by the upper management to reduce the usage of paper as much as possible. Respondent 11 illustrateed in this regard as,

> *"...all the correspondences form the local offices are done through email, without the use of any paper."*

The respondents also emphasised on 'process related fuel and power consumption' by the processes (N=3). According to them, if there was stable power like other countries they could maximise the profit, give more services to the customers, and reduce the environment pollution. It is clearly reflected in the following statement made by participant 11,

> *"For every office we have to arrange small generators which cost us money. Because of the generator use we are consuming fuel, polluting the environment, making noise and vibrations."*

Employees in the process division are advised to reduce the usage of AC by wearing

comfortable cloths. This would reduce the usage of power and generators, and the pollutions. They are also asked to switch off all the lights and computers after use. Respondent 9 explained in this regard as,

> *"...our employees shut down most of the computers (except few individual computers) and monitors when we finish for the day. For example, when I go home I turn off my AC and my computer."*

The 'environmental legislations compliance' (N=3) in the country are not fully enforced by the government. Therefore, most of the banks here do not follow the legislations. But according to the process managers of the case bank, compliance of legislations is very crucial when delivering the environmental values. In addition the legislation compliance, the internal environmental policy and management (strategy, policy, targets) is also considered important by the process respondents (N=2). They indicated that the e-banking media will soon be used to increase the awareness about environmental values among the employees. In accordance with this participant 10 referred to their management as,

> *"When our employees go for training they are given knowledge about green environment and green technology. They are also advised to implement them in their offices."*

He added,

> *"We have a guideline for maintaining the temperature of the ACs but may be implementation is not monitored. We also try to use the ACs as less as possible."*

About the, 'environmental performance of suppliers', (N=3) the participants commonly agreed on the fact that the practice of judging the suppliers by environmental performance is rare in the country. Still, this bank is trying to use this performance as one of the criteria for selecting suppliers. Participant 9 quoted on this issue as,

> *"...we buy most of our goods from branded companies who supply best quality and also take care of the environment and society."*

Participant 10 also agreed on the same fact by stating,

> *"We also try to buy goods and services from branded companies in that sense that they follow more ethical, social, and environmental code of conducts"*

As per the respondents, the environmental performance of a company reflects its behavioural activities and these behavioural activities of a company help the bank to

judge that business (supplier). From the above quotation and the content analysis of the field study a summary can be drawn regarding the environmental value requirements for process which is shown in Table 5.11.

Table 5.11: Environmental requirements for process value

Factor	Variable	Respondent		
		9	10	11
Environmental requirements for process value	Process related fuel and power consumption (e.g., AC and light usages, energy efficient AC, light, and generators)	y	y	y
	Impact on air by the process activities (e.g., efficient generator, reduced usage of AC)	y	y	y
	Waste disposal and land pollution (e.g., battery, cartridges, hardware)	y	y	y
	Usage of materials for processing purpose (e.g., paper, printer cartridge)	y	y	y
	Environmental legislation compliance by the process division (e.g., 'green banking' guidelines from central bank)	y	y	y
	Internal environmental policy and management (e.g., policy, targets, training, awareness)	y	-	y
	Environmental performance of suppliers (e.g., branded supplier)	y	y	y

5.3.2 Field Study Models

What was found from the literature is that there are sustainability value requirements from the customers, business managers, and process managers that need to be fulfilled to achieve a fully sustainable e-business. It was also found from the literature that some of the sustainability value requirements are commonly demanded by customers, business managers, and process managers whereas some of the demanding sustainability value requirements are completely different. The managers, both business managers and process managers, have shown their willingness to fulfil those three dimensional sustainability value requirements based on their capabilities. It was also realised from the field study that capability of the organisation is one of the important factors that play key role while fulfilling or mitigating the sustainability value requirements. Since capability differs firm to firm, it is not possible to fulfil all the sustainability value requirements at once. Thus, it is very important for any business to effectively rank all the sustainability value requirements for the fulfilment based on the importance or demand. Then, a firm can identify or select strategies to fulfil or mitigate those ranked sustainability value requirements according to its resource limitations.

It was also revealed from the field study that not only three dimensional sustainability value requirements, but also identified strategies need to be ranked based on how each of the identified strategies impact on or mitigate the sustainability value requirements. For example, if one of the identified strategies is less expensive and mitigate only one value requirement; and on the other hand, another identified strategy is little more expensive but mitigate three value requirements, then it is essential to know which strategy would be more fruitful for the company to go for. Therefore, companies need to weight each of the strategies based on the outcome.

From the field study, it was also found that the managers of the company would like to know how their utilisation of resources can be maximised when investing for the sustainability outcome. They would like to know how a certain amount of budget can be used to implement maximum strategies for maximum sustainability outcome. According to the managers, it would be easier for them to determine the budget for sustainability investment if they could find out the cut-off points of budget related to the sustainability outcome. More clearly, the decision makers of the company would like to find out how the sustainability budget utilisation can be maximised to achieve sustainability based on the importance of the strategies, costs of implementing the strategies, and cost-savings from simultaneous implementations of the strategies. Therefore, it is essential to know by the managers, which sustainability value requirements can be mitigated by which strategies, and how those strategies can be implemented with maximum importance and minimised costs.

Based on the content analysis of the interviews, sustainability value requirements for customer, sustainability value requirements for business, and sustainability value requirements for process were identified. Then 3 (three) models were developed from that data to illustrate the findings of each type of participants involved in this study. Model for each participant was not developed since value requirements were commonly identified by each type of participants. Among the models some models represent more value requirements whereas some models show little less. It depends on how the individual respondents expressed their thoughts about the sustainability value requirements. Moreover, as mentioned earlier, there are 3 (three) categories of respondents, namely customer, business managers, and process managers, were considered for the field study. Respondents 1 to 5 are represented by model 1 (Figure 5.2) that include sustainability value requirements of customers; respondents 6 to 8 are represented by model 2 (Figure 5.3) that include sustainability value requirements of business; and respondents 9 to 11 are represented by model 3 (Figure 5.4) that

include sustainability value requirements of process. Appendix **B** is demonstrated with these models (Figure 5.2 to Figure 5.4). Based on these 3 models and field study findings a comprehensive model is developed for e-business sustainability that is shown and explained in Section 5.6.

The outcome of the field study models indicates the completion of the first phase of the content analysis (inductive phase). Therefore, in the next step analysis is carried out involving the deductive phase as mentioned in Section 5.2.5.

5.4 COMPARISON BETWEEN FIELD STUDY FINDINGS AND INITIAL MODEL (Second Stage: Deductive Analysis)

The field study revealed that most of the value requirements discussed by the interviewees were supported by the literature. This section discusses the value requirements that are generated from the field study and whether they are similar or dissimilar from the existing literature.

Based on the literature review, conceptual framework, and discussion in Chapter 3 (Section 3.2 to Section 3.8) a preliminary research model (Figure 5.5) was developed to achieve the research objectives. The initial research model posits that each element of the blended value requirements (economic, social, and environmental value requirements of customer; economic, social, and environmental value requirements of business; and economic, social, and environmental value requirements of process) need to be considered and mitigated to achieve overall sustainability of e-business.

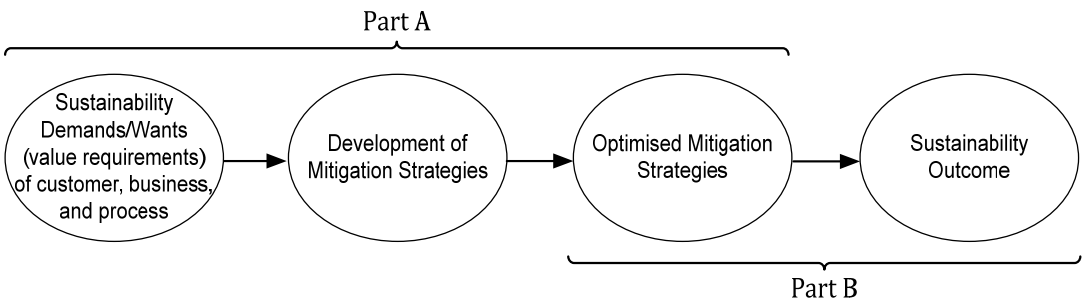


Figure 5.5: Initial overall research model

Empirical assessment for achieving sustainability in e-business is very rare in the literature. Majority of the researchers agreed in their works that there are demands for sustainable ICT or sustainable e-business from customers, business managers, and process managers. Literature also shows that sustainability value requirements of customer, business, and process are not always same. Though some of the business

value requirements and process value requirements are sometimes common, most of them are dissimilar from the customer value requirements.

Similar to the literature review, field study revealed that there are requirements for sustainability from customer, from business managers, and from process managers; and their sustainability requirements are three types: social, economic, and environmental. It was also revealed from the field study that these sustainability requirements of customer, business, and process are not exactly same. Therefore, based on the findings of the filed study, three models were developed to represent sustainability value requirements of customer, business, and process. Figure 5.2 shows sustainability value requirements of customers; Figure 5.3 shows sustainability value requirements of business; and Figure 5.4 shows sustainability value requirements of process. Appendix **B** is demonstrated with these field study models (Figure 5.2 to Figure 5.4).

The literature also indicates that some companies are already trying to fulfil the sustainability value requirements by developing mitigation strategies. But still, companies are lacking efficient way to fulfil all the value requirements of customers, business managers, and process managers to achieve sustainability. Literature review and field study identified main reasons behind this, which are: (i) companies do not identify all three types of (customer, business, process) value requirements for sustainability; (ii) companies do not rank the importance order of sustainability value requirements before implementing sustainability strategies; (iii) sustainability strategies are not prioritised based on the sustainability outcome and resource constraint before implementation. In this lacuna, a research approach needs to be developed which will identify all three types of (customer, business, process) value requirements for sustainability and rank them according to their importance, and which will also prioritise the sustainability strategies based on the sustainability outcome and resource constraint. Thus, based on these grounds and the findings of the filed study, the comprehensive research model is developed which is presented in Section 5.6.

5.5 JUSTIFICATION OF THE FINDINGS BASED ON THE LITERATURE REVIEW

This section presents the justification of the selected blended value requirements that were developed from the field study with the support from literature. It is noted that

the constructs and dimensions (value requirements) that were derived from the field study, on the basis of commonality and consistency, are also supported by the existing literature. Hence, this justification establishes the competency and adequacy of each value requirements in the existing literature. It is also noted that to maintain the originality of each value requirements (factor), field study identifies them in *item level* as shown in Tables 4.3 to 4.11. But due to the vast number of *items* identified by the field study value requirements are considered only up to *variable level* for further analysis to avoid complexity and to keep the analysis simple. Table 5.12 is presented with the value requirements that are finalised with the corresponding literature support.

Table 5.12: Justification of the findings of the field study variables with literature

Value type	Value requirement	Sources
Economic value requirements of customer	Potential value added services for customers	Gonza´lez et al. (2004); Mihelis et al. (2001); Bauer et al. (2004)
	Quality of the services for customers	Levesque and McDougall (1996); Gonza´lez et al. (2004); Wang and Hong (2007)
	Security of the services for customers	Agarwal et al. (2009); Gonza´lez et al. (2004); Liao and Cheung (2002); Bauer et al. (2004)
	Profit and benefits from the services for the customers	Gonza´lez et al. (2004); Levesque and McDougall (1996); Molina et al. (2007)
	Total time needed to get the services by the customer	Kwong and Bai (2002); Gonza´lez et al. (2004); Mihelis et al. (2001); Molina et al. (2007)
	Simplicity of the services and complexity level	Venkatesh et al. (2003); Gonza´lez et al. (2004); Levesque and McDougall (1996); Mihelis et al. (2001)
	Costs of the services for customer	Kwong and Bai (2002); Gonza´lez et al. (2004); Mihelis et al. (2001)
	Customer service excellence	Mihelis et al. (2001); Levesque and McDougall (1996); Molina et al. (2007)
Social value requirements of customer	Accountability of products and services for customers	Delai and Takahashi (2011); Poon and Lee (2012)
	Compliance of legislation and code of conduct	Vinodh and Chintha (2011); Delai and Takahashi (2011)
	Contribution to social development at national level	Labuschagne et al. (2005); Delai and Takahashi (2011)
	Human rights of employee	Tanzil and Beloff (2006); Zairi and Peters (2002)
	Employment and benefits	Labuschagne et al. (2005); Vinodh and Chintha (2011); Delai and

		Takahashi (2011)
	Contributions to local community development	Epstein and Wisner (2001); Labuschagne et al. (2005)
Environmental value requirements of customer	Usage of materials	Delai and Takahashi (2011); Tanzil and Beloff (2006); Lin et al. (2010)
	Organisation's impact on air resources	Labuschagne et al. (2005); Vinodh and Chintha (2011); Masui et al. (2003)
	Proper environmental policy and management	Epstein and Wisner (2001); Lo and Sheu (2007)
	Compliance of environmental legislation	Labuschagne et al. (2005); Nikolaou et al. (2012); Jeucken and Bouma (1999)
	Usages of energy resources by the organisation	Vinodh and Chintha (2011); Masui et al. (2003); Lin et al. (2010); Tanzil and Beloff (2006)
	Organisation's commitment for future generations	Beheiry et al. (2006); Delai and Takahashi (2011)
	Organisation's impact on land resources	Labuschagne et al. (2005); Vinodh and Chintha (2011)
Economic value requirements of business	Profitability, liquidity, and investment capability	Labuschagne et al. (2005); Vinodh and Chintha (2011)
	Economic performance of the company including share performance, market growth, and ROI	Labuschagne et al. (2005); Vinodh and Chintha (2011)
	Potential benefits for the business from overall improvements (market growth, productivity)	Vinodh and Chintha (2011); Mahmood and Mann (2000)
	Overall productivity of the business for cost efficiency	Figge et al. (2002); Wang and Hong (2007)
	Cost of goods, material, and services consumed	Kuo et al (2009); GRI (2006); IChemE (2005)
	Readiness for risk and crisis management	Lo and Sheo (2007); Hoggarth et al. (2004); DJSI (2005); Delai and Takahashi (2011)
	Taxes paid to all taxing authorities	Zairi and Peters (2002); GRI (2006); IChemE (2005)
	Customer relationship management	Lo and Sheo (2007); Delai and Takahashi (2011); Kotler and Armstrong (2004);
	Reputation of the organisation	Mihelis et al. (2001); Bloemer et al. (1998)
Social value requirements of business	Maintaining products and services responsibilities by the bank	Delai and Takahashi (2011); Poon and Lee (2012)
	Legislation and social code of conduct compliance	Vinodh and Chintha (2011); Delai and Takahashi (2011)
	Labour practices and benefits of the employee	Epstein and Wisner (2001); Erek (2011); Lo and Sheo (2007);
	Non-discrimination and freedom of association	Epstein and Wisner (2001); GRI (2006); DJSI (2005)
	Local community development	Tanzil and Beloff (2006); Vinodh

		and Chintha (2011); Zairi and Peters (2002)
	Government taxes	Zairi and Peters (2002); Delai and Takahashi (2011)
	Social development at national level	Epstein and Wisner (2001); Tanzil and Beloff (2006); Erek (2011); Veleva and Ellenbecker (2001)
Environmental value requirements of business	Environmental legislation compliance	Labuschagne et al. (2005); Nikolaou et al. (2012); Jeucken and Bouma (1999)
	Total consumption of fuel and power	Veleva and Ellenbecker (2001); Masui et al. (2003); Lin et al. (2010);
	Contribution to air pollution by the organisation	Erek (2011) GRI (2006); IChemE (2005); Delai and Takahashi (2011)
	Usage of materials by the organisation	Tanzil and Beloff (2006); Erek (2011); IChemE (2005)
	Land pollution by the organisation	Tanzil and Beloff (2006); Vinodh and Chintha (2011); Delai and Takahashi (2011)
	Internal environmental policy and management of the organisation	Tanzil and Beloff (2006); Lo and Sheo (2007); GRI (2006); DJSI (2005)
	Commitment for future generations	Ethos (2005); Beheiry et al. (2006)
Economic value requirements of process	Financial structure of the process division	Labuschagne et al. (2005); Vinodh and Chintha (2011)
	Potential benefits for the process from technological improvements	Vinodh and Chintha (2011); Mahmood and Mann (2000)
	Productivity of the processes	Figge et al. (2002); Weske (2012); Wang and Hong (2007); Hlupic and Robinson (1998)
	Security of the processes including data security	Alam et al. (2007); Maugis et al. (2005)
	Process related costs	GRI (2006); IChemE (2005); Field study
	Risk and crisis management of the processes	Lo and Sheo (2007); Hoggarth et al. (2004)
	Meeting additional customer requirements	Gonza´ lez et al (2004); Molina et al. (2007)
Social value requirements of process	Fulfilment of products and services requirements by process	Delai and Takahashi (2011); Poon and Lee (2012)
	Labour practices and benefits in the process division	Epstein and Wisner (2001); Erek (2011); Lo and Sheo (2007); Lin et al. (2010);
	Non-discrimination and freedom of association	Epstein and Wisner (2001); GRI (2006); DJSI (2005);
	Local community development enhancement	Tanzil and Beloff (2006); Veleva and Ellenbecker (2001); Lin et al.

		(2010);
	Social development enhancement at national level	Tanzil and Beloff (2006); Erek (2011)
Environmental value requirements of process	Environmental legislation compliance by the process division	Labuschagne et al. (2005); Nikolaou et al. (2012); Jeucken and Bouma (1999)
	Process related fuel and power consumption	Sakao et al. (2003); Vinodh and Chintha (2011); Masui et al. (2003)
	Impact on air by the process activities	Epstein and Wisner (2001); Sakao et al. (2003)
	Waste disposal and land pollution	Epstein and Wisner (2001); Veleva and Ellenbecker (2001); Sakao et al. (2003)
	Usage of materials for the process	Epstein and Wisner (2001); Veleva and Ellenbecker (2001)
	Internal environmental policy and management by the process (strategy, policy, targets)	Lo and Sheo (2007); GRI (2006); DJSI (2005)
	Environmental performance of suppliers	Epstein and Wisner (2001); GRI (2006)

5.6 COMPREHENSIVE RESEARCH MODEL (Field Study and Literature)

This section presents the comprehensive research model based on the field study findings and the initial research model. Justifications of the different blended value requirements were made on the basis of the literature and the interviews from the field study. Based on the field study findings and the initial research model a refined and combined e-business sustainability model was developed which was then tested by employing QFD analysis and PLS based SEM approach.

5.6.1 Expansion of Initial Research Model

A comparison was made between the initial research model and the findings of the field study based on the participants' interviews. Compared to the initial research model, in the comprehensive research model, firstly, all three types of (customer, business, process) sustainability value requirements are identified and ranked according to their importance. Secondly, mitigation strategies are not only developed but also prioritised and optimised based on their outcome, implementation costs, and cost trade-offs. Finally, to confirm the sustainability outcome from the optimal strategies a quantitative

survey study is completed. Figure 5.5 presents the comprehensive research model for e-business sustainability based on the blended value requirements.

5.6.2 Two Prone Analyses

The analyses for the comprehensive research model presented above (Figure 5.6) are carried out in two main parts: 'Analysis Part 1' and 'Analysis Part 2'. Mitigation strategies development and optimisation are completed in 'Analysis Part 1' and hypotheses development and tests are completed in 'Analysis Part 2'.

5.6.2.1 Analysis Part 1: Mitigation strategies development and optimisation

QFD based research analysis is completed in this part of the analysis. At first, blended value requirements identified by the field study is prioritised. AHP analysis is employed for ranking and synthesising these three dimensional sustainability value requirements.

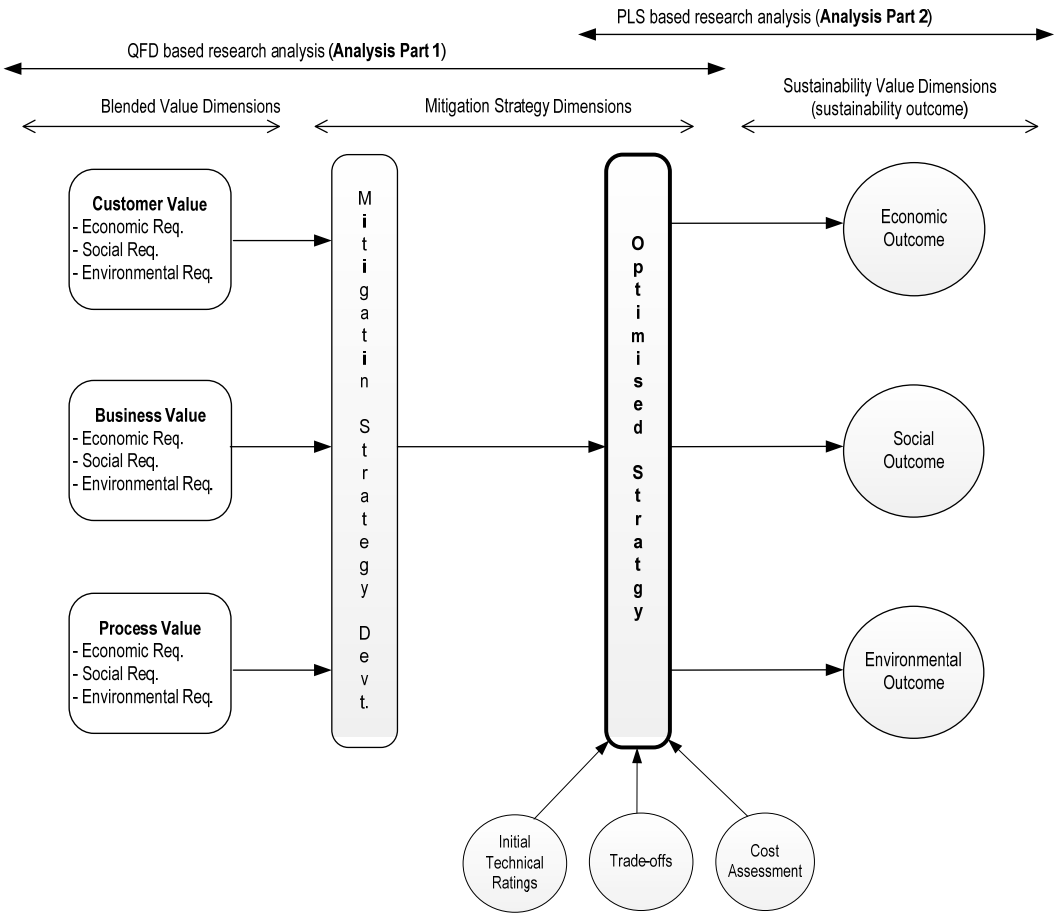


Figure 5.6: Comprehensive research model based on field study and literature

Participants of three categories, namely customer, strategic managers, and process managers, were used for the prioritisation process. After the prioritisation process, mitigation strategies are developed to mitigate the value requirements, and value requirements with significant weights are used for QFD analysis to prioritise those mitigation strategies. Then prioritised mitigation strategies are optimised using non-linear quadratic integer programming based on initial technical ratings, trade-offs among the mitigation strategies, and the budget constraint. Field study is also conducted for data collection to be used for prioritisation process, mitigation strategies development, and optimisation. The details of 'Analysis Part 1' including the field study for data collection are explained in Chapter 6.

5.6.2.2 Analysis Part 2: Hypotheses development and tests

In the second part of the research model, hypotheses are developed based on the optimised mitigation strategies and their contributions in fulfilling or mitigating the blended value requirements for e-business sustainability. In other words, hypotheses are developed based on the relationships of the mitigation strategies with the e-business sustainability outcome of the company. After hypotheses development, a quantitative survey study is completed to confirm the sustainability outcome from the optimal strategies. PLS based SEM is employed for quantitative analysis using SmartPLS version 2.0.M3 (Ringle, Wende and Will 2005) software. The details of 'Analysis Part 2' including data collection are explained in Chapter 7.

5.7 SUMMARY

The findings of the field study are presented in this chapter based on the content analysis. This qualitative approach was undertaken by using semi-structured interviews with 6 decision makers (strategic and IT) and 5 customers (retail and corporate) of the case bank. The main objective of this qualitative study was to explore, identify, and validate the important blended value requirements by studying the strategic management, the process management, and the customers (corporate and retail). Furthermore, other relevant and significant important issues associated with the e-business sustainability in the context of Bangladesh were determined. As a whole, 'content analysis' technique involving inductive and deductive phases were employed to reveal interesting outcome with regard to the factors of e-business sustainability. The factors and variables that have been explored and identified were justified and

further analysed under the light of literature. In addition, relationships among factors were established.

Based on the outcome of this analysis a comprehensive research model was developed to further analyse how the blended value requirements can be fulfilled or mitigated with optimal strategies for e-business sustainability (Analysis Part 1). The comprehensive research model also includes a confirmatory study to see how those optimal mitigation strategies impact on the sustainability outcome of the e-business. In the next chapter (Chapter 6), optimal mitigation strategies will be developed and optimised based on QFD analysis for mitigating the blended value requirements. Then in Chapter 7, hypotheses will be developed and further examined with quantitative data (Analysis Part 2).

CHAPTER 6

ANALYSIS PART 1: MITIGATION STRATEGIES DEVELOPMENT AND OPTIMISATION USING QFD BASED ANALYSIS

6.1 INTRODUCTION

In Chapter 5, a qualitative field study was completed to identify the blended value requirements by studying the strategic management, the process management, and the customers of the case bank. The research model is then developed to compare with the initial model. Based on the field study findings and the initial research model a refined and comprehensive research model was established. The comprehensive research model consists of two prone analyses: 'Analysis Part 1' and 'Analysis Part 2' as shown in Figure 6.1. Mitigation strategies development and optimisation based on QFD analysis are completed in 'Analysis Part 1' which is presented in this chapter; and hypotheses development and tests are completed in 'Analysis Part 2' which is presented in Chapter 7.

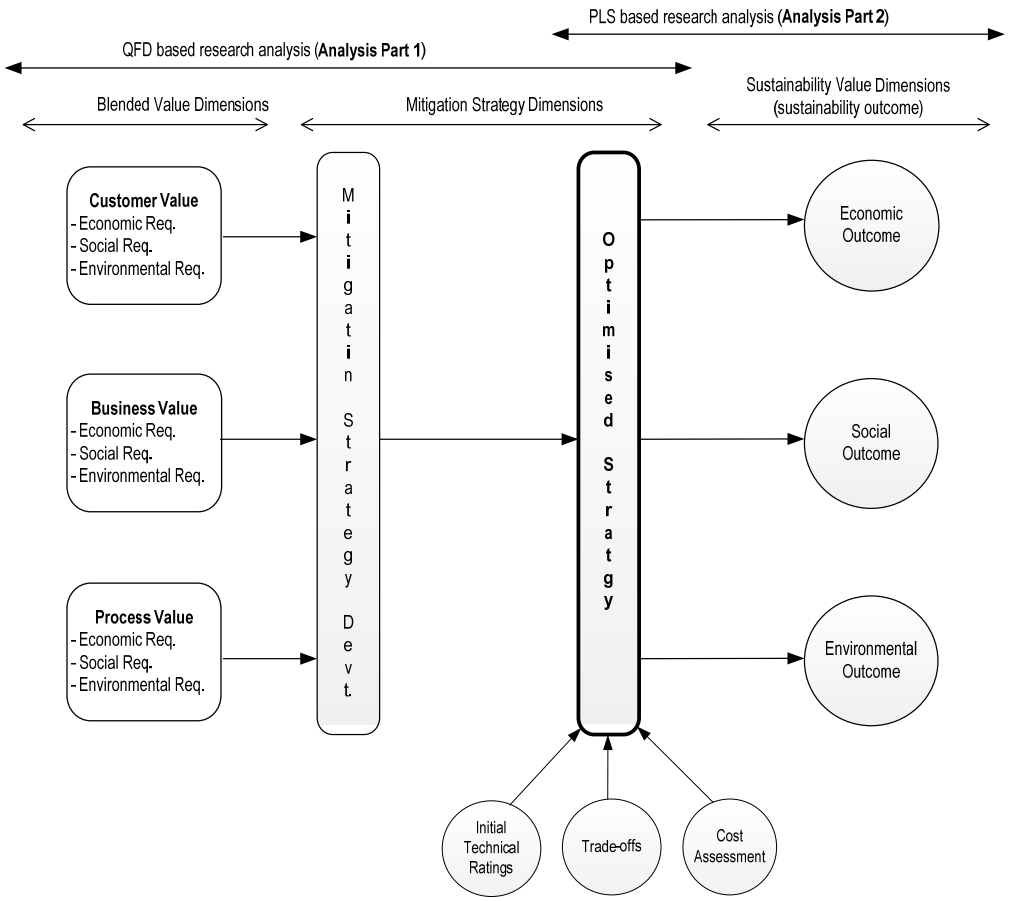


Figure 6.1: Comprehensive research model

The primary aim of 'Analysis Part 1' is to determine the optimal mitigation strategies. In determining the optimal mitigation strategies Park and Kim's (1998) approach is adapted. By following the model, blended value requirements were prioritised at first and then initial mitigation strategies were generated based on the prioritised blended value requirements (economic, social, and environmental value requirements for customer, economic, social, and environmental value requirements for business, and economic, social, and environmental value requirements for process) which are already identified and explained in Chapter 5. Then based on the initial importance ratings, trade-offs, and cost-assessment of the mitigation strategies, a set of optimal strategies were determined. Blended value requirements were prioritised and selected through field study using Analytic Hierarchy Process (AHP) analysis; mitigation strategies were developed using literature and field study; and optimal mitigation strategies were determined using QFD analysis and non-linear quadratic integer programming.

This chapter is organised as follows: blended value requirements are prioritised at first using AHP. Then mitigation strategies are developed corresponding to the important blended value requirements which were prioritised and ranked using QFD analysis. After identifying the important mitigation strategies cost analysis is completed to obtain the relative costs of implementing the strategies and the cost-savings from simultaneous implementations of the strategies. Finally, mitigation strategies are optimised using non-linear quadratic integer programming method based on the importance weights of the strategies, the implementation costs, and the cost-savings.

6.2 PRIORITISATION OF BLENDED VALUE REQUIREMENTS

The field study (presented in Chapter 5) identified a group of sustainability value requirements for customer, a group of sustainability value requirements for business, and a group of sustainability value requirements for process. A total of 21 value requirements for customer, 23 value requirements for business, and 19 value requirements for process were identified which are grouped into economic, social, and environmental values. Table 6.1 shows the number of value requirements in each group identified from the field study. Table 6.3 in the upcoming section shows all value requirements in detail. These total 63 blended value requirements were weighted and ranked using AHP analysis as discussed in Section 4.7.1 in Chapter 4. The upcoming sections show the sample selection, participants' description, data collection, prioritisation process, and findings of the AHP analysis.

Table 6.1: Identified sustainability value requirements

	Number of Customer Value Requirements	Number of Business Value Requirements	Number of Process Value Requirements
Economic:	8	9	7
Social:	6	7	5
Environmental:	7	7	7

6.2.1 Sample Selection

For the prioritisation of blended value requirements it is necessary to rank all of them according to the importance. Since blended value requirements include customer value, business value, and process value, selection of participants was made based on the beneficiary of value types and the position of the participants. A total of 6 participants were selected for the prioritisation of the requirements: 2 customers: 1 corporate and 1 retail; 2 strategic managers; and 2 process managers. Therefore, non-probability sampling or convenience sampling is employed for this purpose (Babbie 2010). Furthermore, this sampling technique provides the means to approach the participants more conveniently (Cavana, Delahaye and Sekaran 2001). The participants took part in this study voluntarily.

6.2.2 Participants' Description

While selecting the respondents, careful consideration was given to make sure that they are highly involved in receiving or delivering the values of the case company and they understand the reason for prioritisation and selection of blended value requirements. Hence, customers, strategic decision makers, and process decision makers of the case bank were selected as the respondents of the field study. Table 6.2 shows the profiles of the participants in this phase of the study. Among the respondents P1 is a retail customer; P2 is a corporate customer; P3 and P4 are business strategic managers; and P5 and P6 are process managers of the case bank.

6.2.3 Data Collection

After selecting the participants, they were approached through telephone for their availability and eventually to participate in the study. The response from all of the participants was encouraging as all 6 of the participants agreed to participate in the

Table 6.2: Participants description

Participant	Company	Position	Respondent Type
P1	University	Senior Lecturer	Retail customer of the case bank
P2	University	Vice Chancellor	Corporate customer of the case bank
P3	Case bank	Asst. Vice President	Strategic manager of the case bank
P4	Case bank	Vice president	Strategic manager of the case bank
P5	Case bank	Deputy Head of IT	Process manager of the case bank
P6	Case bank	Deputy Head of Mobile Banking	Process manager of the case bank

study. Once oral consent was affirmed, the confirmation letter about the date and time of appointment and a brief idea about the participation activities were sent to them. The appointments were scheduled as per convenience of the participants to ensure less disruptions and interruptions in their working schedule. Along with the letter the participant information sheet and consent form were sent to them. The consent form explicate that their participation is fully voluntary and will be kept confidential. This document was signed by the participants before the participation took place. It was observed that the interviewees were at ease during the sessions and they willingly answered all the questions posed to them. A detailed explanation of the activities was provided to every participant before the participation to make sure that correct data is received. Participants were contacted again regarding this matter for further confirmation and validation.

6.2.4 Prioritisation and Selection Process: AHP Analysis

As mentioned earlier (see Section 4.7.1 in Chapter 4), AHP requires pairwise comparisons to assess the priorities of different levels (Saaty 1980; 2008). The process starts with the pairwise comparisons of Level 2 objectives with respect to the overall objective of Level 1 (goal). It then continues to the next level until it reaches the bottommost level (alternative). The assessment is commonly done by asking the questions to the participants. In this research, the pairwise comparison was made by the researcher taking the inputs from the participants. In each stage of the comparison process the participants were asked the question to compare between value requirements and the feedback was translated into an input for the matrix table. For

example, to get the priority weight of 'economic value' of business, alternative with respect to 'social value' and 'environmental value' of business, the following question was asked: "*Between economic value, social value and environmental value of business which one should be considered as the most important value?*" A nine-point scale (as discussed in Section 4.7.1 in Chapter 4) was used to obtain the cardinal ratio measurements of the above question. 'Expert Choice 11" (Expert Choice Inc. 2004) permits pairwise comparisons including numerical comparison, verbal comparison, and graphical representations. In this research approach, the graphical representation of comparison was used.

All 6 participants were asked to compare and rank all of the blended value requirements (economic, social, and environmental values for customer, business, and process) based on their understanding about these value requirements. Details about every value requirement and comparison method were explained to every participant before their comparing process. Participants were asked the comparison-questions to get input for the matrix tables with all of the 63 blended value requirements to compare. Each of the participants was asked to give input for a total of 13 matrix tables: 1 table to compare among economic value requirements of customer, 1 table to compare among economic value requirements of business, 1 table to compare among economic value requirements of process, 1 table to compare among social value requirements of customer, 1 table to compare among social value requirements of business, 1 table to compare among social value requirements of process, 1 table to compare among environmental value requirements of customer, 1 table to compare among environmental value requirements of business, 1 table to compare among environmental value requirements of process, 1 table to compare among economic, social, and environmental value of customer, 1 table to compare among economic, social, and environmental value of business, 1 table to compare among economic, social, and environmental value of process, and 1 table to compare among customer value, business value, and process value (see Figure 6.2 and Appendix **C**).

Once all the inputs were received in the table from the participants, their 'geometric means' were calculated and considered as input for the "Expert Choice 11" to get the weights of the each blended value requirements. The geometric mean is calculated as follows:

$$\left(\prod_{i=1}^{n} a_i\right)^{1/n} = \sqrt[n]{a_1 a_2\, a_3 \ldots\ldots\ldots a_n}$$

where, $\{a_1 a_2\ a_3 \ldots \ldots \ldots a_n\}$ is a given set of data, and n = number of data in the set.

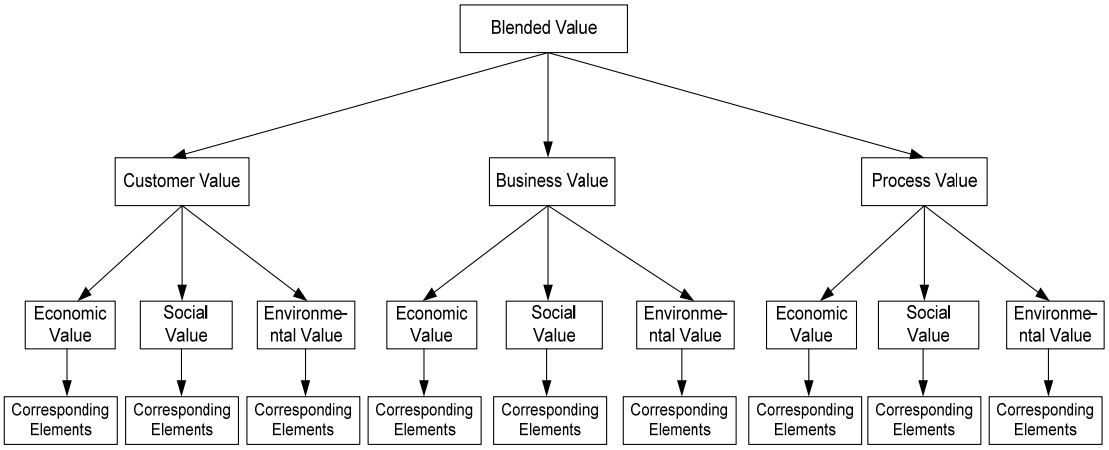


Figure 6.2: Blended value decision hierarchy

6.2.5 Findings

From the comparisons it was observed that when comparing the sustainability value requirements of the customer, the economic value requirements received the highest weight with a weight value of 0.465 (see Figure 6.3). The social value requirements (0.270) received the second position followed by the environmental value requirements (0.265). Similar results were observed from the comparisons of the business value requirements (see Figure 6.4). The highest weight is received by economic value requirements (0.482) followed by social (0.271) and environmental value requirements (0.247). But from the comparisons of the process value requirements it is found that although economic value requirements received the highest weight (0.473), unlike customer value requirements and business value requirements, the second position is achieved by environmental value requirements (0.279) instead of social value requirements (0.248) (see Figure 6.5).

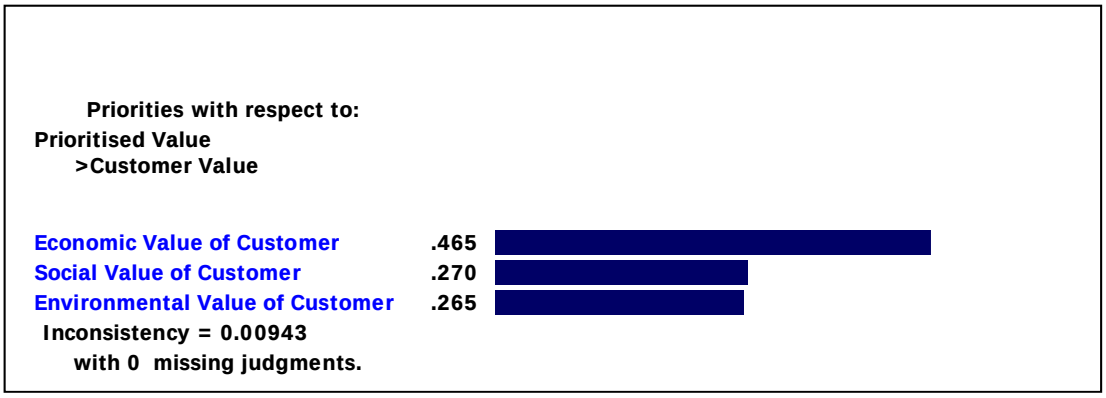


Figure 6.3: Weights of the sustainability value requirements of customer

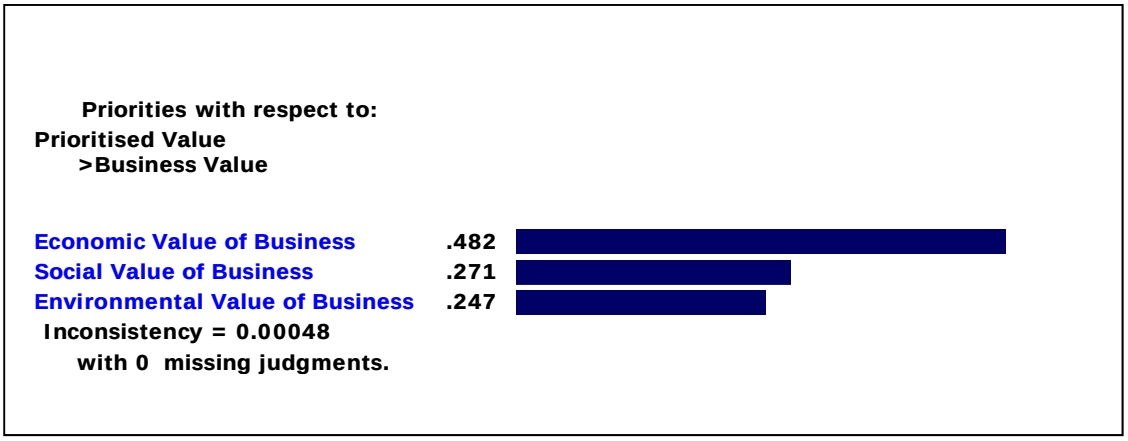


Figure 6.4: Weights of the sustainability value requirements of business

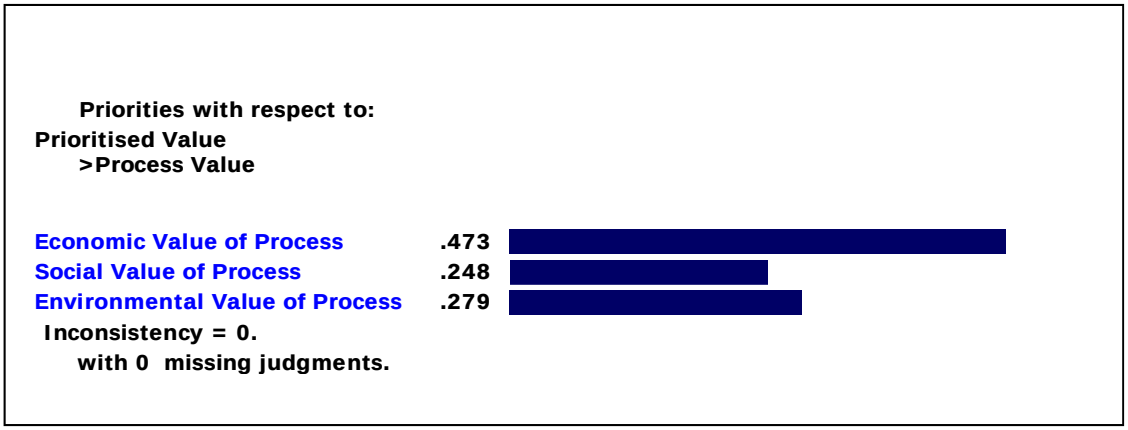


Figure 6.5: Weights of the sustainability value requirements of process

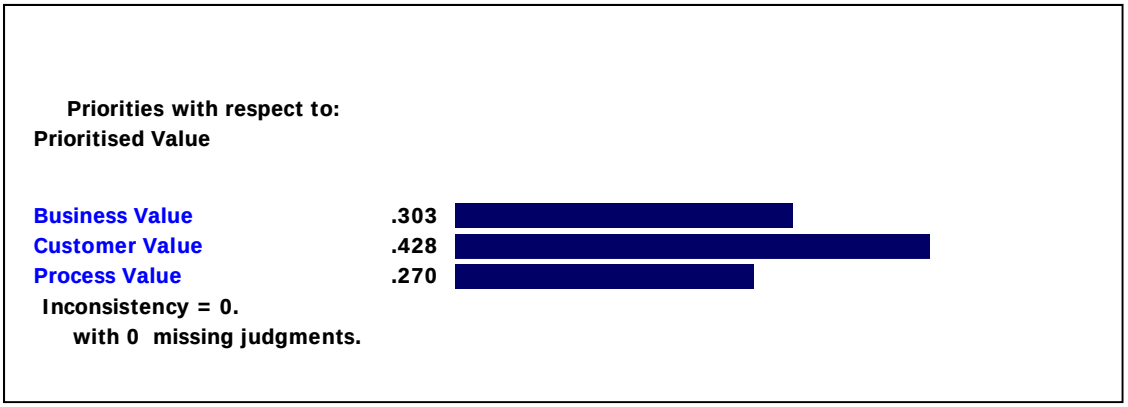


Figure 6.6: Weights of the customer value, business value, and process value

Therefore, what is realised from the above discussion is that in all three comparisons (sustainability value requirements for customer, business, and process) economic value requirements obtained the highest priority.

When compared among the customer value, business value, and process value, it was revealed that customer value was considered as the most important with a weight value of 0.428 followed by business value with weight value of 0.303, and process value with weight value of 0.270 (see Figure 6.6).

Based on the weights discussed above, all 63 blended value requirements were synthesised using "Expert Choice 11" (2004) software package to get actual blended weight of each of them (see Appendix **D**). After synthesising the weights the following results were obtained as shown in Table 6.3:

Table 6.3: Weights of the blended value requirements from AHP analysis

Sustainability value of customer:		**Representing Symbol**	**Blended weight (Synthesised)**	**Synthesised order of importance**
Economic requirements	Security of the services for customer	CR1	0.049	1
	Quality of the services for customer	CR2	0.041	2
	Simplicity of the services and complexity level	CR3	0.029	4
	Profit/benefits from the services for customer	CR4	0.026	7
	Total time needed to get the services by the customer	CR5	0.021	10
	Potential value added services for customer	CR6	0.019	12
	Costs of the services for customer	CR7	0.015	16
	Customer service excellence	CR10	0.019	12
Social requirements	Compliance of legislation and code of conduct	CR8	0.022	9
	Accountability of products and services for customers	CR9	0.021	10
	Human rights of employee	CR11	0.015	16
	Contributions to social development at national level	CR12	0.014	17
	Contributions to local community development	CR19	0.013	18
	Employment and benefits	CR21	0.011	19

Environmental requirements	Usage of energy resources by the organisation	CR13	0.022	9
	Organisation's impact on air resources	CR14	0.017	14
	Usage of materials	CR15	0.016	15
	Proper environmental policy and management	CR16	0.015	16
	Compliance of environmental legislation	CR17	0.015	16
	Organisation's commitment for future generations	CR18	0.015	16
	Organisation's impact on land resources	CR20	0.013	18
Sustainability value of business:				
Economic requirements	Reputation of the organisation	BR1	0.028	5
	Profitability, liquidity and investment capability	BR2	0.023	8
	Economic performance of the company including share performance, market growth, and ROI	BR3	0.022	9
	Cost of goods, materials and services consumed	BR4	0.018	13
	Readiness for risk and crisis management	BR5	0.016	15
	Potential benefits for the business from overall improvements (market growth, productivity)	BR6	0.016	15
	Overall productivity of the business for cost efficiency	BR7	0.015	16
	Taxes paid to all taxing authorities	BR17	0.009	21
	Customer relationship management	BR8	0.017	14

Social requirements	Maintaining products and services responsibilities by the bank	BR9	0.015	16
	Legislation and social code of conduct compliance	BR10	0.014	17
	Labour practices and benefits of the employee	BR15	0.010	20
	Non-discrimination and freedom of association	BR18	0.007	23
	Government taxes	BR19	0.007	23
	Local community development	BR21	0.006	24
	Social development at national level	BR22	0.006	24
Environmental requirements	Total consumption of fuel and power	BR11	0.014	17
	Environmental legislation compliance	BR12	0.014	17
	Internal environmental policy and management by the business	BR13	0.013	18
	Usage of materials by the organisation	BR14	0.011	19
	Commitment for future generations	BR16	0.010	20
	Contribution to air pollution by the organisation	BR20	0.007	23
	Land pollution by the organisation	BR23	0.006	24
Sustainability value for process:				
Economic requirements	Security of the processes including data security	PR1	0.037	3
	Risk and crisis management of the processes	PR2	0.027	6
	Productivity of the processes	PR3	0.019	12
	Financial structure of the process division	PR4	0.018	13
	Process related costs	PR5	0.014	17

	Potential benefits for the process from technological improvements	PR6	0.014	17
	Meeting additional customer requirements	PR7	0.020	11
Social requirements	Fulfilment of products and services requirements by process	PR8	0.017	14
	Non-discrimination and freedom of association	PR13	0.009	21
	Labour practices and benefits in the process division	PR14	0.008	22
	Local community development enhancement	PR17	0.007	23
	Social development enhancement at national level	PR18	0.007	23
Environmental requirements	Environmental legislation compliance by the process division	PR9	0.016	15
	Process related fuel and power consumption	PR10	0.014	17
	Usage of materials for the process	PR11	0.011	19
	Internal environmental policy and management by the process	PR12	0.011	19
	Process related air pollution	PR15	0.008	22
	Waste disposal and land pollution by process division	PR16	0.008	22
	Environmental performance of suppliers	PR19	0.006	24

It is found from the synthesised results that 'Security of the services for customer' and 'Quality of the services for customer', which are parts of economic value requirements of customer, achieved maximum importance by the participants based on the weights. The synthesised weights of the 'Security of the services for customer' and 'Quality of the services for customer' are 0.049 and 0.041 respectively (see Table 6.3). The third-most importance was given to 'Security of the processes including data security' with a weight value of 0.037, which is a part of process value requirements of process and

fourth-most importance was attained by 'Simplicity of the services and complexity level' which is again a part of economic value requirements of customer. The fifth position weight was given to 'Reputation of the organisation' (0.028) which is a part of economic value of business, and the sixth position weight was given to 'Risk and crisis management of the processes' (0.027) which is a part of economic value of process. The seventh (Profit/Benefits from the services for customer: 0.026) and eighth (Profitability, liquidity and investment capability: 0.023) positions were also given to the economic values.

The ninth position was jointly achieved by an economic value requirement of business ('Economic performance of the company including share performance, market growth and ROI: 0.022)', a social value requirement of customer ('Full compliance of legislation and code of conduct': 0.022), and an environmental value requirement of customer ('Usage of energy resources by the organisation': 0.022). So, what is revealed from this result is that from position one to eight there is no position for social or environmental value requirements which indicates that customers, strategic managers, and process managers are more concerned about the economic value requirements than social or environmental value requirements.

Similarly, the tenth position weight was jointly achieved by an economic value requirement ('Total time needed to get the services by the customer': 0.021) and a social value ('Accountability of products and services': 0.021) requirement of customer. The next importance weight was given to 'Meeting additional customer requirements' with a weight value of 0.020 which is a part of economic value requirements of process. The twelfth position importance was jointly given to three value requirements with a weight value of 0.019, which are 'Potential value added services for customer' (economic value requirement of customer), 'Customer service excellence' (economic value requirement of customer), and 'Productivity of the processes' (economic value requirement of process). Again, the detailed weights of every blended value requirements with their ranks are shown in Table 6.3.

6.3 DEVELOPMENT OF MITIGATION STRATEGIES

6.3.1 Sample Selection and Data Collection

After the prioritisation process of the blended value requirements, mitigation strategies are developed for QFD analysis as discussed in Section 4.7.2 in Chapter 4. For this purpose, the literature was reviewed and the strategic managers of the case bank who

are involved in decision making of the company were selected and contacted to complete four tasks:

i. To develop and select the strategies for the mitigation of those value requirements;

ii. To decide the mitigation impact of each strategies on the blended value requirements;

iii. To identify the degree of relationships between the mitigation strategies; and

iv. To decide about the approximate costs of implementing the mitigation strategies individually and simultaneously including the cost savings.

A total of 3 participants were selected from the top management of the case company for the above mentioned tasks. The participants took part in this study voluntarily. Table 6.4 shows the demographic information of the participants. In this section, development and selection of mitigation strategies are mainly discussed. Decision about the mitigation impact of each strategy on the blended value requirements and decision about the approximate costs of implementing the strategies are discussed in the upcoming sections.

Table 6.4: Participants' description

Participant	Company	Position	Respondent Type
S1	Case bank	Asst. Vice President	Strategic manager of the case bank
S2	Case bank	Vice president	Strategic manager of the case bank
S3	Case bank	Head of IT	Process manager of the case bank

6.3.2 Mitigation Strategies Development and Selection

The literature was thoroughly reviewed to develop the initial mitigation strategies corresponding to the blended value requirements. Then the above participants were contacted and requested to sit together along with the researcher for a discussion to select appropriate strategies for the mitigation of all value requirements. The participants kindly managed suitable time at their convenience to meet together for a discussion and selection of the mitigation strategies. After an extensive discussion on the blended value requirements, finally, a total of 18 strategies were recommended by the participants for the mitigation of all value requirements. It was revealed that out of

18 mitigation strategies, 11 of them are for economic value requirements, 4 of them are for social value requirements, and 3 of them are for environmental value requirements. Table 6.5 shows all the selected mitigation strategies which are explicated below:

Table 6.5: Selected mitigation strategies

MS1	Outsource high security software and hardware	MS10	Improve vigilance to illegal actions
MS2	Learning and development of the employee	MS11	Establish green banking cell
MS3	Ease e-banking service delivery process	MS12	Ensure efficient availability of service delivery point
MS4	Maintain privacy of information	MS13	Establish CRM unit
MS5	Increase CSR activities for national development	MS14	Improve efficiency in supply chain management and use of goods, materials, and services
MS6	Ensure crisis management and early warning signals above industry standard	MS15	Reduce the impact on air
MS7	Redesign e-banking products	MS16	Improve efficiency of internal processes
MS8	Invest more on potential value added services	MS17	Ensure socially responsible action throughout the organisation
MS9	Manage investment efficiently	MS18	Increase environmental CSR activities for future generation

1. Outsource high security software and hardware (MS1)

It was realised from the field study that customer considers security of the e-banking services as the main element of reliability. Locally produced software and hardware do not meet the security standard required by the bank for the processes and services. The bank itself also doesn't have facility to develop high quality software or hardware.

Reliability of the services is fundamental to product or service quality (Parasuraman, Zeithaml and Berry 1988; Van Gorder 1990). Liao and Cheung (2002) proposed that expected security is a significant quality attribute in the perceived usefulness of Internet-based e-retail banking. Security of e-banking is being defined as a threat which creates circumstance, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service, and/or fraud, waste, and abuse (Yousafzai, Pallister and Foxall 2003; Kalakota and Robinson 2003). According to the customers of

the bank security of the e-banking e-services means full security warranty for them against any kind of fraudulent and incorrect transaction.

Process security was identified as one of the major requirements by the bank. An appropriate security, which means giving security and confidentiality to the operations and insuring customers against fraud on the e-business services, was identified as a basic condition for the e-banking processes. This basic condition is also emphasised by González et al. (2004). It was revealed from the field study that the existing software and hardware infrastructure fulfils only seventy precents of the process managers' expectations. Therefore, to ensure full security of the e-banking services for the customers and security of the processes high quality software and hardware are must. Consequently, outsourcing high security software and hardware was chosen as the only option to maintain full security for the e-banking services and processes.

According to the management of the bank, security of the services is one of the prime requirements for overall quality of the e-banking services. Therefore, fulfilling of this requirement will help to attain positive impression of the customers.

2. Learning and development of the employee (MS2)

Learning and development of the employee includes emphasising training and awareness programs for employees about the security and quality of services. Awareness among employees is very important to maintain process security and the customer's security. The learning and development process in this bank also includes improving the efficiency of the employee through increased accuracy of services, individual attention, knowledge and skills, responsiveness and pro-activeness.

To increase competency and responsibility of the employee learning and growth is essential (Titko and Lace 2010). Both the customers and the managers of the bank agreed on the fact that quality of the e-banking services plays major role in satisfying the customers. Competency of the employee is essential to deliver high quality product and service. Providing quality products and services to customers enhances a bank's reputation, improve its customer retention, attract new customers, and increases its financial performance and profitability (Zeithaml, Berry and Parasuraman 1996). Delivering quality service and products is essential for success and survival in today's competitive banking environment (González et al. 2004; Wang, Lo and Hui 2003). It was also realised from the field study that there is a lack of awareness among the employees about the security. According to Jamal and Naser, 'the bank management has

to make sure that the employees are properly trained so that the employees are not only courteous, pay attention and are willing to help customers, but also are experts in their field so that they understand specific customer needs' (Jamal and Naser 2002, p.157). Therefore, learning and development of the employee was chosen as the mitigation strategy.

The strategic managers affirmed that this strategy will also help to increase the productivity of the processes and decrease the total time to provide the services for the customers. Increase in productivity and decrease in service delivery time will result in cost efficiency for the business and more quality of the services for the customers. Learning and development will also help to enhance the process security and security of the services for customer.

3. Ease e-banking service delivery process (MS3)

Most of the customers of the case bank opined that e-banking and its related services are very complex to them. Issues, such as, user-interface, resetting of PIN or password, ATM card replacement, registration for Internet banking were commonly identified as complex process by the customers. According to the customers, a number of benefits of e-banking services are eliminated due to the complexity of the service delivery process.

To analyse customer requirements efficiently and to provide customer friendly services complexity of the services need to be reduced to minimum. Levesque and McDougall (1996) considers convenience of the banking services, such as, locations, visual appeal (interface), simplified statements, easy to get in/out quickly, etc. as the important features of the customer satisfaction. Bauer et al. (2004) considers simplicity, flexibility, easy access and easy transaction completion as the core elements of convenience of e-banking services. Even, to build confidence and trust of the customers on the e-banking services, complexity of interactions need to be reduced (Yousafzai, Pallister and Foxall 2003). A number other scholars (e.g., Wang, Lo and Hui 2003; Poon and Lee 2012; Collier and Bienstock 2006; Cho and Park 2001; Yang and Jun 2002; Parasuraman, Zeithaml and Malhotra 2005) also have identified ease of use as one of the important antecedents of product and service quality in e-services. González et al. (2004) argue that if the users cannot efficiently obtain the services desired or if they do not know how do they work, potential benefits will be eliminated or reduced for the users as well as for the provider. To reduce the complexity and to simplify the service delivery, e-banking service delivery process must be simplified and eased.

Easing the service delivery process will also significantly reduce the total time to get the services by the customers. Saving of time and energy was considered as imperative aspects of the quality of the e-banking services by the customers.

4. Maintain privacy of information (MS4)

Privacy of information is not strictly maintained by most of the banks in Bangladesh. For example, it is very common to reveal the account information by the employees to others when asked without the consent of the account holder. But privacy of information is considered as part of the quality, reliability, security, and as a whole accountability of the e-banking products and services by the customers of this bank. Similarly, it was alleged by the customers that since privacy is not maintained strictly, the services provided by the employees related to e-banking services (e.g., card replacement, PIN change, etc.) are commonly inaccurate for which time of both the customers and the employees is wasted.

Accountability of the e-banking products and services is considered crucial by the management of the bank for ensuring reliability, trust, and commitment. From the field study it was revealed that maintaining privacy of information is the main elements of the products and services accountability/responsibility. Privacy of information is strongly demanded by the customer as it is closely linked to the security aspect of the e-banking services. Zeithaml et al. (2002), Yousafzai et al. (2003), and Bauer et al. (2004) also mentioned privacy as one of the significant elements for measuring the quality of the services. Levesque and McDougall (1996) considers 'meeting promises' as one of the core elements of customer satisfaction in the banking industry. Empirical studies have found that financial services consumers are often reluctant to share personal information from the fear that their financial life will become an open book to everyone (Yousafzai, Pallister and Foxall 2003).

Therefore, this mitigation strategy was identified by the management to ensure the accountability/responsibility of the e-banking product and services. It was affirmed by the management that maintaining privacy of information will have significant positive impact on the reputation of the organisation.

5. Increase corporate social responsibility (CSR) activities for national development (MS5)

From the field study it was comprehended that reputation of the organisation plays very critical role in the banking industry. According to the managers of the bank, reputation is very important in the country to gain trust of the customers. Two types of reputation were mentioned by the managers that customers usually seek for: reputation for technological excellence and reputation for CSR or social cause activities.

The CSR construct describes the relationship between business and the larger society (Snider, Hill and Martin 2003). The positive link between CSR performance and business performance has already been established (Simpson and Kohers 2002). Griffin and Mahon (1997) provide the empirical evidence on the relationship between CSR performance and financial performance. Therefore, CSR activities help to build strong relationships with the society by increasing reputation among the customers which can lead to increased business performance. The bank is already investing on social cause activities to a certain extent and some reputation has already been established. Therefore, more CSR activities are recommended for the national development to gain more reputation since the customers consider it as the main element for trust. Among all the CSR activities some must be committed for the environment to meet the needs of future generations.

More CSR investment by the bank will fulfil the customer's requirements regarding contributing to the social development at national level and the environmental commitment for future generations. Contributing to the social development and fulfilling the environmental commitment will help the bank to gain more reputation.

6. Ensure crisis management and early warning signals above industry standard (MS6)

From the field study, readiness of the organisation for risk and crisis management was identified as very important element of the e-banking services since the business is heavily dependent on the technological platform. E-banking crisis may occur from fraud, processing errors, system disruptions, or other unexpected events resulting in the bank's inability to deliver products or services followed by huge financial and reputation loss. Both the business managers and the process managers indicated that one small failure of the system could be disastrous for the whole business.

Along with the quality of the banking services, e-banking has increased the complexity and the quantity of the transactions and operations risks and crises. Banks must be aware of such risks and crises, and take appropriate actions in order to benefit from e-banking services (Angelakopoulos and Mihiotis 2011). Crisis management has a high connection with reputation and license to operate protection (Delai and Takahashi 2011). According to Hoggarth et al. (2004), ensuring crisis management is crucial to protect the payments system and to reduce the damage to confidence in the banking system.

Implementation of an early warning system is important for signs of changes in bank's operating risks (Coletti and Tirri 2005). At the same time, for the competitive advantage it is essential to implement early warning signals above local industry standard. Therefore, the standard of the crisis management of the bank cannot be less than the standard of any other internationally reputed banks. To ensure high standard crisis management and early warning signals this strategy was recommended.

Sweeney et al. (1999) proposed that the less the perceived financial/performance risk, the greater is the perceived product/service quality. They also proposed that perceived financial/performance risk is a true mediator of the various quality components (product quality, technical service quality, functional service quality) and value. Management of the bank also agreed that satisfactory risk and crisis management measures will have positive impact on the overall quality of the services of the bank.

7. Redesign e-banking products (MS7)

The existing costs of the e-banking products and services for the customers are little high which can be reduced or adjusted with other costs. It was revealed from the field study that the customers are not fully satisfied with the e-banking charges. According to the customers, charges for e-banking services should be less than the charges of traditional accounts as e-banking services require less human resource. Mihelis et al. (2001) found in his study that cost of the offered product and services is an important factor for customer dissatisfaction in the banking industry.

In addition, it was demanded by the customers of the bank that profit rates from the e-banking accounts should be higher than traditional accounts like other developed countries. González et al. (2004) advocates that to be competitive banks need to offer competitive return of investment for the customers coupled with a deep comfort and reliability of the services. A study by Levesque and McDougall (1996) revealed that

bank's competitive interest rates are significant contributors to customer satisfaction. It was also suggested by the customers of the bank that there should be some rewarding programs for the customers for using the e-banking services.

Since the existing costs of the e-banking products and services are visible to the customers, redesigning products with reduced costs, increased profits, and rewarding options were proposed. The costs arising from the redesigning of the products can be adjusted with the other costs of the e-banking services which are less visible to the customers.

8. Invest more on potential value added services (MS8)

After analysing the customer needs and recognising the latent demands of the customers, more investment on potential value added services of e-banking was selected as the strategy to improve the market share. Potential value added services, such as, new technology and new contents are given considerable importance both by the customers and the business managers. Identified potential value added services include free reports, financial tools, online processing of services (FDR, loan, third-party payment), investment suggestions, priority banking for valued customers, after-hours or weekend banking, etc.).

González et al. (2004) found in a study that investing on potential value added services, such as, new information technology including equipment and software are very important to satisfy the customer requirements. A study by Mihelis et al. (2001) revealed that value added services or special services are very important to the customers. Furst et al. (2002), Broderick and Vachirapornpuk (2002), and Csikszentmihalyi (1988) are among other scholars who strongly emphasised e-banking value added services for customers. Potential financial benefits from technological improvement have been highlighted by Vinodh and Chintha (2011) and Mahmood and Mann (2000). It has been also experienced by the strategic management of the bank that 'technological change provides the impetus for new and better ways to satisfy customer needs' (Teece 2010, p. 187). The bank experienced a significant growth in market share when the bank first made a huge investment on setting up the largest ATM network of the country. According to the strategic management, value added services increases the satisfaction of the customers, and consequently, satisfaction of the customers helps to improve the market share. Customer satisfaction and market share have direct impact on the profitability (Anderson, Fornell and Lehmann 1994).

Investment on value added services, such as, largest ATM network, mobile banking, and Internet banking has already proved the significant positive impact on the bank's market share growth. Improved market share will have positive impact on the profitability, liquidity and investment capability of the bank (Anderson, Fornell and Lehmann 1994). Therefore, improved market share will have significant influence on the return-on-investment.

9. Manage investment efficiently (MS9)

According to the strategic managers of the bank minimising costs and maximising earnings are very important for better economic performance of the bank, which is comprised of return-on-investment, revenues, and market share and growth. To them, earning per share (EPS) and the rate of return on investment (ROI) also reflect the economic performance.

Study finds that of the firms that increased IT investments annually, those with superior strategic position increased management productivity three times more than firms with inferior strategic position (Schoeffler 1983; Weill and Margrethe 1989). Which means appropriate strategic direction is very important for investment to achieve desired economic performance. According to Weill and Margrethe (1989), every investment must be converted into useful outputs and important organisational issues, such as, the impetus for the investment and the link to strategy, must be emphasised when considering investment. The strategic mangers of the bank have opined that to minimise costs and maximise earnings and to ensure good economic performance efficient management of investment is very important. Efficient investment includes not just understanding of the investment options available but also assembling the evidence needed to validate conjectures and hunches about costs, customers, competitors, complementors, distributors and suppliers takes detailed fact-specific inquiry, and a keen sense of customer needs and customer willingness to pay, along with the understanding of competitor positioning and likely competitive responses (Teece 2010, p.188). Efficient management of investment will enhance the profitability, liquidity, and investment capability.

Efficient management of investment will also assists in reducing the process costs to a certain extent. Since economic performance, profitability, liquidity, and investment capability were judged as important economic value requirements for business, efficient management of investment was selected as the strategy to facilitate them.

10. Improve vigilance to illegal actions (MS10)

Legislation and code of conduct compliance was identified as one of the important social value requirements by both the customers and the bank. Similarly, environmental legislation compliance was recognised as another important value requirement. There is no dedicated vigilance team currently exists in the management of the bank for the vigilance of legislation compliances.

Assuring sustainability in the organisation requires constant vigilance from planners, managers, and others (Goldsmith and Brinkerhoff 1990, p.229). According to the management of the bank a dedicated team can be effective for the vigilance of compliances by the organisation related to legislations and social codes of conduct. Although the bank is not complying with all the legislations currently, the strategic management intends to comply with all the government legislations and social code of conducts as early as possible.

The base-line for consideration of the business response to the environment is compliance with the legal requirements (Roome 1994). To the management, full compliance of legislations including the environmental legislations can only be ensured by improving the vigilance to illegal actions. So, development of a vigilance team was highly recommended for the optimum improvement of the vigilance. It is confirmed by the strategic management that this improvement of vigilance will also facilitate the environmental policy and management of the bank.

11. Establish green banking cell (MS11)

Recently, environmental concerns have been introduced to the banks and other financial businesses by the central bank of Bangladesh. The government has been trying softly to address the issue by framing environmental legislations and encouraging industry to follow environmental technologies and practices. Due to the growing awareness about the environmental values in the country banks are now trying to adopt green banking policies to attain reputation.

There are evidences that show positive link between environmental performance and financial performance (Hamilton 1995; Hart and Ahuja 1996; Blacconiere and Patten 1994). Both by the bank and its customers have strongly emphasised on the environmental issues, such as, energy usages, pollution, legislation, policies and management. To reduce the impact on air, usage of energy (power and fuel consumption), and usage of materials a sustainability-oriented organisational culture is

essential for the business. Strategic management of the bank have agreed on the fact that establishment of the green banking cell by the bank can bring that culture in the organisation. Currently the bank does not have any dedicated cell or unit for the environmental management. It is also agreed that establishment of green banking cell will look after the environmental policy and management issues, such as, creating awareness about environmental values among the employees and the customers, monitoring the pollution issues, etc. Managers affirmed that the environmental legislation compliance issues can be dealt by the green cell, too, to minimise the legal risks. According to them, establishment of the green banking cell will assists in managing environmental risks and in identifying innovative environment friendly products that will facilitate reduction of process costs. There are evidences where environmental management system has positive result in cost savings, increase in bond value, etc. (Heim and Zenklusen 2005). Hence, this strategy was selected by the management.

Green banking cell will also assists the bank in reducing the usages of materials and energy resources. Reduction of energy resources will lead to less fuel consumption and less air pollution. Any initiative regarding fulfilment of environmental value requirements will enhance the reputation of the bank. In addition to the enhanced efficiency through operations, sustainability in information system management can improve the corporate image, the competitive advantage, and the attractiveness to investors and customers through demonstrating a corporate commitment to environmental awareness (Erek et al. 2009).

12. Ensure efficient availability of service delivery point (MS12)

According to the customers of the case bank, although the bank has installed the largest ATM network in the country, a number of them do not work for various reasons when customers need them. For example, if one of the ATM is not in working condition customers do not know where the nearest next one is since there is no list or map is available at the ATM booths. Even at the e-banking customers service points customers need to wait much longer than they expect.

Availability of service delivery point and efficient service delivery are the main cause that effect the total time required to get the e-banking services by the customers. Cox and Dale (Cox and Dale 2001) found that determinants, such as, accessibility, communication, and availability are critical to the success of e-retailing services. Reliability of the service has a strong influence on the overall product quality in the

banking industry (Wang, Lo and Hui 2003). Similarly, Levesque and McDougall (1996) and Parasuraman et al. (2005) identified accessibility and system availability of the e-banking services accordingly as the key contributors to the customer satisfaction. A study by Mihelis et al. (2001) found that waiting time of the customer can play critical role for customer satisfaction in the banking industry. In a study, González et al. (2004) identified machines availability and convenient e-banking service delivery point as the significant aspects for satisfying the customers and suggested to increase the number of e-banking facility which will allow the customers to make more transactions with comfort and service quality. It was revealed from the field study that efficient availability of service delivery point is considered by the customers as a requirement of the standard e-banking services.

Strategic managers agreed on the fact that decrease in total time of delivering the services will enhance the total quality of the e-banking services. Wang et al. (2003) argue that product availability and product convenience should be the important antecedents of product quality.

13. Establish customer relationship management (CRM) unit (MS13)

Customer service excellence and meeting additional customer requirements are identified as one of the imperative economic value requirements from the field study. Currently the bank does not have a dedicated customer relationship management (CRM) unit and customer relations are maintained individually by the branches of the bank. Therefore, the lack of communication with the customer or customer involvement is clearly visible.

A CRM unit in the organisation enhances the overall process of building and maintaining customer relationships by delivering superior customer value and satisfaction (Kotler and Armstrong 2004). Good customer service positively influences the overall evaluation of products and companies (Poon and Lee 2012).A study by González et al. (2004) revealed that increased customer involvement through frequent contacts and feedback, phone interviews, surveys, etc. is essential to satisfy the customer requirement. The output of the CRM unit will be four dimensional (Sin, Alan and Yim 2005): (i) key customer focus that includes delivering superior and added value to selected key customers through personalized/customized offerings; (ii) CRM organisation which includes organisational structure, organisation-wide commitment of resources, and human resources management; (iii) knowledge management that includes knowledge learning and generation, knowledge dissemination and sharing,

and knowledge responsiveness; and (iv) technology based CRM that includes equipping the business with the IT capability to collect, store, analyse, and share customer information in ways that greatly enhance their ability to respond to the needs of individual customers and thus to attract and retain customers. Top level managers of the bank agreed on the fact that to maintain good customer relationships and to get to know about and fulfil the additional customer requirements of the customers CRM unit is essential. According to the management of the bank, good customer relations help to gain more knowledge about the customers and their demands and therefore, help to serve the customers better for increased satisfaction (Zeithaml and Berry 1993; Zeithaml, Berry and Parasuraman 1991; Shani and Chalasani 1992).

CRM has generally been assumed to create a competitive edge for an organisation, as well as to have a positive impact on organisational performance (Sin, Alan and Yim 2005). Establishment of CRM unit will help to develop the longitudinal relationships with the customers from which both the bank and the customers will be benefitted. According to the management of the bank CRM unit will also help to provide customer friendly services which is considered as part of the product and service requirements.

14. Improve efficiency in supply chain management and use of goods, materials, and services (MS14)

One of the imperative economic value requirements recognised by the bank is the process cost that includes e-banking maintenance costs (ATM, mobile banking, Internet banking, data centre), network link costs, materials consumption costs, power costs (electricity, generator, IPS), and more. In the country, the availability of network links and power facility, which are considered as basic necessities for e-banking operations, is not to the required level. It was revealed from the field study that the cost of fulfilling these two requirements is very high compared to other countries among other processing costs.

According to Beamon and Ware (1998), improving the quality of all supply chain processes results in reduced costs, improved resource utilisation, and improved process efficiency. The management of the bank realised that to reduce the process costs supply chain management has to be more efficient. The main objectives of improving efficiency in supply chain management is to enhance the operational efficiency, profitability, and competitive position of the company and its supply chain partners (Min and Zhou 2002). Similarly, goods, materials, and services have to be used more efficiently by the bank to reduce the consumption costs. Schaefer and Crane

(2005) explicate how efficient consumption helps to achieve sustainability. Resource usage (e.g., total material consumed) has been identified as one of the core elements of supply chain performance (Beamon 1999). Hence, to reduce the process costs this strategy was selected.

Emphasising on three areas, i.e., resource usage, energy usage, and waste generation, helps businesses to achieve and maintain green supply chain for sustainability (Beamon 1999). Figge and Hahn (2004) found out that efficient use of resources lead to the reduction of environmental impact. Replacement of the old generators was suggested by the bank management with the more efficient ones which consume less fuel and create less pollution. Along with the process costs, efficient use of goods, materials, and services will bring down the amount of power and fuel consumption that will help to reduce the impact on the environment.

15. Reduce the impact on air (MS15)

Impact on the air resources or air pollution was recognised as one of the imperative environmental requirements by the customers. Discharges of smoke on air from air-condition and generator usages are identified as the main reasons for polluting the air by the bank. Moreover, most of the employees of the bank use different transports instead of mass transport to travel to their workplace.

According to Holliday et al., (2002b), a key contribution of companies to sustainability is the reduction of air pollution. This key contribution of companies happens through reducing their impacts on air, water, and land (GRI 2011). This contribution has several positive impacts on company performance since reductions on environmental impacts means optimisation in the usage of raw materials, energy, and more (Delai and Takahashi 2011). Therefore, this strategy is selected to reduce the impact on air by reducing the usages of air-condition and generator, and by arranging and encouraging mass transport for the employees. Reduction in air-condition and generator usages will result in reduced usages of energy resources (power and fuel consumption) that will assist in trimming down the e-banking process cost.

Implementation of this strategy will fulfil the customer's requirements regarding organisation's impact on air resources and reduced usage of energy resources by the organisation; business's requirements about cost of goods, materials and services; and process's requirements about energy consumption and processing costs.

16. Improve efficiency of internal processes (MS16)

From the field study, it was exposed that the internal efficiency of the process is not at the desired level. It was also agreed by both the business and process managers of the bank that productivity is the key to process efficiency and cost efficiency. The managers opined that efficiency of the internal processes plays main role in improving the productivity, and productivity plays important role in reducing the process costs.

According to Weske (2012), a company can reach its business goals in an efficient and effective manner only if people and other enterprise resources, such as, information systems, play together well; and business process is the crucial tool to facilitate these effective collaboration. Productivity is clearly the key factor in operation and management, and directly related to the organisational performance (Fisher 1990). Productivity and internal efficiency are considered as imperative business requirements by many other scholars, such as, Wang and Hong (2007) and Figge et al., (2002). Hlupic and Robinson (1998) suggest that the management needs fundamental rethinking and process redesigning to achieve significant improvements in the performance of the company.

Since the productivity was identified as one of the key economic value requirements, improvement of internal processes efficiency was emphasised in this strategy. Use of productivity software and hardware was suggested for the improvement of internal efficiency. In addition, establishment of research and development unit was also suggested for the internal efficiency improvement.

17. Ensure socially responsible actions throughout the organisation (MS17)

The strategic managers of the bank argued that socially responsible actions throughout the organisation need to be ensured for the protection of human rights inside the organisation. Human-rights of the employees was identified as one of the important social value requirements by the customers. Non-discrimination and freedom of association were acknowledged as the main aspects of human rights.

Focus on social responsibility can be an area of high importance and can enable organisations to derive sustainable competitive advantages; for example, making environmentally and socially responsible decisions and implementing social human resource policies can create added social value for the organisation (Zairi and Peters 2002; Nelson 1998). Turban and Greening (1997) states that that firms engaging in

socially responsible actions would have more positive reputations and would be perceived as more attractive employers. Reducing environmental incidents and improving employee safety and health improve productivity and lower operating costs (Kaplan and Norton 2004, p.165).

Therefore, socially responsible actions of the organisation will not only protect the human rights of the employees but also enhance the reputation of the organisation. Zairi and Peters (2002) suggest that there are links between the socially responsible actions and economic benefits, various efficiencies, and positive corporate image. Hence, this strategy was proposed.

18. Increase environmental CSR activities for future generation (MS18)

Commitment for the future generations was strongly recognised by the customers in the field study when they were asked to respond about the reputation of the bank. Though the bank is investing on environmental CSR activities to a limited extent, customers are demanding for more contribution. Customers identified issues, such as, funding for environmental enhancement projects, implementing solar technology, and using e-media to create awareness about environmental value (global warming, ozone depletion, and environmental pollution) among the employees and clients by the bank as the environmental activities the bank should perform for the future generations.

It has been recognised by the scholars that the relation between environmental and economic interests is a balance of purely competitive and purely cooperative (Sarkar 2008; Babiak and Trendafilova 2011). This view has been advocated by Gimenez Leal et al. (2003) and claimed that there is a direct and positive connection between the adoption of environmental practices and the company's competitive position. A study by Babiak and Trendafilova (2011) suggests that for many organisations, environmentally focused CSR appears to be viewed as a value driver with many benefits. The strategic management, therefore, has agreed on the fact that environmental CSR activities need to be increased for the commitment of the future generations as well as for the reputation.

Implementation of this strategy will mitigate the customers' demand regarding organisation's commitment for future generations and business's requirement regarding reputation of the organisation.

6.4 DETERMINING OPTIMAL MITIGATION STRATEGIES

This section is presents the process of optimising the mitigation strategies developed above. QFD analysis and non-linear quadratic integer programming are used for the optimisation process. Non-linear quadratic integer programming methods (Salkin 1975) are comprehensively explained in Section 4.7.3 in Chapter 4. The following sections show the findings from the analyses.

6.4.1 Sample Selection and Data Collection

It is mentioned above in Section 6.3.1 that strategic managers of the case company were selected as the respondents for data collection. The respondents were used to identify the degree of relationships between the mitigation strategies, and to decide about the approximate relative costs of implementing those strategies individually and simultaneously including the cost savings.

6.4.2 Finalising Blended Value Requirements for QFD Analysis

It is revealed from the discussion of the participants that some of the value requirements in the prioritised list are same or very similar to some other value requirements. For instance, 'Organisation's impact on air resources' (CR14) is very similar to the value requirements 'Air pollution by the company' (BR20) and 'Process related air pollution' (PR15). The participants also agreed on the fact that these three value requirements can be mitigated by the same mitigation strategy. Another example of this type is 'Non-discrimination and freedom of association' (BR18) and 'Non-discrimination and freedom of association' (PR13) which are same type of value requirements and very similar to the value requirement 'Human rights of employee' (CR11). Again, the participants agreed that these three similar value requirements (BR18, PR13, CR11) can be mitigated by the same mitigation strategies. The same applies to: 'Usage of materials' (CR15), 'Usage of materials by the organisation' (BR14), and 'Usage of materials for the process' (PR11); 'Proper environmental policy and management' (CR16), 'Internal environmental policy and management by the business' (BR13), and 'Internal environmental policy and management by the process' (PR12); 'Contributions to social development at national level' (CR12), 'Social development at national level' (BR22), and 'Social development enhancement at national level' (PR18); and more.

It was also revealed that some of the value requirements carry very little weight compared to their similar value requirements in the prioritised blended value requirements list. For example, the weights of BR20 and PR15 are 0.007 and 0.008 accordingly compared to their similar value requirement CR14's weight 0.017. Likewise, BR18's weight is 0.007 and PR13's weight is 0.009 compared to their similar value requirement CR11's weight 0.015; PR11's weight is 0.011 and BR14's weight is 0.011 compared to their similar value requirement CR15's weight 0.016; BR22's weight is 0.006 and PR18's weight is 0.007 compared to their similar value requirement CR12's weight 0.014; and more.

Therefore, it was recommended and decided by the above mentioned participants (see Section 6.3.1 and Table 6.4) that if any of the value requirements has low weight and signify other value requirement/s which has higher weights, and if they can be mitigated by the same mitigation strategy, then value requirement/s with lower weight will not be considered and the value requirement/s with greater weight will be considered with other unique value requirements for the QFD analysis. Based on these criteria it was found that value requirements BR13 and PR12 carry the weight 0.013 and 0.011 and signify value requirement CR16 which has the weight value of 0.015. Thus, CR16 has higher weight than BR13 and PR12. Moreover, both value requirements, BR13 and PR12, can be mitigated by the same strategy developed to mitigate CR16, that is, MS11 and MS10. Therefore, BR13 and PR12 were excluded and not considered for the mitigation strategies' optimisation process. Similarly, BR17 (0.009) and BR19 (0.007) carry lower weights than their signifying value requirement CR8 (0.022). Therefore, BR17 and BR19 were excluded from the optimisation process, too. By following the same rule 23 blended value requirements (3 customer value requirements, 11 business value requirements, and 9 process value requirements) were excluded from the optimisation process (see Table 6.6) and a total of 40 blended value requirements (18 customer value requirements, 12 business value requirements, and 10 process value requirements) were finally considered for the mitigation strategies optimisation process in QFD analysis. Table 6.6 shows the criteria for not including 23 blended value requirements for the optimisation of mitigation strategies in QFD analysis.

Table 6.6: Criteria for not including some requirements for QFD analysis

Requirements				Mitigation Strategies
Not Selected	**Weight**	**Selected (similar)**	**Weight**	
BR13	0.013	CR16	0.015	MS11, MS10
PR12	0.011			
BR14	0.011	CR15	0.016	MS11
PR11	0.011			
BR16	0.010	CR18	0.015	MS5
BR15	0.010	CR11, CR8, BR10	0.015, 0.022, 0.014	MS17
PR14	0.008			
CR21	0.011			
BR18	0.007	CR11	0.015	MS17
PR13	0.009			
BR17	0.009	CR8	0.022	MS10
BR19	0.007			
BR20	0.007	CR14	0.017	MS15
PR15	0.008			
BR22	0.006	CR12	0.014	MS5
PR18	0.007			
CR19	0.013			
BR21	0.006			
PR17	0.007			
CR20	0.013	CR16	0.015	MS11
BR23	0.006			
PR16	0.008			
PR19	0.006			

6.4.3 Quality Function Deployment (QFD) Analysis

As mentioned earlier (see Section 6 in Chapter 4), the following steps are followed in a QFD analysis:

Step 1: Identification of value requirements or problems of organisations that are termed as WHATs;

Step 2: Relative importance ratings of WHATs are determined;

Step 3: Mitigation strategies (MSs) also known as HOWs are generated;

Step 4: Relationships between WHATs and HOWs are determined;

Step 5: Correlation between mitigation strategies (HOWs) are determined;

Step 6: Initial technical ratings of HOWs are determined;

Step 7: Final technical ratings of HOWs are determined. Lastly, based on the rankings of weights of HOWs the mitigation strategies are selected.

6.4.3.1 Relationship matrix analysis

Once the blended value requirements were prioritised, the next step was to establish the relationships between the mitigation strategies (HOWs) and the blended value requirements (WHATs). The relationship between a HOW and a WHAT is usually determined by analysing to what extent a HOW could technically relate to and influence a WHAT. All these relationships form a matrix with the WHATs as rows and the HOWs as columns. It is suitable to complete this matrix in a column- or HOW-wise manner since once a HOW is defined we usually begin establishing to what extents it relates to the WHATs (Chan and Wu 2005).

To develop the matrix of WHATs and HOWs, the participants from the case company mentioned in Section 6.3.1 (see Table 6.4) were asked to determine the mitigation impacts of each strategy on the blended value requirements. Mitigation impacts were measured by the participants based on to what extent each of the strategies mitigates one or more blended value requirements. To establish the relationship between WHATs and HOWs, each participant was given a matrix sheet containing all 18 mitigation strategies and all 40 value requirements so that they can indicate the impact level of the strategies on each value requirement. The mitigation strategies were in the rows of the matrix and the value requirements were in the columns. The participants were asked to indicate the level of impact in one of the four categories: *Strong, Moderate, Little,* or *No* as this method is used by many scholars, such as, Han et al.,(2001), Wang and Hong (2007), Das and Mukherjee (2008), Hwarng and Teo (2001) and many more. If the mitigation strategy has a greater impact on the value requirement/s then they were asked to put *Strong;* if there is a medium impact then they were asked to put *Moderate*; if there is a weak impact then they were asked to put *Little*; and if there is no impact then they were asked to put *No.* Later these indicators were converted to weights as numerical values which are 9, 3, 1, and 0. Each participant completed one matrix individually before agreeing on a final matrix. Details of the impact of mitigation strategies on the blended value requirements are shown in Table 6.7. In the table, impact level (strong, moderate, and weak) of each mitigation strategy on each of the value requirement are shown elaborately.

It was revealed from the participants' analysis that MS1 has strong impacts on CR1 and PR1, moderate impact on CR2, and weak impacts on BR7 and PR3. This means, outsourcing high security software and hardware by the company will-

- strongly mitigate the needs of two blended value requirements: (i) Security of the services for customer, and (ii) Security of the processes including data security; and moderately;
- moderately mitigate the needs of one blended value requirement: (i) Quality of the services for customer; and
- weakly mitigate the needs of one blended value requirements: (i) Total time needed to get the services by the customer.
- Thus, based on the impacts of MS1, it can be concluded that outsourcing high security software and hardware will- highly improve the security of the services and security of the processes, improve the quality of the services to medium extent, and shorten the total time to a minimum extent needed to get the services by the customer.
- Similarly, MS2 has strong impacts on CR2, BR7, and PR3, moderate impacts on CR1 and PR1, and weak impact on CR5. This indicates that learning and development of the employee will highly - improve the quality of the services for customer, increase the productivity for cost efficiency, and productivity of the processes. Learning and development of the employee will also improve the security of the services for customer and security of the processes to medium extent; and shorten the total time for the customer to a minimum extent to get the services. Likewise, MS3 has strong impacts on CR2 and CR3 while moderate impact on CR5 and weak impacts on PR3 and BR7. That means, easing the e-banking service delivery process by the company will improve the quality of the services for customer by reducing complexity level and by shortening the total time needed to get the services. Productivity will also be enhanced to a certain extent from the implementation of this strategy. Impacts of all other strategies on the blended value requirements are listed in Table 6.7.

Table 6.7: Mitigation strategies with their impact level on BVRs

MSs	BVRs	Impact Level	MSs	BVRs	Impact Level
MS1	CR1	Strong	MS11	BR1	Weak
	CR2	Moderate		CR13	Strong
	PR1	Strong		CR14	Strong
	PR3	Weak		CR15	Strong
	BR7	Weak		PR9	Strong
MS2	CR1	Moderate		CR16	Strong
	CR2	Strong		CR17	Strong
	PR1	Moderate		BR11	Weak

	CR5	Weak		BR12	Strong
	PR3	Strong		PR10	Weak
	BR7	Strong	MS12	CR2	Strong
MS3	CR2	Strong		CR5	Strong
	CR3	Strong	MS13	CR2	Strong
	CR5	Moderate		PR7	Strong
	PR3	Weak		CR10	Strong
	BR7	Weak		BR8	Strong
MS4	BR1	Moderate		BR6	Moderate
	CR9	Strong	MS14	BR4	Strong
	PR8	Strong		BR11	Strong
	BR9	Strong		PR5	Strong
MS5	BR1	Strong		PR10	Strong
	CR18	Moderate			
	CR12	Strong	MS15	CR13	Weak
MS6	CR2	Weak		BR4	Weak
	PR2	Strong		CR14	Strong
	BR5	Strong		BR11	Weak
MS7	CR4	Strong		PR5	Weak
	CR7	Strong		PR10	Weak
MS8	BR2	Strong	MS16	PR3	Strong
	BR3	Strong		BR7	Strong
	CR6	Strong		PR5	Moderate
	PR4	Strong	MS17	BR1	Weak
	BR6	Strong		PR3	Moderate
	PR6	Strong		BR7	Moderate
MS9	BR2	Strong		CR11	Strong
	BR3	Strong	MS18	BR1	Strong
	BR4	Moderate		CR18	Strong
	PR5	Moderate			
MS10	CR8	Strong			
	PR9	Strong			
	CR16	Moderate			
	CR17	Strong			
	BR10	Strong			
	BR12	Strong			

Note: MS = Mitigation Strategies; BVR = Blended Value Requirement; CR = Customer Value Requirement; BR = Business Value Requirement; PR = Process Value Requirement.

Another way to look at this analysis results is how each of the blended value requirements is impacted by one or more mitigation strategies. For example, it can be comprehended from the above table (Table 6.7) that CR1 is strongly impacted only by

MS1 and moderately impacted by MS2; and no other strategy has any impact on CR1. This shows that security of the services for customer can be highly improved by outsourcing high security software and hardware by the company, and moderately enhanced by the learning and development of the employee. Compared to CR1, CR2 is strongly impacted by more than one mitigation strategies (MS2, MS3, MS12, and MS13), moderately impacted by MS1 and weakly impacted by MS6. This comprehends that quality of the services for customer can be enormously improved by enhancing the learning and development of the employee, easing the e-banking service delivery process, ensuring efficient availability of service delivery point, and establishing CRM unit. It also indicates that quality of the services will also be improved reasonably from outsourcing high security software and hardware and ensuring crisis management and early warning signals above industry standard. Likewise, BR5 is only impacted by MS6 (strongly) whereas BR1 is impacted by MS5 (strongly), MS18 (strongly), MS4 (moderate), MS11 (Weak), and MS17 (Weak). PR5 is strongly impacted by MS14, moderately impacted by MS9, MS16, and weakly impacted MS15. All other value requirements are also similarly impacted by the mitigation strategies as shown in Figure 6.7.

6.4.3.2 Ranking of mitigation strategies by QFD analysis

By using Equations (2) to (4) shown in Section 4.7.3.4 the initial technical ratings, absolute importance, and relative importance of all mitigation strategies were calculated (see Table 6.8). According to the results of relationship matrix analysis it was revealed that among all these strategies MS8 (Invest more on potential value added services) ranked first with an absolute importance weight of 1.008 and relative importance weight of 0.093. MS8 has strong impacts on BR2, BR3, CR6, PR4, BR6, and PR6. This result from relationship matrix analysis indicates that the company must consider investing more on potential value added services before considering any other strategy to significantly increase the profitability, liquidity and investment capability of the business and process; economic performance of the company including share performance, market growth, and ROI; and value added services for the customer. MS2 (Learning and development of the employee) ranked second position with an absolute importance weight of 0.954 and relative importance weight of 0.088. As stated above, MS2 has impacts on several blended value requirements. The company should consider the implementation of MS2 after considering MS8 to significantly improve the quality of the services for customer, productivity of the business, and security of the services and processes. Thus, according to the results arrangement of learning and development of

Sustainability Value Req.	Blended Value Requirements	Importance Weights	MS1	MS2	MS3	MS4	MS5	MS6	MS7	MS8	MS9	MS10	MS11	MS12	MS13	MS14	MS15	MS16	MS17	MS18
Economic	CR1	0.049	●	○																
	CR2	0.041	○	●	●			Δ						●	●					
	CR3	0.029			●															
	CR4	0.026							●											
	CR5	0.021		Δ	○									●						
	CR6	0.019								●										
	CR7	0.015							●											
	CR10	0.019													●					
Social	CR8	0.022										●								
	CR9	0.021				●														
	CR11	0.015																	●	
	CR12	0.014					●													
Environmental	CR13	0.022											●				Δ			
	CR14	0.017											●				●			
	CR15	0.016											●							
	CR16	0.015										○	●							
	CR17	0.015										●	●							
	CR18	0.015					○													●
Economic	BR1	0.028				○	●						Δ						Δ	●
	BR2	0.023								●	●									
	BR3	0.022								●	●									
	BR4	0.018									○					●	Δ			
	BR5	0.016						●												
	BR6	0.016								●					○					
	BR7	0.015	Δ	●	Δ													●	○	
	BR8	0.017													●					
Social	BR9	0.015				●														
	BR10	0.014										●								
Env.	BR11	0.014											Δ			●	Δ			
	BR12	0.014										●	○							
Economic	PR1	0.037	●	○																
	PR2	0.027						●												
	PR3	0.019	Δ	●	Δ													●	○	
	PR4	0.018								●										
	PR5	0.014									○					●	Δ	○		
	PR6	0.014								●										
	PR7	0.020													●					
Soc.	PR8	0.017				●														
Env.	PR9	0.016										●	○							
	PR10	0.014											Δ			●	Δ			

Legends: ● = Strong; ○ = Medium; Δ = Weak;

Figure 6.7: MSs with their impact level on BVRs

the employee should be second-highest priority for strategic consideration. With an absolute importance weight of 0.931 and relative importance weight of 0.086, the third priority is obtained by MS1 (Outsource high security software and hardware). MS1 has impacts on several blended value requirements. It shows that the strategic

Table 6.8: Relationship matrix between mitigation strategies and blended value requirements

Blended Value Requirements		Representing Symbol	Importance Weights (Blended)	MS1	MS2	MS3	MS4	MS5	MS6	MS7	MS8	MS9	MS10	MS11	MS12	MS13	MS14	MS15	MS16	MS17	MS18
Customer Value Requirements	Economic	CR1	0.049	0.441	0.147																
		CR2	0.041	0.123	0.369	0.369			0.041						0.369	0.369					
		CR3	0.029			0.261															
		CR4	0.026							0.234											
		CR5	0.021		0.021	0.063									0.189						
		CR6	0.019								0.171										
		CR7	0.015							0.135											
		CR10	0.019													0.171					
	Social	CR8	0.022										0.198								
		CR9	0.021				0.189														
		CR11	0.015																	0.135	
		CR12	0.014					0.126													
	Environmental	CR13	0.022											0.198				0.022			
		CR14	0.017											0.153				0.153			
		CR15	0.016											0.144							
		CR16	0.015										0.045	0.135							
		CR17	0.015										0.135	0.135							
		CR18	0.015					0.045													0.135

Business Value Requirements	Economic	BR1	0.028				0.084	0.252						0.028						0.028	0.252
		BR2	0.023								0.207	0.207									
		BR3	0.022								0.198	0.198									
		BR4	0.018									0.054					0.162	0.018			
		BR5	0.016						0.144												
		BR6	0.016								0.144					0.032					
		BR7	0.015	0.015	0.135	0.015													0.135	0.045	
		BR8	0.017													0.153					
	Social	BR9	0.015				0.135														
		BR10	0.014										0.126								
	Env.	BR11	0.014											0.014			0.126	0.014			
		BR12	0.014										0.126	0.042							
Process Value Requirements	Economic	PR1	0.037	0.333	0.111																
		PR2	0.027						0.243												
		PR3	0.019	0.019	0.171	0.019												.153+	0.171	0.057	
		PR4	0.018								0.162										
		PR5	0.014									0.042					0.126	0.014	0.042		
		PR6	0.014								0.126										
		PR7	0.020													0.180					
	Soc.	PR8	0.017				0.153														
	Env.	PR9	0.016										0.144	0.048							
		PR10	0.014											0.014			0.126	0.014			
A. I.				0.931	0.954	0.727	0.561	0.423	0.428	0.369	1.008	0.501	0.774	0.911	0.558	0.905	0.540	0.235	0.348	0.265	0.387
R. I.				0.086	0.088	0.067	0.052	0.039	0.040	0.034	0.093	0.046	0.072	0.084	0.051	0.083	0.050	0.022	0.032	0.024	0.036
Rank				3	2	7	8	13	12	15	1	11	6	4	9	5	10	18	16	17	14

Note: A.I.= Absolute importance; R.I.= Relative importance; MS= Mitigation strategies; CR= Customer value requirements; BR= Business value requirements; PR= Process value requirements

management must consider implementing MS1 with third highest priority for significantly enhancing the security and quality of the services and processes. The last position is attained by MS15 with an absolute importance weight of 0.235 and relative importance weight of 0.022 which has significant impact on CR14 and somewhat impacts on CR13, BR4, BR11, PR5, and PR10. The rankings of all the mitigation strategies with their absolute importance weights and relative importance weights are shown in Table 6.8.

6.4.3.3 Roof matrix analysis

The roof matrix analysis is done based on the correlation matrix of the mitigation strategies. As mentioned earlier in Section 4.7.3.6, in the correlation matrix the trade-offs that may exist among the strategies are identified. For example, implementing one mitigation strategy may or may not have a positive impact or influence on other mitigation strategies. The assignment of impact level is determined based on the influence of one strategy on achieving other strategies. To develop the roof matrix, the participants from the case company mentioned in Section 6.3.1 (see Table 6.4) were asked again to determine the correlations between the MSs. To establish the relationship between the MSs, each participant was given a matrix sheet containing all 18 mitigation strategies in rows and columns so that they can indicate the degree of correlations between the strategies. The participants were asked to indicate the degree of correlation in one of the four categories: *Strong, Moderate, Little,* or *No* as this method is used by other scholars, such as, Han et al. (2001), Wang and Hong (2007), Hwarng and Teo (2001) and many more. If one mitigation strategy is highly correlated with another then they were asked to put *Strong;* if there is a medium relationship then they were asked to put *Moderate;* if there is a weak relationship then they were asked to put *Little*; and if there is no relationship then they were asked to put *No.* Later these indicators were converted to weights as numerical values which are 9, 3, 1, and 0. Each participant completed one matrix individually before agreeing on a final matrix. Details of the correlation between the mitigation strategies are shown in Table 6.9. In the table, strong, moderate, and weak correlations between all the strategies are shown elaborately.

It was revealed from the correlation matrix or roof matrix that MS1 (Outsource high security software and hardware) is highly correlated with MS2 (Learning and development of the employee) and MS4 (Maintain privacy of information); and

moderately correlated with MS16 (Improve efficiency of internal processes). This means that implementation of MS1 will significantly facilitate the implementations of

Table 6.9: Correlations between mitigation strategies

MS	Correlation with	Degree of Correlation	MS	Correlation with	Degree of Correlation
MS1	MS2	Strong	MS5	MS18	Strong
	MS4	Strong	MS6	MS13	Weak
	MS16	Moderate	MS8	MS9	Weak
MS2	MS3	Strong	MS9	MS14	Strong
	MS4	Strong	MS10	MS11	Strong
	MS12	Weak		MS17	Strong
	MS13	Strong	MS11	MS15	Strong
	MS16	Strong		MS18	Moderate
MS3	MS12	Strong	MS12	MS13	Strong
	MS13	Moderate	MS14	MS15	Weak
	MS16	Moderate			
MS4	MS6	Weak			
	MS12	Weak			
	MS13	Weak			

Note: MS = Mitigation Strategies

MS2 and MS4; and will reasonably facilitate the implementation of MS16. More clearly, outcome from outsourcing high security software and hardware will have some similarities with the outcome of learning and development of the employee and maintaining privacy of information; and there will be a cost savings in implementing two or more of these MSs simultaneously. In the same way, MS2 is highly correlated with MS3, MS4, MS13, MS16, and somewhat correlated with MS12.This means, implementation of the strategy, learning and development of the employee (MS2), will facilitate in easing e-banking service delivery process (MS3), maintaining privacy of information (MS4), establishing customer relationship management (CRM) unit (MS13), improving efficiency of internal processes (MS16), and ensuring efficient availability of service delivery point (MS12).Thus, there will be cost savings if one or more of these strategies (MS3, MS4, MS13, MS16, MS12) are simultaneously implemented with MS2. Likewise, MS3 is highly correlated with MS12 and moderately correlated with MS13 and MS16, which means, easing e-banking service delivery process by the bank will partially facilitate ensuring efficient availability of service delivery point, establishing customer relationship management, and improving efficiency of internal processes; and there will be cost saving if two or more of these mitigation strategies (MS3, MS12, MS13, MS16) are simultaneously implemented.

MS4 is weakly correlated with MS6 (Ensure crisis management and early warning signals above industry standard), MS12, and MS13; MS5 (Increase CSR activities for national development) is highly correlated with MS18 (Increase environmental CSR activities for future generation); MS6 is weakly correlated with MS13; MS8 is weakly correlated with MS9 (Manage investment efficiently); MS9 is highly correlated with MS14 (Improve efficiency in supply chain management and use of goods, materials, and services); MS10 (Improve vigilance to illegal actions) is highly correlated with MS11 (Establish green banking cell) and MS17 (Ensure socially responsible action throughout the organisation); MS11 is highly correlated with MS15 (Reduce the impact on air) and moderately correlated with MS18 (Increase environmental CSR activities for future generation); MS12 is highly correlated with MS13; and MS14 is weakly correlated with MS15. The roof matrix (correlations between the mitigation strategies) along with the relationship matrix is shown in Figure 6.8.

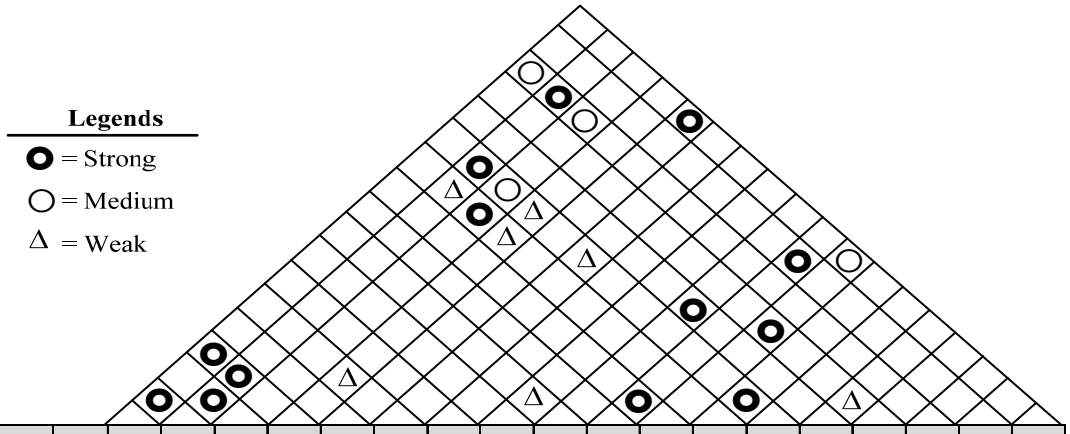
6.4.4 Cost Analysis

For the cost analysis, the information about cost estimation for each strategy implementation is required. Not only the cost estimation for each strategy but also the cost-savings from simultaneous implementations of mitigation strategies are required. But the case company did not want to disclose the actual costs of the MSs implementation because of the commercial in confidence. However, after requesting the case bank agreed to give the relative costs of the MSs implementation for the purpose of the cost analysis.

Therefore, the participants mentioned above (see Section 6.3.1 and Table 6.4) who are the strategic managers of the case bank were asked to determine the approximate relative costs of implementing the strategies individually. They were also asked to estimate the cost-savings from simultaneous implementations of the mitigation strategies.

6.4.4.1 Estimating relative costs of strategy implementation

To determine the approximate relative costs of mitigation strategies implementations, the participants (strategic managers of the case company) were asked to determine the approximate costs of the most expensive and the least expensive strategies. Then, based on these two costs, they were asked to rank the costs of all other strategies. Each participant was individually asked to complete the process and their inputs were averaged to get a single set of costs. The averaged costs were checked again and agreed



Legends

● = Strong

○ = Medium

Δ = Weak

Sustainability Value Req.	Blended Value Requirements	Importance Weights	MS1	MS2	MS3	MS4	MS5	MS6	MS7	MS8	MS9	MS10	MS11	MS12	MS13	MS14	MS15	MS16	MS17	MS18
Economic	CR1	0.049	●	○																
	CR2	0.041	○	●	●			Δ						●	●					
	CR3	0.029			●															
	CR4	0.026							●											
	CR5	0.021		Δ	○									●						
	CR6	0.019								●										
	CR7	0.015							●											
	CR10	0.019													●					
Social	CR8	0.022										●								
	CR9	0.021				●														
	CR11	0.015																	●	
	CR12	0.014					●													
Environmental	CR13	0.022											●				Δ			
	CR14	0.017											●				●			
	CR15	0.016											●							
	CR16	0.015										○	●							
	CR17	0.015										●	●							
	CR18	0.015					○													●
Economic	BR1	0.028				○	●						Δ						Δ	●
	BR2	0.023								●	●									
	BR3	0.022								●	●									
	BR4	0.018									○					●	Δ			
	BR5	0.016						●												
	BR6	0.016								●					○					
	BR7	0.015	Δ	●	Δ													●	○	
	BR8	0.017													●					
Social	BR9	0.015				●														
	BR10	0.014										●								
Env.	BR11	0.014											Δ			●	Δ			
	BR12	0.014										●	○							
Economic	PR1	0.037	●	○																
	PR2	0.027						●												
	PR3	0.019	Δ	●	Δ													●	○	
	PR4	0.018								●										
	PR5	0.014									○					●	Δ	○		
	PR6	0.014								●										
	PR7	0.020													●					
Soc.	PR8	0.017				●														
Env.	PR9	0.016										●	○							
	PR10	0.014											Δ			●	Δ			
A. I.			0.931	0.954	0.727	0.561	0.423	0.428	0.369	1.008	0.501	0.774	0.911	0.558	0.905	0.540	0.235	0.348	0.265	0.387
R. I.			0.086	0.088	0.067	0.052	0.039	0.040	0.034	0.093	0.046	0.072	0.084	0.051	0.083	0.050	0.022	0.032	0.024	0.036
Rank			3	2	7	8	13	12	15	1	11	6	4	9	5	10	18	16	17	14

Figure 6.8: QFD matrix

Table 6.10: Relative costs of implementing the mitigation strategies

Mitigation Strategy	Relative Cost	Mitigation Strategy	Relative Cost
MS1	100	MS10	20
MS2	40	MS11	30
MS3	20	MS12	35
MS4	40	MS13	35
MS5	50	MS14	18
MS6	60	MS15	20
MS7	30	MS16	23
MS8	50	MS17	27
MS9	35	MS18	30

Note: MS = Mitigation Strategies

by all the participants to make sure they were error-free. Finally, those numbers were converted to relative costs so that actual numbers are not disclosed because of the commercial in confidence. Table 6.10 shows the estimated relative costs of implementing the mitigation strategies individually.

It was found from the cost analysis that the total cost (relative) of implementing all 18 strategies is 663 if they are implemented individually. It was also revealed that the most expensive strategy is MS1 (Outsource high security software and hardware) with the relative cost of 100. According to the participants, among all other mitigation strategies 'outsourcing high security software and hardware' is most costly in e-banking process. Since the local suppliers cannot supply the standard software and hardware required by the company, they are bought from the overseas suppliers, and therefore, the cost is very high. Though 'outsourcing high security software and hardware' is very costly, the bank cannot avoid this as this strategy is crucial to maintain the security of the e-banking services and processes. Moreover, high quality software and hardware is essential to provide better quality of the e-banking services and to improve the productivity of the processes.

Mitigation strategy 'ensuring crisis management and early warning signals above industry standard' (MS6) was selected as the second highest expensive strategy with the relative cost of 60. This strategy also covers the risk and crisis management of the e-banking processes. As stated by the participants, to ensure crisis management and early warning signals above industry standard the bank needs to maintain a highly qualified team who can handle crisis situation quickly and effectively. Along with the team, the bank also needs to maintain two extra mirror-server offices to handle any

crisis. To the participants, losing of any data or pausing of transactions during the work-hours can be critical to damage the banking business.

The third highest expensive mitigation strategies are MS5 (Increase CSR activities for national development) and MS8 (Invest more on potential value added services) with the relative cost of 50. To implement MS5 the bank needs to increase the investment on CSR activities for national development. The bank is already investing on CSR and gained some reputation; and therefore, according to the participants, the investment needs to be increased to improve the reputation of the bank. On the other hand, to increase the profitability and economic performance the bank needs to 'invest more on potential value added services'. Implementation of this strategy will also increase the number of potential value added services for the customers. For example, few years back when the bank invested on ATM machines heavily, it rapidly gained significant share of the market which impacted on profitability and economic performance of the bank. Investing on CSR and potential value added services require substantial amount of money. For example, the bank had to spend more than BDT 1 billion for ATM network in 2003 and over BDT 1 billion for sustainability related activities in 2013.

The fourth highest costly mitigation strategies are MS2 (Learning and development of the employee) and MS4 (Maintain privacy of information) with the relative cost of 40. 'Learning and development of the employee' includes periodical and continuous training of the employees about security awareness, services quality, efficiency and more. Periodical and continuous training of the employees requires significant amount money. According to the participants, implementation of MS8 will lead to maintain accountability of products and services which will also require considerable amount of spending.

MS9 (Manage investment efficiently), MS12 (Ensure efficient availability of service delivery point) and MS13 (Establish Customer Relationship Management unit) were identified as the fifth highest expensive mitigation strategies according to the participants with the relative cost of 35. Implementation of MS9 will increase the profitability and economic performance of the bank. But the bank will need to consider taking measures to minimise costs and maximise earning, increase EPS and ROI, and reduce non-performing assets for this strategy. To implement MS12 the bank will need to setup more ATM and FastTrack booths which necessitate substantial investment to import, to install, and to maintain. Quality of the service will be improved and total time to get the services by the customers will be reduced if MS12 is implemented. Likewise,

if MS13 is implemented, quality of the service and customer relationship will be improved significantly. But establishing CRM unit is not inexpensive.

With the relative cost of 30 the participants have recognised MS7 (Redesign e-banking products), MS11 (Establish green banking cell), and MS18 (Increase environmental CSR activities for future generation) as the sixth expensive strategy for the company to implement. MS17 (Ensure socially responsible action throughout the organisation) was identified as the seventh expensive strategy for the bank with the relative cost of 27. According to the participants, implementation of MS17 will require a number of changes inside the organisation including providing more benefits and facilities to the employees, and therefore, will require extra investment. Similarly, the participants have recognised MS16 (Improve efficiency of internal processes) as the eighth expensive strategy with the relative cost of 23 that will improve the internal productivity for cost efficiency. MS3 (Ease e-banking service delivery process), MS10 (Improve vigilance to illegal actions), and MS15 (Reduce the impact on air) were referred as the ninth expensive strategies by the participants. Implementing MS3 will need the bank to re-arrange e-banking service delivery process; MS10 will involve forming of a vigilance team; and MS15 will require initiatives for operational changes. Finally, MS14 (Improve efficiency in supply chain management and use of goods, materials, and services) was considered by the participants as the least expensive mitigation strategy for the company to implement.

6.4.4.2 Estimating savings from simultaneous implementations of mitigation strategies

If there are dependencies (i.e., correlations) among some strategies, some savings in resource consumption are most likely expected when two or more correlated strategies are simultaneously installed (Park and Kim 1998). Therefore, based on the dependencies among the mitigation strategies the participants were asked to estimate the savings from simultaneous implementations of strategies. Each participant was individually asked to identify the savings and then their inputs were averaged to get a single set of cost-savings. The averaged costs were then checked again and agreed by all the participants to make sure that the estimates are error-free. Finally, those numbers were converted to cost-saving ratios so that actual numbers are not disclosed because of the commercial in confidence. Table 6.11 shows the estimated ratios of cost-savings from the simultaneous implementations of mitigation strategies.

It was revealed from the cost-savings estimations that the participants identified cost-savings only from the medium and strong correlations of the strategies. According to the participants, the cost-savings from the weak correlations were very minimal and

Table 6.11: Cost-savings from simultaneous mitigation strategies implementations

Mitigation strategies	Total implementation cost	Cost-saving from simultaneous implementations
MS1 and MS2	140	10
MS1 and MS4	140	10
MS1 and MS16	118	10
MS2 and MS3	60	5
MS2 and MS4	80	10
MS2 and MS13	75	10
MS2 and MS16	63	10
MS3 and MS12	55	10
MS3 and MS13	55	5
MS3 and MS16	43	5
MS5 and MS18	80	15
MS9 and MS14	53	5
MS10 and MS11	50	10
MS10 and MS17	47	10
MS11 and MS15	50	15
MS11 and MS18	60	5
MS12 and MS13	70	10

Note: MS = Mitigation strategies

insignificant, and therefore, they were ignored. Judgment of this kind by the participants is supported by Park and Kim (1998). The highest cost-savings were estimated from the simultaneous implementations of MS5 and MS18, and MS11 and MS15. If MS5 and MS18 are individually implemented the estimated total cost is 80, whereas if both of them are implemented together the cost is 65, and therefore, there is a cost-saving of 15. In the same way, the estimated total cost of individual implementations of MS11 and MS15 is 50, whereas their simultaneous implementations cost is 35. Therefore, there is a cost-saving of 15 from their simultaneous implementations. Similarly, there will be a cost-saving of 10 from the simultaneous implementations of each pairs of MS1 and MS2, MS1 and MS4, MS1 and MS16, MS2 and MS4, MS2 and MS13, MS2 and MS16, MS3 and MS12, MS10 and MS11, MS10 and MS17, MS12 and MS13. There will be a cost-saving of 5 from the

simultaneous implementations of each pairs of MS2 and MS3, MS3 and MS13, MS3 and MS16, MS9 and MS14, MS11 and MS18.

6.4.5 Optimisation Using Non-linear Quadratic Integer Programming Method

Since every business has it's resource limitation, it is not possible for most of the businesses to implement all the strategies at once required for sustainability. The situation for this case bank was not different. Therefore, it is necessary for this bank to optimise the mitigation strategies for sustainability based on the QFD ranking, budgetary constraint, and cost-savings from simultaneous implementations of the strategies. Non-linear quadratic integer programming method was used for this purpose.

6.4.5.1 Optimisation process

For optimisation process the importance of each mitigation strategy subject to budgetary constraint including cost-savings were processed. Non-linear quadratic integer programming was adopted at this phase of the research. The non-linear quadratic integer programming model for optimising strategy is presented by Section 4.7.4 in Chapter 4. The optimisation model is presented in Section 4.7.4.1.

The participants (strategic managers) identified a total of 18 (eighteen) mitigation strategies corresponding to the finalised blended value requirements (see Table 6.7). The ranking and weights of the strategies are computed by QFD analysis in Section 6.4.2.4. The costs of every mitigation strategy are identified in Section 6.4.3.1. Cost-savings from simultaneous implementations of these strategies are also determined in Section 6.4.3.2. The participants mentioned above (see Section 6.3.1 and Table 6.4), who are the strategic managers of the case company have acknowledged based on the previous records that 70% to 80% of the budget proposed by the e-banking unit is generally approved by the company. Since the total estimated cost (relative) of implementing all 18 strategies is 663 (see Section 6.4.3.1), if 80% of the total cost is approved the available budget to implement the strategies will be 530 (approx.). Therefore, based on the implementation costs, the weights, cost-savings, and budget for the identified 18 mitigation strategies, the functional notation for optimisation is as follows:

$$Max \int (x) = \sum_{i=1}^{18} AI_i x_i$$

$$\text{s.t. } c_1x_1 + c_2x_2 + c_3x_3 + c_4x_4 + c_5x_5 + c_6x_6 + c_7x_7 + c_8x_8 + c_9x_9 + c_{10}x_{10} + c_{11}x_{11} + c_{12}x_{12} + c_{13}x_{13} + c_{14}x_{14} + c_{15}x_{15} + c_{16}x_{16} + c_{17}x_{17} + c_{18}x_{18} - S_{1,2}x_1x_2 - S_{1,4}x_1x_4 - S_{1,16}x_1x_{16} - S_{2,3}x_2x_3 - S_{2,4}x_2x_4 - S_{2,13}x_2x_{13} - S_{2,16}x_2x_{16} - S_{3,12}x_3x_{12} - S_{3,13}x_3x_{13} - S_{3,16}x_3x_{16} - S_{5,18}x_5x_{18} - S_{9,14}x_9x_{14} - S_{10,11}x_{10}x_{11} - S_{10,17}x_{10}x_{17} - S_{11,15}x_{11}x_{15} - S_{11,18}x_{11}x_{18} - S_{12,13}x_{12}x_{13} \leq B$$

$$x_i = 0, 1$$

The absolute importance of mitigation strategies (AI_i) are available from Figure 6.8; the relative costs of the strategies (c_i) are available from Table 6.10; and the savings from the simultaneous implementations (s_{ji}) are available from Table 6.11. For the purpose of the optimisation process, the above quadratic integer programming was solved by using the Solver module in Microsoft Excel (Fylstra et al. 1998; Walsh and Diamond 1995) and the following result has been received:

(i) Objective function value of the total absolute importance is: 10.825;

(ii) Decision variables: $\mathrm{MS}_1 = \ldots\ldots \mathrm{MS}_{18} = 1$;

(iii) Actual total cost: 663;

(iv) Optimised total cost: 508;

Table 6.12: Optimisation based on 80% of the total cost

Mitigation Strategies (DR_i):	MS1	MS2	MS3	MS4	MS5	MS6
Importance weights (AI_i):	0.931	0.954	0.727	0.561	0.423	0.428
Costs (c_i):	100	40	20	40	50	60
Decision Variable (x_i):	1	1	1	1	1	1
Mitigation Strategies (DR_i):	MS7	MS8	MS9	MS10	MS11	MS12
Importance weights (AI_i):	0.369	1.008	0.501	0.774	0.911	0.558
Costs (c_i):	30	50	35	20	30	35
Decision Variable (x_i):	1	1	1	1	1	1
Mitigation Strategies (DR_i):	MS13	MS14	MS15	MS16	MS17	MS18
Importance weights (AI_i):	0.905	0.54	0.235	0.348	0.265	0.387
Costs (c_i):	35	18	20	23	27	30
Decision Variable (x_i):	1	1	1	1	1	1

It was revealed from the results (see Table 6.12) that estimated available budget is 530 (80% of 663), the normal cost is 663, and the optimised total cost to implement all 18 strategies is 508 with the maximum objective function value of 10.825. It is observed

that there is no increase in objective function value after total budget of 508. Therefore, cost-savings of 155 which is about 23.38% of the total cost is achieved through the optimisation process. Considering this cut-off point, the company will not need to increase the budget.

If the company approves only seventy percent (70%) of the total cost to implement these strategies then the available budget to implement the strategies will be 464 (approx.). Based on this budget limit the following solution has been found:

(i) Objective function value of the total absolute importance is: 10.397;

(ii) Decision variables: $\mathrm{MS}_1 = \ldots\ldots \mathrm{MS}_5 = 1;\ \ \mathrm{MS}_6 = 0;\ \mathrm{MS}_7 = \ldots\ldots \mathrm{MS}_{18} = 1;$

(iii) Actual total cost: 603;

(iv) Optimised total cost: 448;

It can be obtained from this optimisation results (see Table 6.13) that the maximum objective function value that can be achieved is 10.397. With this specified budget, all the mitigation strategies except MS6 can be implemented. To implement 17 of these strategies the actual total cost is 603 and the optimised total cost is 448 while the estimated available budget is 464. Therefore, through the optimisation process a cost-saving of 25.70% of the total cost is achieved.

Table 6.13: Optimisation based on 70% of the total cost

Mitigation Strategies (DR_i):	MS1	MS2	MS3	MS4	MS5	MS6
Importance weights (AI_i):	0.931	0.954	0.727	0.561	0.423	0.428
Costs (c_i):	100	40	20	40	50	60
Decision Variable (x_i):	1	1	1	1	1	0
Mitigation Strategies (DR_i):	MS7	MS8	MS9	MS10	MS11	MS12
Importance weights (AI_i):	0.369	1.008	0.501	0.774	0.911	0.558
Costs (c_i):	30	50	35	20	30	35
Decision Variable (x_i):	1	1	1	1	1	1
Mitigation Strategies (DR_i):	MS13	MS14	MS15	MS16	MS17	MS18
Importance weights (AI_i):	0.905	0.54	0.235	0.348	0.265	0.387
Costs (c_i):	35	18	20	23	27	30
Decision Variable (x_i):	1	1	1	1	1	1

6.4.5.2 Sensitivity analysis

If for some reason, the company cannot afford to approve the required budget mentioned above, the optimisation results will very. For this reason, sensibility analysis is performed in this section as stated earlier in Section 4.7.47.2 in Chapter 4. The

sensibility analysis demonstrates how the variation in budget, from 100 to 508, impacts on the optimisation results. The result reveals that if the company can afford only 25% of the total cost of implementing all mitigation strategies, which is about 165.75, the maximum objective function value that can be achieved is 5.952 (see Table 6.14). With this budget a maximum of 9 mitigation strategies can be implemented which are MS2, MS3, MS10, MS11, MS12, MS13, MS14, MS15, and MS16. The optimised cost that is required to implement these 9 strategies is 161. If the budget is increased to 250 which is about 37.71% of the total cost, the objective function value will increase to 7.521 with 11 strategies, and the optimised cost will be 241. Now, if the company can invest only 50% of the total strategies implementation cost, which is 331.5, the objective function value will be 8.832. A maximum of 14 mitigation strategies can be implemented with this budget and the actual optimised cost will be 331. Similarly, if 75% of the total cost (497.25) is approved by the company then the maximum objective function value that can be achieved is 10.56 and 17 out of 18 strategies can be implemented; and the total actual cost that will be required after optimisation is 491. There is no change in the optimisation results if the budget is increased from 491 to 502. Figure 6.9 and Table 6.14 show the optimised outcome trend based on the budget constraint.

It was also revealed from the optimisation results that MS1 and MS7 is not covered in the implementation list unless until the budget is increased to 400. The reason for this type of behaviour by the optimisation model is that though the importance rating is high for MS1 (0.931), the cost is the highest (100). On the contrary, the cost is not very high for MS7 (30) but the importance rating is low (0.369). For the same reason, MS6 is not covered in the implementation list unless until the budget is increased to 500. Therefore, company shall determine the cut-off point carefully while it wants to increase investments for implementing the strategies. As mentioned before, an optimised cost of 508 instead of 663 will be required to implement all 18 mitigation strategies simultaneously.

6.4.5.3 Optimisation with mandatory implementation of mitigation strategies

Mitigation strategies with higher importance may require higher implementation costs and vice-versa. Since the optimisation model considers cost and cost-saving in addition to the importance level, some strategies may not be included in the optimised strategies list until the budget is not increased to a certain amount. Thus, as mentioned

in Section 4.7.4.3 in Chapter 4 that it is not unlikely for the bank to consider some of the mitigation strategies as top priority while implementing them. For example, 'outsource high security software and hardware' (MS1) is considered very crucial for e-business. But as mentioned in the previous section (Section 6.4.4.3) that this strategy is not covered in the implementations list until the investment budget is increased to a certain extent (400); and the reason for this is that though the importance rating is high for this strategy, the cost is very high. According to the strategic managers of the case bank (see Table 6.4), regardless of the amount of implementation costs, this strategy (MS1) is generally given very high priority by the bank since it is directly related to the security of the e-banking processes and services. The importance of this strategy is also reflected by the QFD analysis. Along with MS1, MS2 (Learning and development of the employee), MS8 (Invest more on potential value added services), MS10 (Improve vigilance to illegal actions), MS11 (Establish green banking cell), and MS13 (Establish customer relationship management unit) are also considered important for the company according to the strategic managers and the QFD analysis result. Thus, in this regard, it is noteworthy to analyse and see the results of optimisation with mandatory implementations of these 6 strategies. This analysis will show how objective function value in the optimisation process is impacted within the limited budget if some of the strategies are mandatorily implemented regardless of their importance ratings and implementation costs. This analysis also shows how the optimised outcome differs if the mandatory strategies implementation is considered and not considered.

From the results of optimisation with mandatory implementations of 6 mitigation strategies it was found that the minimum budget that is required to implement them is 245 and the maximised objective function value is 5.483 (see Table 6.15). The optimisation results also show that the optimised outcome with mandatory implementations of strategies is inferior to the optimised outcome without mandatory implementations of strategies, until a certain amount of investment is considered (see Figure 6.10). For example, with the same minimum budget above (245), the maximised objective function value is 7.521 when the mandatory strategies implementation is not considered. Similarly, when the budgets are 300 and 350, the maximised objective function value are 7.912 and 8.953 respectively with mandatory implementations of strategies, and 8.409 and 9.097 respectively without any mandatory implementations. The difference in outcome continues until the budget is increased to 400. With this amount of budget the optimised outcome is same (9.709) for both optimisations with and without mandatory implementations of mitigation strategies. The optimised

Table 6.14: Optimisation results based on non-linear quadratic integer programming

Budget	Optimised cost	OFV	MS1	MS2	MS3	MS4	MS5	MS6	MS7	MS8	MS9	MS10	MS11	MS12	MS13	MS14	MS15	MS16	MS17	MS18
100	100	3.601	0	1	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0
165.75	161	5.952	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0
200	191	6.513	0	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	0	0
250	241	7.521	0	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1	0	0
300	296	8.409	0	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	1
331.5	331	8.832	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1
350	348	9.097	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1
400	396	9.709	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1
450	448	10.397	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
500	491	10.56	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
508	508	10.825	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

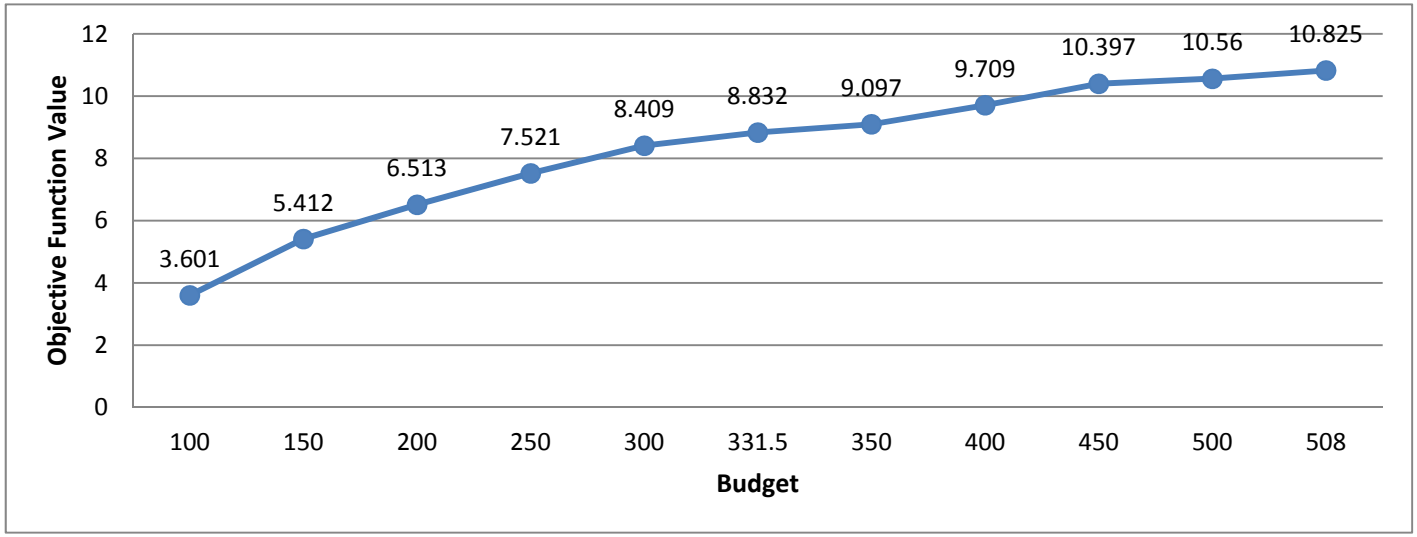


Figure 6.9: Optimised outcome based on the budget constraint

Table 6.15: Optimisation results with 6 mandatory mitigation strategies

Budget	Optimised cost	OFV	MS1	MS2	MS3	MS4	MS5	MS6	MS7	MS8	MS9	MS10	MS11	MS12	MS13	MS14	MS15	MS16	MS17	MS18
245	245	5.483	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0
300	293	7.912	1	1	1	1	0	0	0	1	0	1	1	1	1	0	1	1	0	0
331.5	328	8.717	1	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1	1	0
350	341	8.953	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	0
400	396	9.709	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1
450	448	10.397	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
500	491	10.56	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
508	508	10.825	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

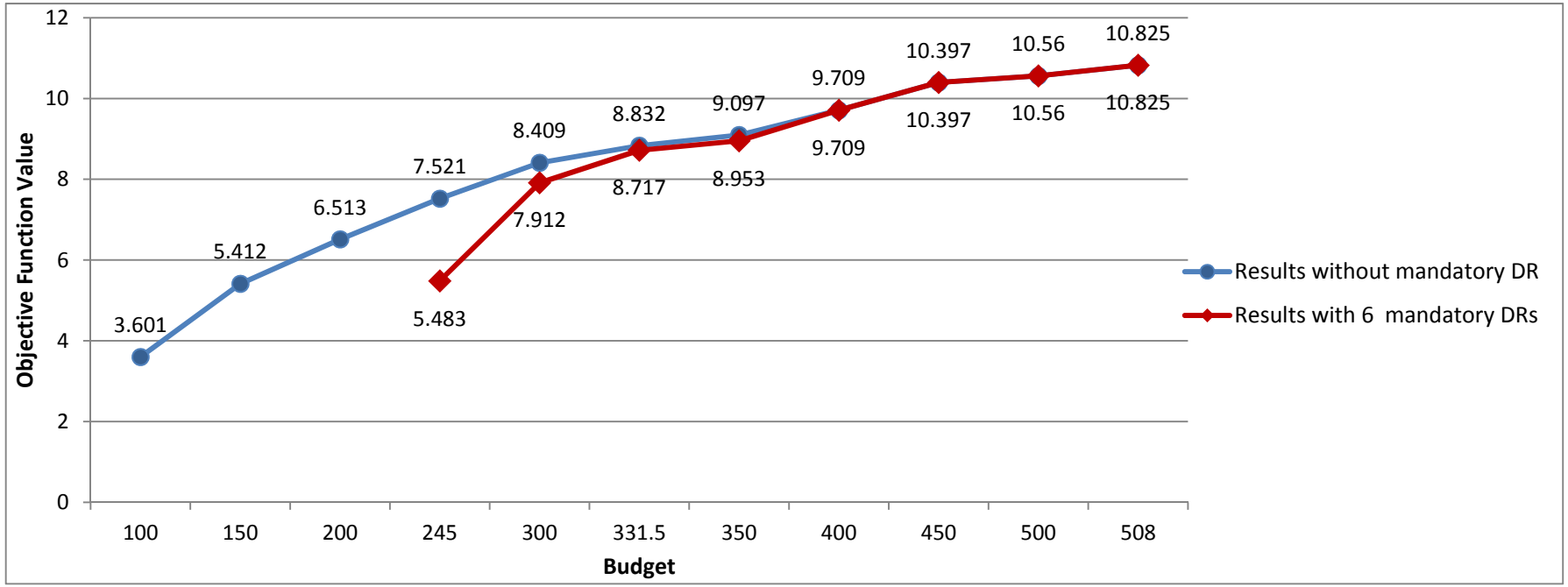


Figure 6.10: Comparisons between optimised results

outcome is same for all the budget amounts between 400 and 508 till all 18 of the strategies are covered. Therefore, if the budget is less than 400 the company need to choose strategies carefully for mandatory implementations. But if the budget is more than 400 the company can go ahead with the mandatory implementations of 6 mitigation strategies without much thinking since there is no difference in the optimised outcome.

6.4.5.4 Comparison with the Knapsack Model

In this section, this optimisation model (see Section 6.4.4.1) is compared with the 'Knapsack' model proposed by Gary Wasserman (1993). This section demonstrates how this optimisation model is more efficient and productive than the 'Knapsack' model by comparing between the optimised outcomes. The proposed model by Wasserman (1993) is originated from the classical 'Knapsack' problem in operations research (Taha 1992). A simple linear cost constraint function for $k(x)$ is presented by him to select the most appropriate mitigation strategies under the limitation of a given budget. By using his model, Equation (5) is solved as follows:

$$k(x) = c_1x_1 + \ldots\ldots\ldots + c_nx_n - B \ \leq 0$$

where,

c_i = cost required to implement DR_i;

B = given total budget;

Also, strategies should be selected in a decreasing order of the (importance rating/cost) ratio until the total cost of the selected strategies does not exceed the limited budget. In his model, the cost-savings from the simultaneous implementations of mitigation was not considered. But as shown in Section 6.4.3.2, if dependencies or correlations exist among the strategies, some savings are most likely expected when they are implemented simultaneously. Since 'Knapsack' model does not consider the organisational constraint of cost-savings, it will miss out on implementing more strategies which might be selected with cost-savings.

The comparison between optimised results with cost-savings (proposed model) and optimised results without cost-savings (Knapsack model) reveals that the optimised outcome by the Knapsack model is inferior at every budget point to the outcome by the proposed model (see Table 6.16, and Figure 6.11). To achieve maximum objective function value of 10.825 and to implement all 18 mitigation strategies the Knapsack

Table 6.16: Optimisation results without cost-savings (Knapsack model)

Budget	Optimised Cost	OFV	MS1	MS2	MS3	MS4	MS5	MS6	MS7	MS8	MS9	MS10	MS11	MS12	MS13	MS14	MS15	MS16	MS17	MS18
100	98	2.995	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
150	145	4.271	0	1	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0
165.75	163	4.811	0	1	1	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0
200	198	5.369	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
250	248	6.377	0	1	1	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0
300	298	6.999	0	1	1	0	0	0	0	1	0	1	1	1	1	1	1	0	0	1
331.5	331	7.521	0	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1	0	0
350	346	7.787	0	1	1	1	0	0	0	1	1	1	1	1	1	1	0	1	0	0
400	396	8.409	0	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	1
450	446	8.832	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0	1
497.25	496	9.34	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	0	1
508	503	9.466	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
550	533	9.739	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	1
600	593	10.167	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1
650	643	10.59	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
663	663	10.825	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

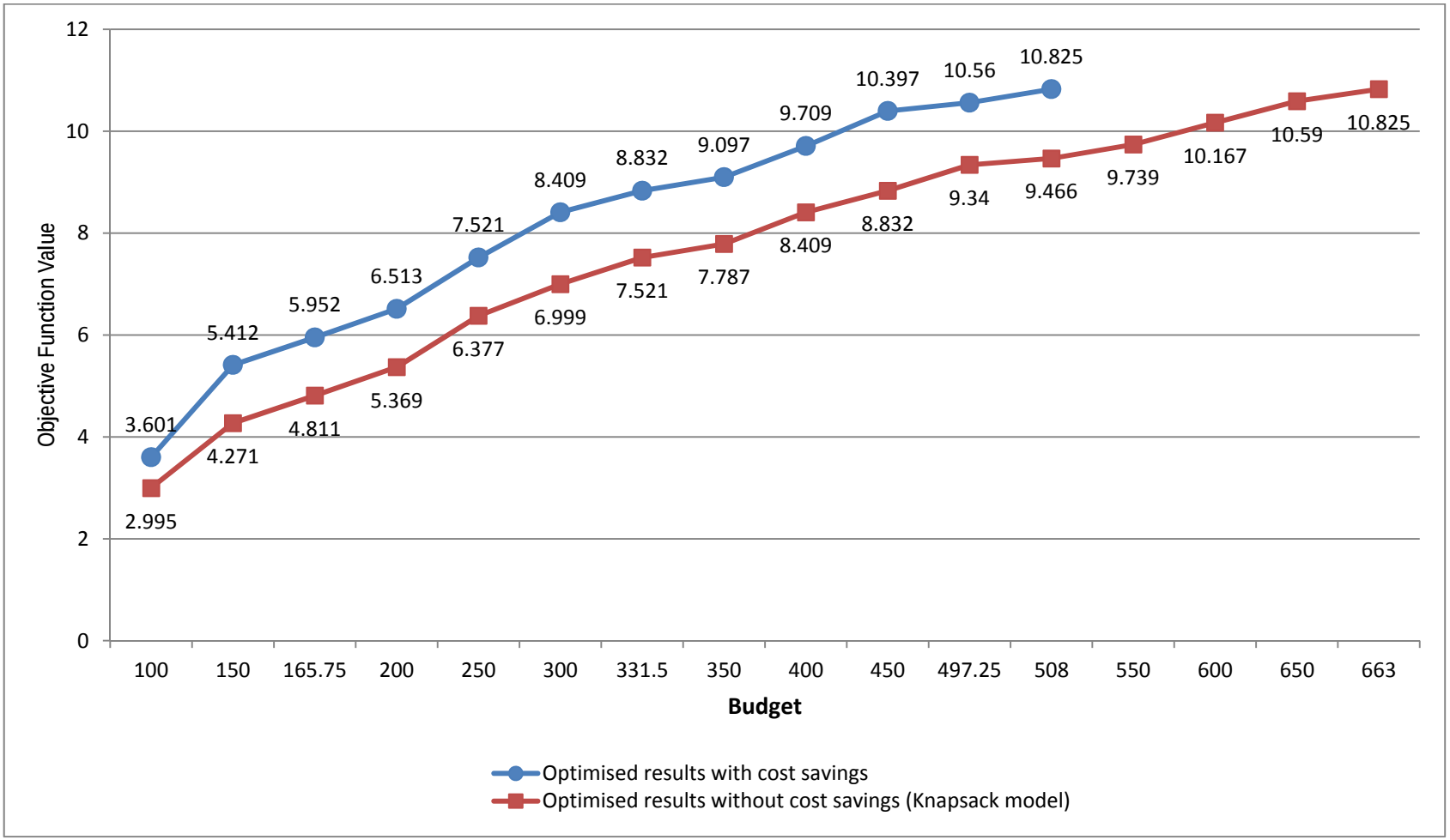


Figure 6.11: Comparison between the results of proposed model and Knapsack model

model costs 663 whereas the proposed optimisation model costs only 508 to achieve same objective function value of 10.825. Therefore, there is a significant cost-saving of 155 achieved by the proposed model which is about 23.38% of the total cost that cannot be offered by the Knapsack model. Moreover, if the company invests only 25% of the total implementation costs all mitigation strategies which is 165.75, with the Knapsack model the optimised objective function value is 4.811 and only 6 out of 18 strategies (MS2, MS3, MS10, MS11, MS13, and MS14) can be implemented. Whereas with the same budget, the proposed model can achieve an optimised objective function value of 5.952 and 9 strategies (MS2, MS3, MS10, MS11, MS12, MS13, MS14, MS15, and MS16) can be implemented. Hence, along with those 6 strategies, 3 more strategies can be implemented with the cost-savings from the proposed model. Similarly, if the company invests only 50% of the total implementation costs which is 331.5, the Knapsack model can achieve an optimised objective function value of 7.521 only; and can cover only 11 strategies (MS2, MS3, MS4, MS8, MS10, MS11, MS12, MS13, MS14, MS15, and MS16) for implementations. But with the proposed model the same budget can be used to implement 3 more strategies (MS5, MS9, and MS18) along with those 11 strategies with an optimised objective function value of 8.832. In the same way, with the investment of 75% (497.25) of the total implementation cost the Knapsack model can cover only 14 strategies for implementations and can achieve a maximum objective function value of 9.340. On the contrary, with the same amount of budget the proposed model can cover a total of 17 strategies for implementations and can achieve a maximum objective function value of 10.560. Therefore, it can be summarised from the above discussion that the optimised results by the proposed model is more efficient than the results produced by the Knapsack model. These findings are consistent with the findings of Park and Kim (1998).

6.5 SUMMARY

This chapter presented QFD based research analysis to develop and determine the optimal mitigation strategies for the sustainability of the e-business. In determining the optimal mitigation strategies, the blended value based e-business sustainability requirements were prioritised using AHP. Then based on the prioritised value requirements, mitigation strategies were developed, prioritised, and optimised by using QFD analysis and non-linear quadratic integer programming method. With the sensitivity analysis, this chapter also clearly shows how the proposed optimisation

method is better than others, and how variations in investment amount and mandatory implementations influence the implementations of the strategies.

To confirm the findings of this analysis (Analysis Part1) a quantitative survey study is completed in Chapter 7 (Analysis Part 2). For this, hypotheses are developed based on the relationships of the mitigation strategies with the e-business sustainability outcome of the company. Partial Least Square (PLS) based Structural Equation Modelling (SEM) technique (Chin 1998a) is adopted for quantitative analysis.

CHAPTER 7

ANALYSIS PART 2: HYPOTHESIS DEVELOPMENT AND TESTS

7.1 INTRODUCTION

The previous chapter presents the QFD based analysis (Analysis Part 1) that determines the optimal mitigation strategies based on the blended value requirements identified by the field study. To confirm the findings of QFD based analysis, this chapter presents some hypotheses and their tests (Analysis Part 2).

This chapter is divided into two main parts. The first part provides the hypotheses development and data analysis instruments including questionnaire development based on the study completed in Chapter 6. Hypotheses for quantitative data analysis were developed based on the perceived links between the optimal mitigation strategies (economic, social, and environmental) and the sustainability outcomes (economic, social, and environmental). To test these hypotheses, the questionnaire was developed based on the findings from the QFD analysis and the prior literature in this field. Data analysis instruments were developed from the literature and then they were contextualised in the context of the current study.

The second part of this chapter presents the quantitative tests based on the optimal mitigation strategies determined and their mitigation impacts on the blended value based requirements. The research model for quantitative data analysis (Analysis Part 2) is shown in Figure 7.1. This study has been intended to see how the managers of the case bank at operational levels perceive these optimised strategies and their mitigation impacts on the blended value requirements.

This chapter is organised as follows: Hypotheses are developed at first. Then questionnaire is developed that includes the development of measurement instruments. After the hypotheses and questionnaire development quantitative data analysis is provided. In the quantitative data analysis, descriptive analysis is presented first followed by the hypotheses tests using PLS based SEM.

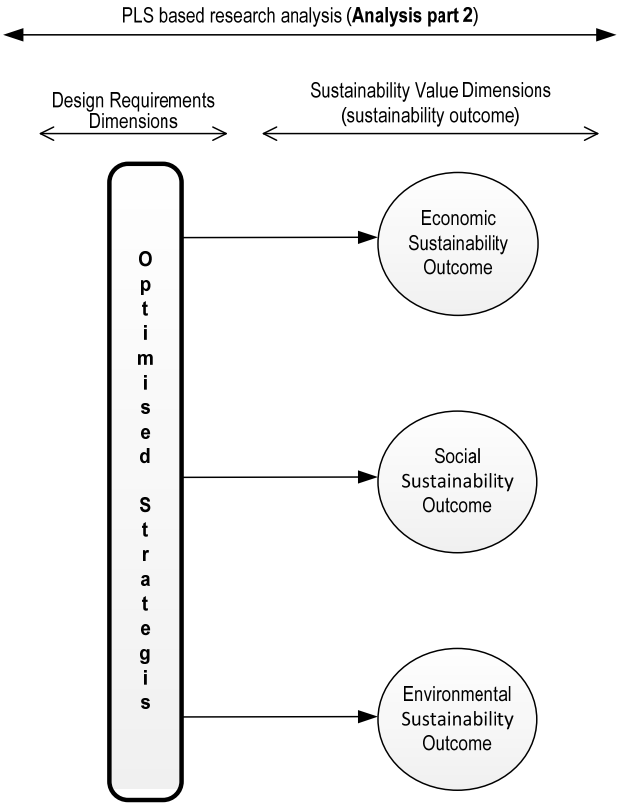


Figure 7.1: PLS based research analysis (Analysis Part 2)

7.2 HYPOTHESES DEVELOPMENT

This is the first part of this chapter where hypotheses and questionnaire are developed for quantitative tests. Hypotheses are presented at the beginning of this part followed by the development of questionnaire. Based on the study-outcomes of the previous chapters it has been found that there are 6 constructs in total in this research model that represent optimal mitigation strategies and sustainability outcomes (see Figure 7.2). They are: EcoMSs (strategies for economic value requirements or economic strategies), EnvMSs (strategies for environmental value requirements or environmental strategies), SocMSs (strategies for social value requirements or social strategies), EcoSus (economic sustainability outcome), EnvSus (environmental sustainability outcome), and SocSus (social sustainability outcome). Economic strategies were optimised for economic sustainability outcome. Similarly, environmental strategies were optimised for environmental sustainability outcome and social strategies were optimised for social sustainability outcome. Thus, economic strategies are expected to have positive impacts on economic sustainability outcome, environmental strategies are expected to have positive impacts on environmental sustainability outcome, and social strategies are expected to have positive impacts on

social sustainability outcome. But it was revealed from the study that some of the mitigation strategies have impact on more than one type of sustainability outcome. For the total impacts of strategies on blended value requirements, please refer to the Table 6.9 in Chapter 6.

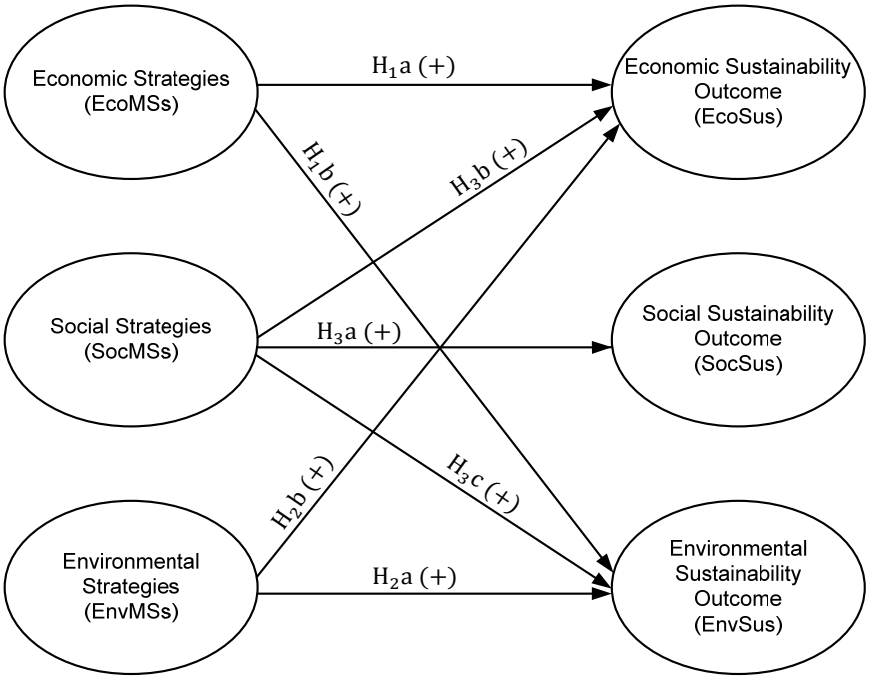


Figure 7.2: Quantitative research model with hypotheses

7.2.1 Hypotheses Related to Economic Strategies

As mentioned above, economic strategies were expected to have positive influence on economic sustainability outcome. But it was also revealed from the field study (Chapter 5) and QFD analyses (Chapter 6) that economic strategies have impacts not only on economic sustainability outcome, but also on environmental sustainability outcome. For example, MS14 (Improving efficiency in supply chain management and use of goods, materials, and services) is an economic strategy and has impact on environmental sustainability outcome (CR13, CR15, BR11, PR10). The following sub-sections explain the impacts of economic strategies on economic sustainability outcome and environmental sustainability outcome.

7.2.1.1 Economic sustainability

Potential value added services and potential financial benefits in e-banking business have been emphasised by many scholars (Vinodh and Chintha 2011; Mahmood and Mann 2000; González et al. 2004; Mihelis et al. 2001; Bauer, Hammerschmidt and Falk

2004; Furst, Lang and Nolle 2002; Broderick and Vachirapornpuk 2002). González et al. (2004) found in a study that investing on potential value added services, such as, new information technology including equipment and software are very important to satisfy the customer requirements. The bank experienced a significant growth in market share immediately after installing the country's largest ATM network. Thus, it has been experienced by the strategic management of the bank that investment on technological change provides the impetus for new and better ways to satisfy customer needs which is also mentioned by Teece (2010, p. 187). Therefore, investing more on potential value added services will have positive impact on the economic performance of the bank.

Delivering quality service and products is essential for success and survival in today's competitive banking environment (González et al. 2004; Wang, Lo and Hui 2003). Learning and growth of the employee is essential to increase competency and responsibility (Titko and Lace 2010). For increased productivity and quality 'the bank management has to make sure that the employees are properly trained so that the employees are not only courteous, pay attention and are willing to help customers, but also are experts in their field so that they understand specific customer needs' (Jamal and Naser 2002, p.157). It was revealed form the field study that management of the bank expects efficiency of the employee for productivity and quality through accuracy of the services, individual attention, knowledge and skills, responsiveness and pro-activeness.

Accessibility and availability of product and service has been considered an imperative issue in the service business (Johnston 1995; Cox and Dale 2001; Wang, Lo and Hui 2003; González et al. 2004; Molina, Martín-Consuegra and Esteban 2007). It was found by Cox and Dale (2001) that determinants, such as, accessibility, communication, credibility, appearance, and availability are critical to the success of e-retailing services. Wang et al. (2003) argued that product availability and product convenience should be the important antecedents of product quality. Similarly, Levesque and McDougall (1996) identified convenience of the banking services as a key contributor to the customer satisfaction. A study by Mihelis et al. (2001) found that waiting time of the customer can play critical role for customer satisfaction in the banking industry. In a study, González et al. (2004) identified machines availability and convenience of e-banking service delivery point as the significant aspects for satisfying the customers and suggested to increase the number of e-banking facility which will allow the customers to make more transactions with comfort and service quality. Strategic managers of the bank agreed on the fact that ensuring efficient availability of service

delivery point will decrease service delivery time and decrease in total time of delivering the services will enhance the total quality of the e-banking services. Quality of the product and service and satisfaction of the customer have direct effect on the profitability of the company (Anderson, Fornell and Lehmann 1994). Finally, providing quality products and services to customers enhances a bank's reputation, improve its customer retention, attract new customers, and increases its financial performance and profitability (Zeithaml, Berry and Parasuraman 1996).

Considering the above mentioned literature and findings from the field study regarding investing on potential value added services, learning and development of the employee, efficient availability of products and services and their potential economic outcome, the following hypothesis was developed:

H_1a : Economic strategies positively impact the perceived economic sustainability outcome.

7.2.1.2 Environmental sustainability

Cost effectiveness and environmental considerations of the business, such as, resource and energy conservation have been closely linked in the literature (Lee, Lye and Khoo 2001; Kuo, Wu and Shieh 2009; Veleva and Ellenbecker 2001; Enticott and Walker 2008). The evidence suggests a positive relationship between the efficiency of the business and sustainable performance (Enticott and Walker 2008). The importance of technological change for the transformation towards sustainability has been emphasised by many scholars (Stahel 1996; James 1997; Fussler and James 1996; Jackson 1996). This technological change provides increased customer value and business value while significantly decreases environmental impacts (James 1997). The management of the bank also agreed on the fact that efficient use of goods, materials, and services brings down the amount of power and fuel consumption.

One of the imperative economic value requirements recognised from the field study is the process cost that includes e-banking maintenance costs (ATM, mobile banking, Internet banking, data centre), network link costs, materials consumption costs, power costs (electricity, generator, IPS), and more. The management of the case bank realised that to reduce the process costs supply chain management has to be more efficient. Improving the quality of all supply chain processes results in reduced costs, improved resource utilisation, and improved process efficiency (Beamon and Ware 1998). MS14 was recommended in this regard. Similarly, goods, materials, and services have to be

used more efficiently to reduce the consumption costs. For example, replacement of old generators was suggested by the management of the case bank with the more efficient ones which consume less fuel and create less pollution. Public transports for the employee and minimum usage of air conditioning in the offices were suggested to reduce the cost which will also help to reduce energy consumption and pollution. Schaefer and Crane (2005) explicate how efficient consumption helps to achieve sustainability. According to Veleva and Ellenbecker (2001), efficient supply chain management can contribute to the reductions of energy usage, raw materials, and waste generation. Zhou et al. (2000) has shown how optimised supply chain can minimise the resource usage, pollution and waste generation to contribute to the environmental sustainability. Efficient use of goods, material, and services will lead to less use of resources and consequently, to less pollution. Figge and Hahn (2004) found out that efficient use of resources lead to the reduction of environmental impact. Therefore, considering the impact of the above mentioned economic strategies on the environment it can be hypothesised that,

H_1b : ***Economic strategies positively impact the perceived environmental sustainability outcome.***

7.2.2 Hypotheses related to Environmental Strategies

The optimised environmental strategies determined in Chapter 6 are expected to have positive impacts on the environmental sustainability outcome of the case bank. Similar to the economic strategies, it was found from the field study and QFD analyses that environmental strategies also have impacts on economic sustainability outcomes in addition to the impacts on environmental sustainability outcomes. For example, MS11 (Establishing green banking cell) is an environmental strategy and has impact on economic sustainability outcome (BR1); and MS18 (Increasing environmental CSR activities for future generation) is an environmental strategy and has impact on economic sustainability outcome (BR1).

7.2.2.1 Environmental sustainability

A key contribution of companies to environmental sustainability is the reduction of air pollution (Holliday, Schmidheiny and Watts 2002b). This key contribution of companies to environmental sustainability happens through reducing their impacts on air, water, and land (GRI 2011). Epstein and Wisner (2001) also emphasised that environmental strategies, such as, environmental research and development,

investment in cleaner technology, and more are essential to mitigate the barriers (e.g., air pollution, discharge to water) of environmental sustainability.

Veleva and Ellenbecker (2001) states that usages of materials, energy resources, fresh water and productions of pollutants, wastes, emissions need to be minimised for environmental sustainability. In the study of Stanwick and Stanwick (1998), environmental performance of the organisation is represented by the level of pollution emissions released by the organisation. It was exposed from the filed study of this research that to achieve environmental sustainability, the case bank is required to minimise the usages of materials, minimise the usages of energy resources, minimise the air pollution, ensure the environmental legislation compliance, facilitate the environmental policy and management, and fulfil the environmental commitment for future generations. To mitigate these environmental value requirements, the decision makers of the case bank selected three strategies, which are MS11 (Establishing green banking cell), MS15 (Reducing the impact on air), and MS18 (Increasing environmental CSR activities for future generation). Since these environmental strategies were selected to fulfil the above environmental value requirements, these strategies should have positive impacts on the above environmental value requirements which are indicators of sustainability outcome. Therefore, based on this argument it can be hypothesised that,

H_2a : Environmental strategies positively impact the perceived environmental sustainability outcome.

7.2.2.2 Economic sustainability

As mentioned earlier, environmental considerations and cost effectiveness of the business, such as, resource and energy conservation have been closely linked in the literature (Lee, Lye and Khoo 2001; Kuo, Wu and Shieh 2009; Veleva and Ellenbecker 2001; Enticott and Walker 2008). There are evidences that show positive link between environmental performance and financial performance (Hamilton 1995; Hart and Ahuja 1996; Blacconiere and Patten 1994). According to Erek (2011), environmental sustainability is aimed at increasing the energy efficiency of operations and enhancing the sustainable usage of material resources, and thus, the efficiency enhancements will contribute to the economic sustainability through saving costs. An environmentally sustainable organisation tries to generate less waste, and less waste means better utilisation of inputs, resulting in lower costs for raw materials and waste disposal (Hart

and Milstein 2003). Cost reductions through environmental sustainability often include lower energy consumption during the production process, reduced material storage and handling costs and reduced waste disposal (Heim and Zenklusen 2005). Strategies for environmental sustainability not only generate cost reductions but also create a positive reaction from customers who may benefit from these savings or product improvements (Epstein and Wisner 2001).

Field study has revealed that the usages of materials and energy resources (power and fuel) need to be reduced for environmental sustainability by efficiently using AC, generator, and individual transport. To reduce the usages of materials and energy resources, decision makers of the case bank recommended establishment of green banking cell (MS11) as the mitigation strategy. According to the decision makers, green banking cell will help to reduce the process cost and to uphold the reputation of the bank by maintain the environmental sustainability. As stated by Hart and Milstein (2003), firms now frame sustainability as a business opportunity, offering avenues for lowering cost and risk, or even growing revenues and market share through innovation.

Environmental management helps organisations in developing reputation and such reputation may invite patronage from customers and generate opportunities for business with other organisations (Darnall, Jolley and Handfield 2008; Darnall and Carmin 2005). Reputation earned from competencies to lower environmental impacts has been observed to not only eliminate the chances of jeopardising a firm's competitive advantage but also reinforces and differentiates the firm's position through the positive effects of a good reputation, giving them sustained competitive advantage (Dao, Langella and Carbo 2011). Since process cost and reputation are indicators of economic sustainability, therefore, it can be hypothesised that,

H_2b: Environmental strategies positively impact the perceived economic sustainability outcome.

7.2.3 Hypotheses Related to the Social Strategies

The growing and collective knowledge on social sustainability and performance increasingly points in the direction of positive returns from a range of social responsibility investments by private firms that includes environmental measures, like pollution control disclosure, waste prevention practices, and environmental practices surveys; and social measures, like equality of opportunity, social performance disclosure, ethical behaviour towards stakeholders or compliance with codes of

conduct (Enticott and Walker 2008). In this study, the social strategies were optimised based on the social value requirements (see Chapter 6). Thus, social strategies were expected to have positive influence on social sustainability outcome. It was attained from the field study and QFD analysis that social strategies have positive impacts on economic sustainability outcomes and environmental sustainability outcomes, too. For instance, MS17 (Ensure socially responsible action throughout the organisation) is a social strategy and has impacts on economic sustainability outcomes (BR1, BR7, PR3). Similarly, MS10 (Improving vigilance to illegal actions) is a social strategy and has impacts on environmental sustainability outcomes (CR17).

7.2.3.1 Social sustainability

A growing number of socially responsive investments have shown that it is possible to do good for both society and the shareholder at the same time (Haigh and Griffiths 2008). Epstein and Roy (2001) recognise the importance of appropriate strategies for social sustainability performances, such as, community development, human rights, product safety, ethical sourcing, etc. For building societal value, Nelson (1998) proposes strategies based on three elements: (a) efficient and ethical pursuit of core business activities, e.g., making socially responsible decisions; (b) social investment and philanthropy, e.g., sponsoring community development programs; and (c) contribution to the public policy debate, e.g., contribution to social policies and frameworks.

From the field study of this research it was found that to achieve social sustainability, social value requirements, such as, protecting human rights, contributing to social development, ensuring legislation and social code of conduct compliance, maintaining accountability of products and services for the customers, need to be fulfilled. Based on the field study and QFD analysis, four optimal mitigation strategies were identified to fulfil these social value requirements, which are maintaining privacy of information (MS4), increasing CSR activities for national development (MS5), improving vigilance to illegal actions (MS10), and ensuring socially responsible actions throughout the organisation (MS17). As these strategies were identified to fulfil the social value requirements and based on the above discussions, it can be postulated that,

H_3a : Social strategies positively impact the perceived social sustainability outcome.

7.2.3.2 Economic sustainability

The positive link between corporate social performance and business performance has already been established (Simpson and Kohers 2002). Griffin and Mahon (1997) provide the empirical evidence on the relationship between social performance and economic performance. The study by Stanwick and Stanwick (1998) also supports that a strong relationship exists between profitability and social performance. Social sustainability activities has been shown to positively affect performance (Preston and O'Bannon 1997; Ruf et al. 2001; Simpson and Kohers 2002), establish a positive corporate image/reputation (Nussbaum 2009; Smith 2008; Leisinger 2005; Kotler and Lee 2005), reduce operating costs (Nussbaum 2009; Kotler and Lee 2005), improve purchase intent (Leisinger 2005; Creyer 1997).

Field study and QFD analysis revealed that reputation of the organisation is one of the significant economic value requirements which need to be fulfilled for economic sustainability. Zeithaml et al. (2002), Yousafzai et al. (2003), and Bauer et al. (2004) also identified privacy as one of the significant elements for measuring the quality of the services. This research also found that implementations of social strategies, i.e., maintaining privacy of information (MS4) and increasing CSR activities for national development (MS5) will increase the reputation of the bank. According to the literature, social sustainability activities can have substantial positive impact on the organisation by helping to build corporate reputation (Kotler and Lee 2005; Smith 2008). In shifting towards sustainability, the businesses are now commonly using social sustainability as instrument to assist in protecting the reputation and brand value (Deutsch 2007). Therefore, this research posits that,

H_3b : Social strategies positively impact the perceived economic sustainability outcome.

7.2.3.3 Environmental sustainability

Shrivastava (1995) identified a shift in businesses to 'eco-centric' management, and organisations operating under the eco-centric paradigm establish harmonious relationships between their natural and social environments. It is expected that one of the critical components in the measurement of social performance will be based on the environmental performance of the organisation and thus, for firms to be acknowledged as leaders in social responsibility, need to focus not only on their financial performance, but also on their environmental performance (Stanwick and Stanwick 1998). This

Table 7.1: Summary of hypotheses

Construct	Link	Hypothesis #	Hypothesis statement
Economic strategies (EcoMSs)	EcoMSs → EcoSus	H_1a	Economic strategies positively impact the perceived economic sustainability outcome.
Economic strategies (EcoMSs)	EcoMSs → EnvSus	H_1b	Economic strategies positively impact the perceived environmental sustainability outcome.
Environmental strategies (EnvMSs)	EnvMSs → EnvSus	H_2a	Environmental strategies positively impact the perceived environmental sustainability outcome.
Environmental strategies (EnvMSs)	EnvMSs → EcoSus	H_2b	Environmental strategies positively impact the perceived economic sustainability outcome.
Social strategies (SocMSs)	SocMSs → SocSus	H_3a	Social strategies positively impact the perceived social sustainability outcome.
Social strategies (SocMSs)	SocMSs → EcoSus	H_3b	Social strategies positively impact the perceived economic sustainability outcome.
Social strategies (SocMSs)	SocMSs → EnvSus	H_3c	Social strategies positively impact the perceived environmental sustainability outcome.

statement is also advocated by the research conducted by Poduska et al. (1992) and Reilly (1992). A study conducted by Babiak and Trendafilova (2011) recommends that for many organisations, environmentally focused CSR appears to be viewed as a driver for social sustainability with many benefits.

In this study, it has been cited by the strategic managers of the case bank and revealed by the QFD analysis that CSR investment by the bank will not only help to fulfil the customer's requirements regarding contributing to the social development but also help to fulfil the environmental commitment for future generations. Currently, to a certain extent the bank is investing on various fields for CSR activities where one of the fields is natural environment. The study suggests, if MS18 (increasing environmental CSR activities for future generation) which is dedicated for environment is not implemented, then MS5 (increasing CSR activities for national development) will assist in fulfilling the environmental commitment for future generations. Therefore, based on the above discussion the following hypothesis was developed:

H_3c : Social strategies positively impact the perceived environmental sustainability outcome.

A total of seven hypotheses were developed based on the quantitative research model of this study to describe the relationships between the constructs. These relationships between the constructs indicate the impacts of optimal mitigation strategies on the sustainability outcomes. The quantitative research model includes the factors and variables explored from the literature, the field study, and the QFD analysis (Chapter 6). Figure 7.2 and Table 7.1 present the research model for quantitative tests with all the hypotheses developed above.

It should be noted that the hypotheses were developed based on the impacts of the strategies on the sustainability outcomes. As explained in Section 6.4, the relationship between a strategy and a sustainability outcome is usually determined by analysing to what extent a strategy could technically relate to and influence a sustainability outcome (see Section 6.4 for more explanation). That is why there is no relationship posited between 'Economic strategies and Social sustainability outcome' as well as 'Environmental strategies and Social sustainability outcome'.

7.3 DEVELOPMENT OF QUESTIONNAIRE

A set of questions were developed in order to test the seven hypotheses mentioned above (see Table 7.1 and Figure 7.2). The questions were developed mainly based on the contributions of optimal mitigation strategies on the sustainability outcomes. The following sections are presented with the details of the development of the questionnaire.

7.3.1 Overview of the Questionnaire

A questionnaire was developed for the quantitative survey of this research based on the existing relevant literature, the field study, and the outcome of the QFD analysis. The questionnaire was designed to test the research hypotheses presented in the quantitative research model (see Figure 7.1). A total of 89 questions were developed for the questionnaire under 9 constructs to represent the blended value requirements and their corresponding optimal mitigation strategies. It is important to note that some of the blended value requirements were repeated under more than one strategies as those value requirements impacted or mitigated fully or partially by more than one strategies. The questionnaire was divided into 3 main sections (see Appendix **E**). Before the questions, the questionnaire opens with a brief introduction about the research area, research purpose, the anticipated time to complete. This part of the questionnaire also highlighted the privacy and confidentiality of the respondents and their answers. Respondents were assured that the questionnaire was given with no intention to determine whether their answer is right or wrong, rather it was only for research purposes. The first section of the questionnaire included questions about demographic information of the respondents. The questions about blended value requirements were contained in the second section; and the questions about mitigating optimal strategies were included in the last section.

7.3.2 Development of Measurement Instrument

This section develops the measurement instruments for empirically testing the structural relationships between three exogenous constructs: economic strategies, environmental strategies, social strategies; and three endogenous constructs: economic sustainability outcome, environmental sustainability outcome, social sustainability outcome (see Figure 7.1). In this research model the endogenous construct is the dependent or outcome construct in at least one structural relationship (Hair et al. 2006). It is important to note that a construct, which is also known as latent variable, is

a hypothesized and unobserved concept that can only be measured by observable or measurable variables (Bollen and Lennox 1991). The measurement variables are group of indicators that are used to measure the constructs (DeVellis 2012) to determine whether they would be formative or reflective in a nature. In order to measure the phenomena, which are believed to exist because of theoretical observations, the measurement scales are developed. Multiple items were used for data collection to make measurement process of reliability and validity of the model easier. The indicators of the constructs were principally developed from existing literature. The opinions of respondents gained from the field study (see Chapter 5) were also used for the development and contextualization of the constructs and the relationships among them. Therefore, the indicators of this research were developed based on the literature review, relevant theories, previous empirical studies, and field study.

7.3.2.1 Questionnaire section 1: Measurement items for demographic information

The main purpose of the first section was to obtain information about the demographic information of the respondents involved in this research. The demographic particulars include participants' details (age, gender, experience in banking, experience at the case bank, position at the case bank) and size of the bank branch. Table 7.2 depicts the demographic items used and the related references.**Table 7.2**: Measurement items for demographic information

Item	Variable	Measure	Reference
DM1	Age	Nominate age	Jamal and Naser (2002); Wang et al. (2003); González et al. (2004);
DM2	Gender	Nominate gender	Martin and Morgan (1995); Levesque and McDougall (1996); Poon and Lee (2012)
DM3	Experience in banking industry	Nominate experience in years	Martin and Morgan (1995); Hway-Boon and Yu (2003)
DM4	Experience in the organisation	Nominate experience in years	Innes and Mitchell (1997); Alatrista and Arrowsmith (2004)
DM5	Position at the organisation	Nominate the position	Innes and Mitchell (1997); Alatrista and Arrowsmith (2004)
DM6	Size of the bank	Define the number	Love and Irani (2004);

	branch by number of employee	of employee in branch	Burgers and Sawang (2012)

Two of the six questions in demographic section (DM2 and DM5) used nominal scales; and the other four questions (DM1, DM3, DM4, and DM6) used ordinal scales to represents the measures. The participants were also offered to write the answers if they cannot relate their answers to the options offered. For example, for the questions about *highest level of working experience in the industry* and *highest level of working experience in the organisation,* the respondents were offered with five choices. The respondents were also offered to write down their response in "Others" category mentioning their experiences. It is noted that DM6 measures the size of the bank branch using the number of employee working in that branch.

7.3.2.2 Questionnaire section 2: Measurement items for sustainability requirements

The objective of this section was to identify and measure the prioritised blended value requirements that will be mitigated by the optimal strategies. The blended value requirements are economic value requirements of customer, environmental value requirements of customer, social value requirements of customer, economic value requirements of business, environmental value requirements of business, social value requirements of business, economic value requirements of process, environmental value requirements of process, and social value requirements of process. Fulfilment of these blended value requirements represents the sustainability outcome of the case business. More specifically, the questions in this section measured the sustainability outcome related to the implementations of optimal mitigation strategies.

According to this research approach, economic value requirements of customer, economic value requirements of business, and economic value requirements of process altogether represent economic sustainability outcome of the organisation. Likewise, social value requirements of customer, social value requirements of business, and social value requirements of process altogether represent social sustainability outcome of the organisation; and environmental value requirements of customer, environmental value requirements of business, and environmental value requirements of process altogether represent environmental sustainability outcome of the organisation.

In this section, the respondents were given six-point Likert scale to express their agreement and disagreement on each statement. The reason for choosing this scale was

to avoid any central tendency error in which respondents tend to avoid using the extreme ends of the scales (Montgomery and Asberg 1979) and consistently rates the middle response (e.g., 'neutral', 'neither agree nor disagree') of the scale regardless of the actual merit of the question.

- ***Economic requirements of customer value***

These customer requirements mean all the customer's value requirements which are somehow economically related directly or indirectly to the product or service that is beneficial to the customer. For example, quality of the services, security of the services, costs of the services, etc. are directly related to the customer economically. A total of 8 economic value requirements of customer were identified from the prioritised blended value requirements to measure the EcoSus construct (economic sustainability outcome) which are shown in Table 7.3. The items for economic value requirements of customer were taken from the literature, and were contextualised. For instance, item Eco4 was adapted from the studies that dealt with potential value added services for customers or special services that add value for the customers. Potential value added services or special services for the customers was also identified by Gonza´lez et al. (2004), Mihelis et al. (2001), and Bauer et al. (2004). Similarly, all other items were taken from the literature, and were contextualised.

Table 7.3: Measurement items for economic requirements of customer value

Item	Symbol used	Dimension	Statement	Sources
Eco4	CR6	Potential value added services for customers	Mitigation strategy (MS8) will increase the bank's potential value added services for the customers.	Gonza´lez et al. (2004); Mihelis et al. (2001); Bauer et al. (2004)
Eco7	CR2	Quality of the services for customers	Mitigation strategies (MS1, MS2, MS3, MS6, MS12, MS13) will improve the quality of the services for customers.	Levesque and McDougall (1996); Gonza´lez et al. (2004); Wang and Hong (2007)
Eco10	CR1	Security of the services for customers	Mitigation strategies (MS1, MS2) will ensure the security of the services for customers.	Gonza´lez et al. (2004); Liao and Cheung (2002); Bauer et al. (2004)
Eco11	CR4	Profit and benefits for the customers	Mitigation strategy (MS7) will increase the profit and benefits for the customers.	Gonza´lez et al. (2004); Levesque and McDougall (1996); Molina et al. (2007)
Eco13	CR5	Total time needed to get	Mitigation strategies (MS2, MS3, MS12) will	Kwong and Bai (2002); Gonza´lez et al. (2004);

		the services by the customer	reduce the total time needed to get the services by the customer.	Mihelis et al. (2001); Molina et al. (2007)
Eco14	CR3	Simplicity of the services and complexity level	Mitigation strategy (MS3) will ensure the elimination of complexity faced by the customers.	Gonza´lez et al. (2004); Levesque and McDougall (1996); Mihelis et al. (2001)
Eco19	CR7	Costs of the services for customer	Mitigation strategy (MS7) will reduce the e-banking service costs for the customers.	Kwong and Bai (2002); Gonza´lez et al. (2004); Mihelis et al. (2001)
Eco20	CR10	Customer service excellence	Mitigation strategy (MS13) will increase the fulfilment of additional customer requirements.	Mihelis et al. (2001); Levesque and McDougall (1996); Molina et al. (2007)

- ***Economic requirements of business value***

Economic value requirements of business are those requirements that add some economic value to the business directly or indirectly if they are fulfilled. These economic requirements are generally identified by the businesses to be fulfilled to achieve the planned goals and targets.

Table 7.4: Measurement items for economic requirements of business value

Item	Symbol used	Dimension	Statement	Sources
Eco1	BR2	Profitability, liquidity, and investment capability	Mitigation strategies (MS8, MS9) will increase the bank's profitability, liquidity, and investment capability.	Labuschagne et al. (2005); Vinodh and Chintha (2011)
Eco2	BR3	Economic performance (share performance, market growth, ROI)	Mitigation strategies (MS8, MS9) will increase the bank's economic performance.	Labuschagne et al. (2005); Vinodh and Chintha (2011)
Eco5	BR6	Potential benefits for the business from overall improvements (market growth, productivity)	Mitigation strategy (MS8) will increase the potential benefits for the business from overall improvements.	Vinodh and Chintha (2011); Mahmood and Mann (2000)
Eco9	BR7	Overall productivity of the business for cost efficiency	Mitigation strategies (MS1, MS2, MS3, MS16, MS17) will increase the overall productivity of the business for cost efficiency.	Figge et al. (2002); Wang and Hong (2007)

Eco15	BR4	Cost of goods, material, and services consumed	Mitigation strategies (MS9, MS14, MS15) will reduce the cost of goods, material, and services for the bank	Kuo et al (2009); GRI (2006); IChemE (2005)
Eco17	BR5	Readiness for risk and crisis management	Mitigation strategy (MS6) will eliminate the chances of crisis for the e-banking services.	Lo and Sheo (2007); Hoggarth et al. (2004); DJSI (2005); Delai and Takahashi (2011)
Eco21	BR8	Customer relationship management	Mitigation strategy (MS13) will facilitate the customer relationship management for the bank.	Lo and Sheo (2007); Delai and Takahashi (2011); Kotler and Armstrong (2004);
Eco23	BR1	Reputation of the organisation	Mitigation strategies (MS4, MS5, MS11, MS17, MS18) will increase the reputation of the bank.	Mihelis et al. (2001); Bloemer et al. (1998)

Table 7.4 shows that there are 8 items that were identified as the prioritised economic value requirements of business to measure the economic sustainability outcome of the bank (EcoSus construct), if the corresponding mitigation strategies are implemented. All of these 8 items were contextualised by the study after adapting from the literature. For instance, Eco17 and Eco21 have dealt with 'readiness for risk and crisis management' and 'customer relationship management' respectively which are also used by Lo and Sheo (2007) and Delai and Takahashi (2011).

- ***Economic requirements of process value***

Economic value requirements for process requirements are mainly linked to the cost savings and efficiencies within the business processes. Generally, the managers identify these value damaging inefficiencies within the existing processes and try to correct them which result in some sort of economic benefits for the organisations. As shown in Table 7.5, a total of 7 items were recognised as the prioritised economic value requirements of process by the study to measure the EcoSus construct (economic sustainability outcome).

These items were adapted from the literature and were contextualised by the study. Respondents were asked to predict the degree of fulfilment of these economic value requirements if the corresponding mitigation strategies are implemented.

Table 7.5: Measurement items for economic requirements of process value

Item	Symbol used	Dimension	Statement	Sources
Eco3	PR4	Financial structure of the process	Mitigation strategy (MS8) will enhance the financial structure of the process.	Labuschagne et al. (2005); Vinodh and Chintha (2011)
Eco6	PR6	Potential benefits for the process from technological improvements	Mitigation strategy (MS8) will increase the potential benefits for the process from technological improvements.	Vinodh and Chintha (2011); Mahmood and Mann (2000)
Eco8	PR3	Productivity of the processes	Mitigation strategies (MS1, MS2, MS3, MS16, MS17) will increase the productivity of the e-banking processes.	Figge et al. (2002); Weske (2012); Wang and Hong (2007); Hlupic and Robinson (1998)
Eco12	PR1	Security of the processes including data security	Mitigation strategies (MS1, MS2) will increase the security of the e-business processes.	Alam et al. (2007); Maugis et al. (2005)
Eco16	PR5	Process related costs	Mitigation strategies (MS9, MS14, MS15, MS16) will reduce the process cost.	GRI (2006); IChemE (2005); Field study
Eco18	PR2	Risk and crisis management of the processes	Mitigation strategy (MS6) will eliminate the chances of crisis for the e-banking process	Lo and Sheo (2007); Hoggarth et al. (2004)
Eco22	PR7	Meeting additional customer requirements	Mitigation strategy (MS13) will ease the processes to meet the additional customer requirements.	Gonza´ lez et al (2004); Molina et al. (2007)

- ***Social requirements of customer value***

Table 7.6 shows that there are 4 items (Soc1, Soc4, Soc5, Soc6) that are recognised as the prioritised social value requirements of customer to measure the SocSus construct (social sustainability outcome). Each of these items was adapted from the literature and was contextualised for the study. Any value expected by the customers for their society is considered as the social value requirement of the customer. There are different dimensions of social value requirements, such as, it can be directly related to

the product or service of the business, (e.g., customers' safety of the product) or it can be indirectly related to the business, (e.g., generating local employment).

Table 7.6: Measurement items for social requirements of customer value

Item	Symbol used	Dimension	Statement	Sources
Soc1	CR9	Accountability of products and services for the customers	Mitigation strategy (MS4) will enhance the accountability of products and services for the customers.	Delai and Takahashi (2011); Poon and Lee (2012)
Soc4	CR8	Legislation and social code of conduct compliance	Mitigation strategy (MS10) will ensure the legislation and social code of conduct compliance.	Vinodh and Chintha (2011); Delai and Takahashi (2011)
Soc5	CR12	Contribution to social development at national level	Mitigation strategy (MS5) will increase the contribution to social development at national level.	Labuschagne et al. (2005); Delai and Takahashi (2011)
Soc6	CR11	Human rights of employee	Mitigation strategy (MS17) will protect all the human rights.	Tanzil and Beloff (2006); Zairi and Peters (2002)

- ***Social requirements of business value***

Social value requirements of business reflect what social value the business is planning and willing to deliver to the customers' society outside the customers' demand. These requirements eventually add value indirectly to the customers' society but instead of demanded by the customers these are identified and fulfilled by the businesses to achieve certain business goals. Table 7.7 depicts that only 2 items (Soc2, Soc4) were identified as the prioritised social value requirements of business by the study to measure the SocSus construct which were adapted from the literature and was contextualised. It is noted that some of the blended value requirements were commonly identified both by the business and the customer. For example, Soc4 (legislation and social code of conduct compliance) has been identified as the social value requirement of customer and social value requirement of business. The respondents were asked to give input in Likert scale to express their prediction about the extent of legislation and social code of conduct compliance by the case bank if the corresponding mitigation strategies are implemented.

Table 7.7: Measurement items for social requirements of business value

Item	Symbol used	Dimension	Statement	Sources
Soc2	BR9	Maintaining products and services responsibilities by the bank	Mitigation strategies (MS4, MS13) will facilitate the business to maintain products and services responsibilities.	Delai and Takahashi (2011); Poon and Lee (2012)
Soc4	BR10	Legislation and social code of conduct compliance	Mitigation strategy (MS10) will ensure the legislation and social code of conduct compliance.	Vinodh and Chintha (2011); Delai and Takahashi (2011)

- ***Social requirements of process value***

Social value requirements of process are those value requirements that can be delivered to the society by the process division of the business. For instance, process division of the business can contribute in organising skills training for unemployed people, employing disabled people, sponsoring social events, organising social gathering, organising awareness programs, etc. which can add significant value to the society.

Table 7.8: Measurement items for social requirements of process value

Item	Symbol used	Dimension	Statement	Sources
Soc3	PR8	Fulfilment of products and services requirements by process	Mitigation strategies (MS4, MS13) will facilitate the process division to fulfil the products and services requirements.	Delai and Takahashi (2011); Poon and Lee (2012)

It can be revealed from Table 7.8 that only 1 item (Soc3) has been listed as the prioritised social value requirement of process to measure the social sustainability outcome (SocSus construct) of the bank if the corresponding mitigation strategies are implemented. Item Soc3 was adapted from the literature (Delai and Takahashi 2011; Poon and Lee 2012) and was contextualised for this study.

- ***Environmental requirements of customer value***

Environmental value requirements include all the environmental factors related directly or indirectly, to the product or service delivered to the customer or they can be somehow related to the operations of supplier of the product or service (Figge et al.

2002). The impacts on the environment may occur directly from the product or service, and/or they may occur internally within the organisation, and/or they may occur along the value chain of the businesses. Thus, any value requirement that reduces or minimises the impact on the environment is considered as the environmental value requirements.

Table 7.9: Measurement items for environmental requirements of customer value

Item	Symbol used	Dimension	Statement	Sources
Env1	CR15	Usage of materials	Mitigation strategy (MS11) will minimise the usages of materials.	Delai and Takahashi (2011); Tanzil and Beloff (2006); Lin et al. (2010)
Env2	CR14	Organisation's impact on air resources	Mitigation strategies (MS11, MS15) will minimise the air pollution.	Labuschagne et al. (2005); Vinodh and Chintha (2011); Masui et al. (2003)
Env3	CR16	Proper environmental policy and management	Mitigation strategies (MS10, MS11) will facilitate the environmental policy and management.	Epstein and Wisner (2001); Lo and Sheu (2007)
Env4	CR17	Full compliance of environmental legislation	Mitigation strategies (MS10, MS11) will ensure the environmental legislation compliance.	Labuschagne et al. (2005); Nikolaou et al. (2012); Jeucken and Bouma (1999)
Env5	CR13	Usage of energy resources by the organisation	Mitigation strategies (MS11, MS14, MS15) will minimise the usages of energy resources.	Vinodh and Chintha (2011); Masui et al. (2003); Lin et al. (2010); Tanzil and Beloff (2006)
Env6	CR18	Organisation's commitment for future generations	Mitigation strategies (MS5, MS18) will fulfil the environmental commitment for future generations.	Beheiry et al. (2006); Delai and Takahashi (2011)

Table 7.9 demonstrates that 6 items (Env1 to Env6) were identified as the prioritised environmental value requirements of customer to measure the EnvSus (environmental sustainability outcome) construct. All the items were contextualised for this study after adapting from the literature.

It is noted that some of the environmental value requirements were commonly identified as the value requirements of customers, business, and process. For instance, Env4 (Full compliance of environmental legislation) and Env5 (Usage of energy resources by the organisation) were commonly identified by the customers, managers,

and the process managers of the bank which have been given places in the weighted priority list of the blended value requirements. The reason for commonly appearing these items in the priority lists is that on the one side, these value requirements were demanded by the customers and on the other side, the business managers and the process managers also shown their interests to fulfil those value requirements for achieving environmental sustainability.

- ***Environmental requirements of business value***

The respondents from the case bank identified these environmental value requirements based on the environment they are operating and aim to achieve some goals by fulfilling these requirements. Table 7.10 shows that only 2 items (Env4, Env5) were prioritised as the important environmental value requirements of business to measure the environmental sustainability outcome (EnvSus construct) of the bank if the corresponding mitigation strategies are implemented. These two items (Env4, Env5) were also identified by the customers of the case bank.

Table 7.10: Measurement items for environmental requirements of business value

Item	Symbol used	Dimension	Statement	Sources
Env4	BR12	Environmental legislation compliance	Mitigation strategies (MS10, MS11) will ensure the environmental legislation compliance.	Labuschagne et al. (2005); Nikolaou et al. (2012); Jeucken and Bouma (1999)
Env5	BR11	Total consumption of fuel and power	Mitigation strategies (MS11, MS14, MS15) will minimise the usages of energy resources.	Veleva and Ellenbecker (2001); Masui et al. (2003); Lin et al. (2010);

- ***Environmental requirements of process value***

Environmental value requirements of process are those requirements which need to be fulfilled to minimize the impact of current value processes on the environment. These value requirements were identified within the existing value processes by the process managers so that they can be fulfilled for achieving environmental sustainability. Two items (Env4, Env5) were listed as the prioritised environmental value requirements of process (see Table 7.11) to measure the EnvSus (environmental sustainability outcome) construct. These two items were also commonly identified by the business managers and the customers.

Table 7.11: Measurement items for environmental requirements of process value

Item	Symbol used	Dimension	Statement	Sources
Env4	PR9	Environmental legislation compliance by process division	Mitigation strategies (MS10, MS11) will ensure the environmental legislation compliance.	Labuschagne et al. (2005); Nikolaou et al. (2012); Jeucken and Bouma (1999)
Env5	PR10	Process related fuel and power consumption	Mitigation strategies (MS11, MS14, MS15) will minimise the usages of energy resources.	Sakao et al. (2003); Vinodh and Chintha (2011); Masui et al. (2003)

7.3.2.3 Questionnaire section 3: Measurement items for mitigation strategies

The main focus of the questions in this section was to measure the capability of the company with regards to implementations of the strategies for sustainability. More specifically, the questions measured the capability and willingness of the case bank for implementing optimised strategies to fulfil the blended value requirements. Like the previous section, in this section also the respondents were asked to give input in a six-point Likert scale to express their agreement and disagreement on each statement.

- ***Economic strategies***

Economic strategies are the strategies that were selected for implementations to achieve economic sustainability. These economic strategies were selected to contribute in fulfilling all the economic value requirements of customers, economic value requirements of business, and economic value requirements of process. Though these strategies were identified based on the economic value requirements for economic sustainability outcome, some of them have contributions to the environmental sustainability outcome, too (see Section 7.2.1.2). Table 7.12 shows that there are 11 items (EcoMS1 to EcoMS11) that were identified as the economic strategies to measure the EcoMSs (economic strategies) construct. All of these items were adapted from the literature and were contextualised for this study.

Table 7.12: Measurement items for economic strategies

Item	Symbol used	Dimension	Statement	Sources
EcoMS1	MS8	Investing more on potential	The bank has the ability to invest enough amount on potential value added	González et al. (2004); Furst et al. (2002), Broderick

		value added services	services.	and Vachirapornpuk (2002); Braga (1996);
EcoMS2	MS2	Learning and development facilities for the employees	The bank is able to provide enough learning and development facilities for the employees.	Titko and Lace (2010); Jamal and Naser (2002)
EcoMS3	MS1	Outsourcing high security software and hardware	The bank has the full capability to outsource the best software and hardware.	Karyda et al. (2006); Goi (2005); (Shiralkar and Vijayaraman 2003)
EcoMS4	MS3	Easing the service delivery process easily	The bank has the ability to ease the service delivery process easily.	Bauer et al. (2004); Yousafzai et al. (2003); De Ruyter et al. (1997)
EcoMS5	MS12	Ensuring efficient availability of service delivery point	The bank has the full capability to ensure efficient availability of service delivery point.	González et al. (2004); Levesque and McDougall (1996); Parasuraman et al. (2005)
EcoMS6	MS14	Improving efficiency in supply chain management and use of goods, materials, and services	The bank has the full capability to improve efficiency in supply chain management and use of goods, materials, and services.	Beamon and Ware (1998); Min and Zhou (2002); Schaefer and Crane (2005)
EcoMS7	MS9	Managing investment efficiently	The bank is fully capable of managing investment efficiently.	Weill and Margrethe (1989); Teece (2010); Kwan and Eisenbeis (1997)
EcoMS8	MS6	Ensuring crisis management and early warning signals above industry standard	The bank has the ability to ensure crisis management and early warning signals above industry standard.	Angelakopoulos and Mihiotis (2011); Hoggarth et al. (2004); Coletti and Tirri (2005)
EcoMS9	MS7	Redesigning the e-banking products for the profit and benefits of the customers	The bank has the ability to redesign the e-banking products for the profit and benefits of the customers.	Mihelis et al. (2001); Garg and Lee (1999); Levesque and McDougall (1996)
EcoMS10	MS16	Improving efficiency of internal	The bank has the ability to improve efficiency of internal processes.	Wang and Hong (2007); Figge et al., (2002); Hlupic and

		processes		Robinson (1998)
EcoMS11	MS13	Establishing customer relationship management (CRM) unit	The bank has the full capability to establish CRM unit.	Kotler and Armstrong (2004); Sin et al. (2005);

- ***Social strategies***

These strategies were optimised and selected to achieve social sustainability by fulfilling the social value requirements of customer, social value requirements of business, and social value requirements of process. Though these strategies are selected to achieve social sustainability, some of them have contributions to economic sustainability (see Section 7.2.3.2) and environmental sustainability (see Section 7.2.3.3). A total of 4 social mitigation strategies were identified and optimised to fulfil all the social value requirements. Table 7.13 depicts those social strategies (SocMS1 to SocMS4) for measuring SocMSs construct (social strategies). These items were contextualised for this study after adapting from the literature.

Table 7.13: Measurement items for social strategies

Item	Symbol used	Dimension	Statement	Sources
SocMS1	MS4	Maintaining privacy of information	The bank is fully capable of maintaining privacy of information.	Yousafzai et al. (2003); Gangopadhyay and Adya (1999); Warkentin et al. (2011); Quaddus and Hofmeyer (2006)
SocMS2	MS10	Improving vigilance to illegal actions	The bank has the ability to improve vigilance to illegal actions.	Goldsmith and Brinkerhoff (1990); Chowdhury (2012)
SocMS3	MS5	Increasing CSR activities for national development	The bank has the full capability to increase CSR activities for national development.	McDonald and Rundle-Thiele (2008); McDonald and Lai (2011); Godfrey and Hatch (2007)
SocMS4	MS17	Ensuring socially responsible action throughout the organisation	The bank is able to ensure socially responsible action throughout the organisation.	Turban and Greening (1997); Sorsa (2008); Peterson and Hermans (2004); Lepoutre and Heene (2006)

- ***Environmental strategies***

To measure the construct EnvMSs (environmental strategies), a total of 3 items (EnvMS1 to EnvMS3) were identified by the study for achieving environmental sustainability by fulfilling environmental value requirements of customer, environmental value requirements of business, and environmental value requirements of process (see Table 7.14). These strategies not only contribute to the environmental sustainability outcome but also to the economic sustainability outcome of the bank (see Section 7.2.2.2). All these 3 items were adapted from the literature and were contextualised for this study. The complete questionnaire of the survey is presented in Appendix **C**.

Table 7.14: Measurement items for environmental strategies

Item	Symbol used	Dimension	Statement	Sources
EnvMS1	MS11	Establish green banking cell	The bank has the full capability to establish green banking cell.	Choudhury et al. (2013); Saha (2013); Chisty (2013); Green Banking and CSR Department (2011)
EnvMS2	MS18	Increase environmental CSR activities for future generation	The bank has the enough capability to increase environmental CSR activities for future generation.	Babiak and Trendafilova (2011); Carlisle and Faulkner (2005); Vives (2006)
EnvMS3	MS15	Reduce the impact on air by reducing the usages of AC, generator, individual transport	The bank is able to reduce the impact on air by reducing the usages of AC, generator, individual transport.	Foxon et al. (2002); Roper and Beard (2006); Kabir and Madugu (2010)

It is noted that to the best knowledge of the researcher to date, items listed in the above tables (Table 7.3 to Table 7.14) has not been used so far by prior studies as the scales of constructs for e-business sustainability. In fact, a comprehensive study using scales for e-business sustainability is yet to be completed.

7.4 PRE- TEST

To test the validity and to ensure the consistency, the questionnaire was investigated carefully through pre-analysis test. The main purpose of this test is to examine the

appropriateness of the questions. In addition to that, the test was intended to find the length of time in answering the questionnaire. To complete this process, a total of 8 questionnaires were distributed among three groups of people (researchers, general people, and potential respondents) as suggested by Frazer and Lawley (2000). They were selected on the basis that "they understand the study's purpose and they have similar training as the researcher" (Frazer and Lawley 2000, p.34) so that formality, comprehensibility, and applicability of the questionnaire can be ensured to meet the research objective. Two questionnaires were distributed among two researchers from two different disciplines. The members of these selected groups were not involved in this research and not related to the topic specifically. Two questionnaires were distributed among two retail customers of the bank who use e-banking frequently. This people were targeted with the aim of getting feedback on whether they understood the questions generally. As for the potential respondents, 4 questionnaires were distributed among the branch managers and branch deputy-managers of the bank.

Most of the respondents generally stated that they have faced no difficulty in answering all the questions. However, some of the participants were confused about few terminologies when answering the questions. For instance, in the question: '*Establishing CRM unit will…*' the word CRM was used for 'customer relationship management'; but most participants considered this word for 'Credit Risk Management'. Therefore, adjustment for this word was made by putting the meaning of 'CRM' in the bracket. Some more texting adjustments were also made for better readability of the questionnaire. This test was not intended to conduct a detailed analysis rather to get feedback on whether they understood the questions clearly. Overall, the findings from the pre-analysis test indicated that all the questions in the questionnaire were understandable and appropriate in the research context.

7.5 QUANTITATIVE TESTS

This is the second part of this chapter. This section presents the quantitative data analysis that is conducted to test the hypotheses developed above. For this purpose, a total of 225 employees at the managerial levels of the branches of the bank were surveyed from which 219 usable samples were collected. Using this collected data, this chapter presents the empirical results of the data analysis by employing the Partial Least Square (PLS) based Structural Equation Modelling (SEM) technique (Chin 1998a). SPSS and SmartPLS have been used as the main analysis tools. The research model is consists of 6 (six) constructs (see Figure 7.1). To ensure that each item distinctly

contributes towards the latent variable, reliability and validity of the measurement scales were examined and reported followed by testing multicollinearity. For the assessment of structural model, explanatory power of the model was tested by computing the R^2 value of the endogenous constructs, and path coefficient (β) and t-values were calculated to determine the significance of the hypothesized relationship.

This section is organised as follows: overview of the quantitative study is presented at first; then, descriptive analysis of the survey respondents is presented followed by the data analysis and results.

7.7 OVERVIEW OF THE DATA ANALYSIS

7.7.1 Sample Selection and Data Collection

After the developments of initial measurement scale and survey questionnaire based on the optimised strategies and their mitigation impacts on the blended value requirements, one of the vice-presidents of the case bank was approached regarding the data collection. Since there is high competition among the banks in the country, the vice-president organised reviews of the questionnaire by the bank employees with associated expertise before proceeding any further regarding data collection. Once the review process was completed and the questionnaire was given green signal, a list of the bank-branches was provided to the researcher with all the contact information from which the survey data could be collected.

It was decided that to get perceptions from different points of view, five employees from each of the required branches of the bank would be used as the respondents for data collection. They are: (i) branch manager; (ii) branch deputy manager; (iii) branch accounts manager; (iv) branch customer service manager; and (v) information technology personnel of the branch. Most of the branches and the respondents were attended physically by the researcher with the questionnaire. A telephone call was made from the vice-president's office to every branch of the bank before approaching for data collection to overcome any complexities and to make sure that the employees are in the office. The above mentioned five employees were gathered at the manager's office of the branch for the explanations of the research area and the questionnaire. Once the questionnaire was understood by the respondents, they were asked to complete them based on their perceptions. In most cases, the researcher was present during the completion of questionnaire by the respondents; therefore, any question from the respondents was immediately answered.

About 15% of the data could not be collected physically since some of the branch offices of the bank are located in the remote areas of the country. In those cases, questionnaire was faxed to the managers before having a teleconference with them by phone. The teleconferences were kindly organised by the bank's vice-president's office. Similar to the above step, the respondents were gathered at the manager's office at their branches for the explanations of the research area and the questionnaire by teleconference; and then they were asked to complete the questionnaire. In case of any question or confusion from the respondents, the researcher was available through teleconference. Once the questionnaires were completed by them, they were mailed to the researcher directly. Some of these participants needed 1 or 2 reminders to mail the completed questionnaires.

7.7.2 Response Rate

As mentioned in earlier in Section 4.8.6 that a major difficulty of the research survey is the low response rate (Krosnick 1999). There are many techniques and practices in this domain that have been used by the researchers to increase the response rate, for example, sending reminders, attending and requesting respondents physically, offering gifts and prizes, and more. But all these techniques work complementarily with the appropriately designed questionnaire. Moreover, it is necessary to increase the interests and awareness of the respondents about the research by encouraging them to take part in the survey. Considering all these factors, a technique called Total Design Method (Dillman 1978, 1991) was employed in developing the questionnaire. This development process includes using non-technical general statements and avoiding any technical jargons (Kitchenham and Pfleeger 2002). Once the questionnaire was developed, it was peer-reviewed by the highly educated academia specialised in the associated field. To explain the significances and the benefits of taking part in the survey, a cover letter was attached with each questionnaire.

To minimise non-response and to improve the response rate more measures were taken. Firstly, as mentioned earlier, most of the respondents (85%) were attended physically according to their convenience for the data collection. Secondly, the cover letter of the questionnaire included the contact details of the supervisor for the respondents to verify the legitimacy of the study. It was also assured in the cover letter that the respondents' individual response would be treated as confidential. Thirdly, the respondents were offered to obtain the summary of the study if they were interested. Lastly, for those respondents, who could not be attended physically for data collection

due to their remote geographic locations, were provided with teleconference communication facility for any question or confusion.

The majority of the questionnaires, 193 cases, was completed and collected on the same day as those respondents were attended physically and meetings with them were pre-arranged. These 193 cases include 50 cases that were used for pre-analysis test providing that there was only a minor change in the questionnaire after pre-analysis test that has not affected the meaning of the measures. The rest of the questionnaires, 32 cases, were faxed, as mentioned earlier, and have returned in 5-15 working days. 6 out of 32 questionnaires were returned incomplete which has brought the total usable questionnaires to 219 and has yielded about 97.33% response rate.

7.7.3 Data Organisation

Questionnaires with more than 8% missing values were not considered for the data analysis. The questionnaires were reviewed to find out any errors in the form of invalid input, missing values, or blank questionnaires. To produce clean and valid data for the research analysis, the carrying out of this process is necessary (Alreach and Settle 1995; Jackson 2008). After reviewing, 6 out of 225 questionnaires were found incomplete, and therefore, were not considered for analysis to avoid erroneous results. The remaining samples satisfied the minimum requirement of 10 times the number of items in the most complex formative construct or the largest number of antecedent constructs leading to an endogenous construct in the research model (Barclay, Higgins and Thompson 1995). According to this argument by Barclay et al. (1995), the minimum required sample size for this study is 210, and the final usable sample size was 219.

7.7.4 Empirical Pilot Study

A pilot study using PLS analysis was conducted based on the usable samples to test the validity of the questionnaire and to rectify any measurement-problem. A total of 40 respondents were considered for the test. The main intension of conducting this test was to get a synopsis of the applicability of the data in this research, and not to assess the structural or measurement model. Most of the respondents generally stated that they have faced no difficulty in answering all the questions. However, some minor modifications were made to the questionnaires based on the feedback. For example, while answering the questionnaire, some of the participants missed out on recognising

1 or 2 reverse-coded questions and answered them like other questions that were not reverse-coded. Thus, to improve the visibility of the reverse-coded questions, the word 'NOT' was capitalised; for example, '*Redesigning of e-banking products will NOT…'.*

In addition, a quick reliability analysis using Cronbach's alpha was performed for the study to see the internal consistency of the constructs. The common statistic for evaluating reliability, the coefficient of internal consistency (alpha) (Lewis, Templeton and Byrd 2005), is computed for each of the construct components and was found that alpha values of most of the constructs well exceeded the minimum standard of 0.70 as suggested by Nunnally and Bernstein (1994). The overall scale relativity was 0.755.

7.7.5 Non-Response Bias Test

It is assumed in the data analysis of this study that there is no difference between the distributions or the opinions between respondents and non-respondents in terms of their socio-demographic characteristics and the selected measurement items. As mentioned earlier, a major portion of the data was collected physically and rest of the data was collected through mail. Since bank employees are generally busy all day, some of the respondents needed reminders to complete and mail the questionnaires. The mailed completed questionnaire took 5-15 working days to arrive. Therefore, in order to assess a potential non-response bias, this study has examined differences between physically and non-physically attended respondents in term of their opinions on the measurement scales and demographic distributions.

An independent sample Mann Whitney U test (Siegel 1956) was conducted to see if there were different distributions between physically attended respondents and non-physically attended respondents in terms of their socio-demographic characteristics. In this study, therefore, the responses were split into two groups: Group 1 and Group 2. For physically attended participants 187 responses were in Group 1 and rest 32 responses were in Group 2.

The test was performed with some selected items from all the constructs (see Table 7.15). From the results of the test it was established that in each instance Z-values were not significant ($p > 0.05$), which indicates that there was no presence of non-response bias in the collected data. Thus, it would be appropriate to conclude that the non-response bias did not cause any problem in this study.

Table 7.15: Mann-Whitney U test for Group 1 and Group 2 sample

Item	Z-value	Sig.
Total time for the customers to get e-banking and its related services	0.165	0.869
Security of the e-business processes	1.596	0.111
Legislation and social code of conduct compliance	1.088	0.276
Contribution to social development at national level	0.694	0.488
Maintaining products and services responsibilities	1.565	0.118
Environmental legislation compliance	1.364	0.172
Usages of materials	0.745	0.457
Environmental commitment for future generations	0.552	0.581
Ability to invest on potential value added services	0.844	0.399
Ability to ease the service delivery process	1.071	0.284
Capability of maintaining privacy of information	0.796	0.426
Capability to establish green banking cell	0.051	0.960

7.8 DESCRIPTIVE ANALYSIS

Descriptive analyses were conducted by using SPSS to understand the respondent's demographic background in this study. As mentioned earlier, the participants of this survey were the employees of the bank who have been working at the branches as managers, deputy managers, customer service managers, accounts managers, and information technology personnel. The characteristics of the respondents, such as, age, gender, experiences, position, are discussed in the following sections.

7.8.1 Age

The respondents were asked to mention their age in the questionnaire. It was found that out of 219 respondents there was no one younger than 25 years or older than 60 years. This age limits conform to the bank's minimum requirements, educational qualifications and experiences, to attain the above mentioned managerial positions. It was also revealed from the analysis that the majority of participants are aged between 31 years and 40 years which is more than 62% (see Table 7.16).

Table 7.16: Survey respondents by age

Years	Frequency	Percentage (%)
25 - 30	29	13.2
31 - 35	77	35.2
36 - 40	59	26.9
41 - 45	37	16.9
46 - 50	13	5.9
51 - 55	3	1.4
56 - 60	1	0.5

Other than this, a little more than 13% of the respondent's age was between 25 years and 30 years; and about 17% of the respondent's age was between 41 years and 45 years. The analysis results also reflect that for the managerial positions of the branches, younger generation is more preferred by the bank than older generation (aged 25-45 years: 92.2%; aged 46-60 years: 7.8%).

7.8.2 Gender

The gender analysis revealed that among the respondents, 94.1% were male whereas 5.9% were female (see Table 7.17). The result from the analysis clearly reveals the dominance of male in the managerial positions of the bank. This result is not surprising in a country like Bangladesh where most of the industry's managerial positions are male dominated. In Bangladesh, women literacy rate is only 54.8% (Paige 1963) and only 11% women are employed (Ullman and Bentler 2012). Therefore, bank's minimum requirements, educational qualifications and experiences, to attain the above mentioned managerial positions are clearly the impediments for equality in positions. It was also found from the field study that managers of the branches need to work long hours, from 10:00 a.m. till 10:00 p.m. in most of the working days. Moreover, security and transport infrastructure of the country do not ensure the safety for women. This type of constraint limits the suitability of the branch's managerial positions particularly for male in the country's context.

Table 7.17: Survey respondents by gender

Gender	Frequency	Percentage (%)
Male	206	94.1
Female	13	5.9

7.8.3 Experience in Banking Industry

The experiences obtained by the respondents are sown in Table 7.18. More than 30% of the respondents have 5-10 years of experience, whereas 28.8% of the respondents have 10-15 years of experience. This indicates that majority of the respondents (59.4%) have at least 5 years of banking experience. Other than this, about 24% of the respondents have 0-5 years of experience and about 13% of the respondents have 15-20 years of experience. Finally, only a small group of respondents (4.2%) have more than 20 years of experience and there was no one with more than 30 years of experience.

Table 7.18: Survey respondents by experience in banking

Years	Frequency	Percentage (%)
≦ 5	52	23.7
6-10	67	30.6
11-15	63	28.8
16-20	28	12.8
21-25	8	3.7
26-30	1	0.5

7.8.4 Experience in the Case bank

It was revealed from the analysis that the largest portion of the respondents (37%) have been working at the case bank for more than 5 years; and about 23% of the respondents have been working for more than 10 years. Therefore, about 60% of the respondents have been working at the case bank for at least 6 years (see Table 7.19). Beside this, 35.6% of the respondents have been working for less than 6 years, and only 4.6% have been working for more than 16 years. Among the respondents, there was no one who has been working for more than 20 years.

Table 7.19: Survey respondents by experience in case bank

Years	Frequency	Percentage (%)
≦ 5	78	35.6
6-10	81	37.0
11-15	50	22.8
16-20	10	4.6

7.8.5 Position at the Case Bank

As mentioned earlier, the target population of the sample was the employees of the bank who have been working at the branches as manager, deputy manager, customer service manager, accounts manager, and IT Personnel. Table 7.20 depicts that among the respondents manager, deputy manager, and customer service manager are 20.5% each. The accounts managers are 20.1% and the IT personnel are 18.4%. Therefore, except the IT personnel, all other respondents carried almost equal percentage of the above mentioned positions.

Table 7.20: Survey respondents by position at the case bank

Position	Frequency	Percentage (%)
Manager	45	20.5
Deputy Manager	45	20.5
Customer Service Manager	45	20.5
Accounts Manager	44	20.1
IT Personnel	40	18.4

7.8.6 Size of the Bank Branch

Table 7.21 depicts the size of the bank branches from which the respondents participated for the survey. The table exposes that 45.2% of the respondents were from the branches where total number employee is up to 20 only whereas 30.1% of the respondents were from those branches which have 21-30 employees. Similarly, 13.7% of the respondents were from the branches where employee number is between 31 and 40; 8.7% respondents are from the branches which have 41-50 employees; and only 2.3% respondents are from those branches which have 51-60 employees.

Table 7.21: Size of the bank branch (based on number of employee)

Number of employee	Frequency	Percentage (%)
≤ 20	99	45.2
21-30	66	30.1
31-40	30	13.7
41-50	19	8.7
51-60	5	2.3

7.9 HYPOTHESES TESTS

7.9.1 Structural Equation Modelling (SEM) Approach

Latent variables with multiple indicators are generally involved in Structured Equation Models (SEM). The relationship between latent variables and indicators are specified by the measurement model or outer model. A number of SEM based applications are available to help with the research analysis. The application that is selected for this study is SmartPLS version 2.0.M3 (Ringle, Wende and Will 2005). SmartPLS is a software application for (graphical) path modelling with latent variables. The partial least square (PLS) method is used for the latent variables analysis in this software. PLS is a second-generation regression model that is suitable for confirmatory factor analysis and simultaneous testing of multiple hypotheses. One of the significant advantages of PLS is that it does not require large sample size like other SEM based tools for analysis. For this reason, a number of scholars, such as, Yoo and Alavi (2001), Barclay et al. (1995), and Fornell and Bookstein (1982) selected PLS among several structural equation modelling tools, including EQS, AMOS, and LISREL. Barclay et al. (1995) used 250 samples, whilst Yoo and Alavi (2001) and Kahani and Cooper (2003) used only 45 samples and 31 samples respectively for successful PLS analysis. Another advantage of using PLS over other tools is that it can be used for both formative and reflective indicators (Chin, Marcolin and Newsted 1996; Barclay, Higgins and Thompson 1995; Fornell and Bookstein 1982; Chin and Gopal 1995).

7.9.2 Nature of Constructs Identification

As stated earlier in Section 4.7.11 that literature was reviewed to identify the nature of the constructs that are going to be used for quantitative analysis. According to the criteria in the literature proposed by scholars (Bollen and Lennox 1991; Chin 1998a; Diamantopoulos and Winklhofer 2001; Jarvis, MacKenzie and Podsakoff 2003), this research model consists of only first order formative constructs. To determine the nature of the constructs, whether reflective or formative, further analysis was essential for this study. Thus, the following sections briefly discussed necessary criteria in selecting the nature the constructs, formative or reflective, that have been used for quantitative analysis.

There are a total of 6 constructs in this researched model: (i) Economic strategies (EcoMSs), (ii) Social strategies (SocMSs), (iii) Environmental strategies (EnvMSs), (iv) Economic sustainability outcome (EcoSus), (v) Social sustainability outcome (SocSus),

and (vi) Environmental sustainability outcome (EnvSus). As mentioned earlier, EcoMSs are the strategies needed to be implemented for economic sustainability. Similarly, SocMSs are the strategies needed to be implemented for social sustainability and EnvMSs are the strategies needed to be implemented for environmental sustainability. EcoSus are the specific economic sustainability outcome demanded by the customers, business managers, and process managers. Likewise, SocSus are the specific social sustainability outcome and EnvSus are the specific environmental sustainability outcome demanded by the customers, business managers, and process managers. None of the economic strategies can be interchanged with one another. Moreover, the correlations between the strategies are very low. The same characteristics apply to social strategies and environmental strategies. The indicators of sustainability outcomes (economic, social, and environmental) are also very specific and cannot be interchanged; and correlations between them are not high.

7.9.2.1 Theory, construct, and indicator

According to the previous research, a theory can be defined as a statement of relationships among ,constructs within a set of boundary assumptions and constraints (Roberts and Thatcher 2009). Based on this definition, a theory can be apportioned into two parts: the first part signifies the relationships between theoretical constructs, and the other part depicts the relationships between constructs and indicators (Roberts and Thatcher 2009; Bagozzi and Phillips 1982). A construct consists of relative indicators is defined as a conceptual term to describe a phenomenon of theoretical interest (Nunnally and Bernstein 1994) whereas an indicator is defined as an observed score congregated by means of self-report, interview, observation, and more (Little, Lindenberger and Nesselroade 1999). The nature of the indicators represents reflections or manifestations of a construct and determines the nature of a construct. There are two types of constructs, reflective and formative, broadly used in the literature (Roberts and Thatcher 2009).

7.9.2.2 Formative construct or reflective construct?

When indicators form the construct, it is called a formative constructs meaning that the construct is formed or induced by its measures, whereas, when different indicators of a construct represent reflections or manifestations, of a construct it is called a reflective construct (Fornell and Bookstein 1982; Gefen, Straub and Boudreau 2000). Formative constructs are commonly conceived as composites of specific component variables or

dimensions and thus, formative indicators are assumed to be uncorrelated and not interchangeable. On the other hand, reflective indicators should be internally consistent and hence, they are expected to be correlated and interchangeable (Barclay et al., 1995). A brief difference of these two types of indicators is shown in Table 7.22.

Table 7.22: Differences between Formative and Reflective Constructs
[adapted from Roberts and Thatcher (2009) and Jarvis et al. (2003)]

Concept	Formative indicators	Reflective Indicators
Causality	Formative indicators are viewed as causes of constructs. The construct is formed or induced by its measures.	Constructs are viewed as causes of reflective indicators. Reflective indicators represent manifestations of a construct.
Interchangeable	Not interchangeable: omitting an indicator is considered as omitting a part of the construct.	Interchangeable: removal of an item does not change the important nature of the construct.
Validity	Indicators are exogenously determined; hence, correlations are not explained by the measurement model.	Validity of indicators can be assessed through the measurement model. Indicators are expected to be correlated.
Nomological net	Nomological net for the indicators may differ. Indicators are not required to have the same antecedents and	Nomological net for the indicators should not differ. Indicators are required to have the same antecedents and consequences

According to the literature, the selection between a formative and a reflective measures should primarily be based on theoretical considerations (Petter, Straub and Rai 2007). This research employed comprehensive field study for validation of the proposed model's constructs and their relative indicators. It was revealed from the outcome of the study that all the constructs of the proposed model were formative in nature. Thus, more literature was reviewed related to the construction of the model, more specifically, related to the formation of a formative construct to explore the real mechanism of formative constructs. The following section explains the nature determination process of the constructs.

7.9.2.3 Conceptual properties of formative indicators and its application

Literature that discusses formative measures and attempts to provide guidelines to researchers is not as matured as the discussion on distinguishing formative and reflective measures (Fornell and Bookstein 1982). Diamantopoulos and Winklhofer (2001) and Petter et al. (2007) have made significant contributions on this topic by providing certain guidelines on the development of formative measures. Other scholars, such as, Rai et al. (2006) and Kim (2011) have presented with formation of formative and reflective constructs by defining items under the constructs level. Jarvis et al. (2003) have exclusively differentiated between formative and reflective constructs and provided thumb rules to distinguish between them. Again, it is important to note that the selection between a formative and a reflective measurement should primarily be based on theoretical considerations in the relationship between the indicators and the latent constructs (Edwards and Bagozzi 2000; Diamantopoulos and Winklhofer 2001; Kim 2011; Petter, Straub and Rai 2007). After considering the theoretical aspects, the primary decision rules by Jarvis et al. (2003) have been employed in this research approach for determining whether the constructs of the research model should be conceptualized as reflective or formative.

After examination of interview transcripts the constructs were recognized whether they are formative or reflective. The nature of the constructs is generally indicated by the nature of indicators of the construct. As Murphy and Hofacker (2009) rightly indicate, specifying a construct as reflective or formative largely depends on the context. Jarvis et al.'s (2003) four thumb rules were employed to determine whether the constructs of the research model should be conceptualized as reflective or formative. The thumb rules are briefly discussed below.

- ***Causal direction of indicators***

This rule assesses the theoretical causal direction from construct to indicators. If the direction of causality is from the construct to the indicators, the construct is reflective, and if causality is directed from the indicators to the construct, the construct is formative. For example, if economic value requirement 'economic performance' (Eco2) is not improved or 'security of the e-banking services' (Eco10) is not ensured then 'economic sustainability outcome' (EcoSus) cannot be achieved. Similarly, if 'air pollution' (Env2) is not reduced or 'environmental legislations' (Env4) are not complied by the organisation then 'environmental sustainability outcome' (EnvSus) will be deeply impacted. The identical characteristics apply to the rest four constructs

of the research model.

- ***Interchangeability of the indicators***

Interchangeability of the indicators is the second determining rule to decide whether a construct is formative or reflective. Indicators that can be interchanged and have common characteristics are often reflective (Little, Lindenberger and Nesselroade 1999). On the contrary, generally, formative indicators are not interchangeable and contain different themes. For instance, the construct EcoMSs (economic strategies) is formed with different indicators of different themes: EcoMS1 (investing more on potential value added services), EcoMS2 (learning and development facilities for the employees), EcoMS3 (outsourcing the best software and hardware), EcoMS4 (easing the service delivery process), and more, which are not interchangeable. Removing one of these indicators will not only change how the construct (EcoMSs) is understood and interpreted, but also will change the nature of the construct (Petter, Straub and Rai 2007). Likewise, construct SocSus (social sustainability outcome) is formed with Soc5 (legislation and social code of conduct compliance), Soc6 (contribution to social development at national level), Soc7 (human rights), and more indicators which are not interchangeable and contain different themes. The same characteristics apply to the rest four constructs of the research model.

- ***Covariation among the indicators***

The third thumb rule refers to whether or not the indicators covary with one another. Reflective indicators generally covary with one another whereas formative indicators do not. For example, SocMSs (social strategies) construct is formed with SocMS1 (maintaining privacy of information), SocMS2 (improving vigilance to illegal actions), SocMS3 (increasing CSR activities for national development), and SocMS4 (ensuring socially responsible action throughout the organisation) which do not covary with one another. If the privacy of the information is maintained appropriately, it will not necessarily improve vigilance to illegal actions or increase CSR activities for national development. Similarly, if CSR activities for national development are increased, it will not necessarily ensure socially responsible action throughout the organisation or improve vigilance to illegal actions. The similar characteristics apply to the rest five constructs of the research model.

- ***Nomological net of the construct indicators***

The fourth thumb rule is about determining whether or not the indicators have the same antecedents and consequences. As mentioned earlier, reflective indicators are interchangeable, and thus, they have the same antecedents and consequences. On the other side, because formative constructs are composites of indicators with different themes, and are therefore not necessarily interchangeable, nomological net for the indicators may differ. This indicates that it is not required for the indicators to have the same antecedents and consequences. In this particular study, it was found that the indicators of all six constructs do not necessarily have the same antecedents and consequences. For example, construct EnvMSs (environmental strategies) is made up of EnvMS1 (establishing green banking cell), EnvMS2 (increasing environmental CSR activities for future generation), and EnvMS3 (reducing the impact on air) which do not have the exactly same antecedents and consequences. The identical characteristics apply to the rest five constructs of the research model.

Based on the discussion above it has been revealed that all the constructs of the model are formative in nature. These findings are consistent with the study of Giavanni and Vinzi (2012) who specified the social, environmental, and economic sustainability performance as formative constructs. Their arguments derived not only from the evidence provided by Jarvis et al. (2003) and Petter et al. (2007), but also from a special issue of the *Journal of Business Research* edited by Diamantopoulos (2008). Gallagher et al. (2004), too, state that a series of constructs *together* define the fundamental characteristics of sustainability. These findings are also consistent with the findings of Petter et al. (2007) and Labuschagne et al. (2005). Petter et al. (2007) stated that constructs, such as, operational performance or economic performance cannot be measured as reflective since each item captures a specific organisational aspect of performance and only their joint combination 'form' the construct. Labuschagne et al. (2005) defined air resources, water resources, land resources and more as the *main criteria* for environmental sustainability; human resources, stakeholder participation, macro-social performance and more as the *main criteria* for social sustainability; and financial health, economic performance, potential financial benefits and more as the *main criteria* for economic sustainability. Thus, aligned with the criteria of Jarvis (2003), the measurement items under each dimension are not interchangeable and dropping an indicator may alter the conceptual domain of the constructs. Moreover, the findings of the study confirmed the formative nature of the constructs as the

correlation between measures under a construct was very low (Bollen and Lennox 1991).

7.9.3 Evaluation of Path Model

Chin (1998a) has proposed a set of criteria to measure partial model structures. A systematic use of these criteria is a two-step process: (i) Assessment of the outer (measurement) model, and (ii) Assessment of the inner (structural) model (see Table 7.23).

According to Henseler et al. (2009), evaluating the structural model is only sensible if the calculated latent variable scores show evidence of sufficient reliability and validity. Thus, the objective of the first step, assessment of the outer model or measurement model, is to examine the validity and reliability of the measurements of the constructs. Since, this study has identified only formative constructs, two parameters were

Table 7.23 Two-step process of PLS path model assessment

Step	Model	Analysis	Construct
1	Outer model (measurement)	– Item reliability	– Reflective
		– Internal consistency	– Reflective
		– Discriminant validity	– Reflective
		– Validity	– Formative
2	Inner model (structural)	– Amount of variance explained (R^2)	– Formative and Reflective
		– Path coefficient (β)	– Formative and Reflective
		– Statistical significance of *t*-values	– Formative and Reflective

examined in the first step to assess construct validity and evaluate reliability as suggested by Petter et al. (2007) and Hair et al. (2011). The parameters are weightings and loadings, and multicollinearity. In the second stage, the inner model or structural model has been assessed to test the proposed hypotheses by examining the amount of variance explained (R^2), path coefficient (β), and statistical significance of associated *t*-values.

7.9.4 Assessment of Measurement Model

In assessing formative indicators, the concepts of internal consistency reliability and convergent validity are not meaningful (Hair, Ringle and Sarstedt 2011; Bagozzi 1994; Bollen 1998). Rather, according to Rossiter (2002), theoretical rationale should be the basis for validity of formative indicators. However, PLS based SEM offers some statistical criteria for assessing formative measurement models' quality (Hair, Ringle and Sarstedt 2011).

7.9.4.1 Weights and loadings

As mentioned earlier, item reliability of formative items is not assessed with item loading but with the item weightings and there is no agreement on the acceptable value of the weights (Rai, Patnayakuni and Seth 2006). In addition to considering the significance of the indicator's weight, indicator's absolute importance for its construct, i.e., loadings, should also be evaluated (Hair, Ringle and Sarstedt 2011). If both weight and loading are not significant, indicator may still be retained to preserve content validity (Bollen and Lennox 1991). Despite statistical measures it should be taken into consideration that conceptual reasoning holds more influence than statistical results when deciding whether or not to drop formative measures (Roberts and Thatcher 2009) as elimination of formative indicators carries the risk of changing the theoretical perspective of the construct (Nunnally and Bernstein 1994). Using SmartPLS, bootstrapping was performed to evaluate the weights, loadings, and their *t*-values. A two-tailed T test is considered with 1.645 critical value of *t* at significant level (*p*-value) 0.1.

From Table 7.24, it was revealed that some of the items' weights were not significant. But the loadings of all the items of all the constructs were significant (P<0.1). For example, the weights of Eco1 item of EcoSus construct, Env5 item of EnvSus construct, and Soc2 item of SocSus construct were 0.586, 1.451, and 0.466 respectively, which were not significant; however, their loadings were 2.309, 3.241, and 2.323 respectively, which were significant (p<0.1). Similarly, all other items' weights which were not found significant, their loadings were found significant. Therefore, according to the thumb rules of Hair et al. (2011), based on the weights there was no need to consider of dropping any item at this level of analysis.

Table 7.24: Measurement of outer model

Construct	Item	Weight	*t*-value	Loading	*t*-value	VIF
EcoSus	Eco1	0.040	0.586	0.196	2.309	1.170
	Eco2	0.043	0.568	0.247	2.617	1.479
	Eco3	0.056	0.742	0.384	5.118	1.465
	Eco4	0.091	1.076	0.191	1.816	1.162
	Eco5	0.064	0.873	0.228	2.287	1.189
	Eco6	0.017	0.243	0.229	2.343	1.195
	Eco7	0.010	0.113	0.356	3.374	1.450
	Eco8	0.101	1.112	0.573	8.585	1.850
	Eco9	0.189	2.175	0.692	11.204	1.809
	Eco10	0.327	3.694	0.633	9.882	1.907
	Eco11	0.018	0.192	0.198	1.903	1.672
	Eco12	0.033	0.442	0.211	2.071	1.177
	Eco13	0.110	1.567	0.303	3.578	1.248
	Eco14	0.120	1.552	0.227	2.456	1.261
	Eco15	0.293	3.480	0.622	7.314	1.915
	Eco16	0.126	1.241	0.538	5.262	2.535
	Eco17	0.214	3.014	0.478	6.656	1.331
	Eco18	0.032	0.396	0.392	4.867	1.364
	Eco19	0.071	0.858	0.404	5.331	1.854
	Eco20	0.213	3.052	0.388	4.678	1.183
	Eco21	0.084	1.118	0.327	4.560	1.523
	Eco22	0.073	1.081	0.277	3.138	1.186
	Eco23	0.039	0.497	0.266	2.537	1.307
EcoMSs	EcoMS1	-0.029	0.298	0.095	4.694	1.358
	EcoMS2	0.342	3.671	0.064	10.934	1.538
	EcoMS3	0.146	1.605	0.068	9.468	1.501
	EcoMS4	0.238	2.345	0.080	8.081	1.481
	EcoMS5	0.175	2.017	0.072	8.919	1.447
	EcoMS6	0.157	1.670	0.074	8.560	1.512
	EcoMS7	0.055	0.636	0.080	6.324	1.331
	EcoMS8	0.063	0.776	0.078	6.676	1.377
	EcoMS9	0.217	2.247	0.069	9.723	1.524
	EcoMS10	0.200	2.264	0.078	6.732	1.182
	EcoMS11	0.009	0.099	0.104	3.291	1.197

EnvSus	Env1	0.104	0.955	0.143	1.994	1.099
	Env2	0.289	2.411	0.120	3.661	1.178
	Env3	0.309	2.933	0.105	6.190	1.369
	Env4	0.527	5.303	0.069	11.609	1.371
	Env5	0.183	1.451	0.138	3.241	1.149
	Env6	0.225	1.944	0.105	5.897	1.284
EnvMSs	EnvMS1	0.386	3.601	0.093	7.066	1.146
	EnvMS2	0.377	3.824	0.080	8.693	1.205
	EnvMS3	0.597	6.749	0.059	13.710	1.145
SocSus	Soc1	0.303	2.863	0.417	3.613	1.025
	Soc2	0.039	0.466	0.235	2.323	1.119
	Soc3	0.155	1.675	0.365	3.842	1.148
	Soc4	0.438	4.153	0.664	7.476	1.112
	Soc5	0.287	2.964	0.487	5.392	1.063
	Soc6	0.513	5.956	0.737	10.564	1.122
SocMSs	SocMS1	0.561	6.228	0.048	17.836	1.366
	SocMS2	0.147	1.686	0.080	6.609	1.202
	SocMS3	0.286	3.171	0.087	5.701	1.063
	SocMS4	0.406	4.051	0.078	9.527	1.279

7.9.4.2 Variance Inflation Factor (VIF)

An indicator's information in the formative measurement model can be redundant if there is high level of multicollinearity. Thus, as suggested by Petter et al. (2007) and Diamantopoulos and Winklhofer (2001), to ensure the absence of multicollinearity, variance inflation factor (VIF) statistic was used to determine that correlation between the formative measures are not too high (see Table 7.24). According to the traditional rule of thumb, multicollinearity is a concern if the VIF is higher than 10. However, for formative measures scholars suggest VIF values greater than 3.3 indicate high multicollinearity (Diamantopoulos and Siguaw 2006). In this study, the maximum value of VIF that has been detected is 2.535 for item Eco16 (see Table 7.24) which is well below the threshold of 3.3. Hence, it is clear that multicollinearity issue did not pose any threat to the validity of formative measures at the indicator level of this study. Therefore, all the formative indicators of the measurement model of this study were kept for further analysis. After establishing the adequacy and sufficiency of the

measurement model for this study, PLS analysis was conducted to assess the inner or structural model.

7.9.5 Assessment of Structural Model

PLS experts have developed two non-parametric approaches to test the relationship between variables: Jackknife or Bootstrap. Either of these two techniques can be can be used for data analysis (Gefen, Straub and Boudreau 2000; Santosa, Wei and Chan 2005) and both have advantages and disadvantages (Chin 1998a). In this study, Bootstrap is used for data analysis because it is considered to be more sophisticated approach than Jackknife (Chin 1998a). As mentioned in Table 7.23, for the assessment of structural model, the amount of variance explained and the statistical significance is evaluated based on three criteria; i) percentage of variance explained or R-square (R^2) which traditionally is called regression score, ii) path coefficient (β) that indicates the strength of the relationships between constructs, and iii) the statistical significance of t-value which tells whether the relationship between constructs is significant (Mustamil 2010).

7.9.5.1 Explanatory power of the model (R^2 value)

To assess the explanatory power of the model, R^2 value was examined for each predicted variable. The interpretation of the R^2 value is similar to the linear regression model (Jackson 2008). R^2 value represents the extent to which the independent constructs explain the dependent constructs. In this study, there are three endogenous constructs in the research model which are EcoSus (economic sustainability outcome), EnvSus (environmental sustainability outcome), and SocSus (social sustainability outcome).

Table 7.25: Endogenous constructs and related R^2 values

Endogenous construct	R^2 value
EcoSus	0.5883
EnvSus	0.3539
SocSus	0.3641

Based on the R^2 values shown in Table 7.25, it was revealed that the explained variances for EcoSus, EnvSus, and SocSus were 58.83%, 35.39%, and 36.41% respectively. This means, the antecedents' independent factors explain 58.83% of the

variance for EcoSus, 35.39% for EnvSus, and 36.41% for SocSus. Thus, the findings show that all the R^2 scores of endogenous constructs are well above the minimum requirement of 0.10 cut-off value (Mustamil 2010; Santosa, Wei and Chan 2005; Rai, Patnayakuni and Seth 2006; Falk and Miller 1992). Therefore, the variability explained by the three endogenous constructs provides the model a substantial nomological validity.

7.9.5.2 Path coefficient (β-value) and statistical significance (t-value)

After establishing the explanatory power of the model through the amount of variance explained (R^2 value), this test was conducted to evaluate the relationships of the constructs as hypothesized in this research. To examine the confidence intervals of the path coefficients and statistical inference, re-sampling technique, such as, bootstrapping was performed as suggested by Tenenhaus et al. (2005) and Henseler et al. (2009). In this regard, the β-value (path coefficient) and the t-value were assessed to evaluate the statistical analysis.

Figure 7.3 and Table 7.26 depict that the influence of economic strategies (EcoMSs) on economic sustainability outcome (EcoSus) is significant (β = 0.430; t = 5.078). Thus, hypothesis $\mathbf{H_1a}$ was supported. Also, the link between economic strategies (EcoMSs) and environmental strategies (EnvSus) shows strong relationship (β = 0.342; t = 2.966), supporting hypothesis $\mathbf{H_1b}$. Similarly, the findings shows that the influence of environmental strategies (EnvMSs) on economic sustainability outcome (EcoSus) is very strong (β = 0.164; t = 2.182). Consequently, $\mathbf{H_2b}$ was supported.

With regards to the impacts of social strategies (SocMSs) on social sustainability outcome (SocSus), economic sustainability outcome (EcoSus), and on environmental sustainability outcome (EnvSus) were expected to be significant. As expected, it was found from the statistical analysis that the relationships between SocMSs and SocSus (β = 0.603; t = 13.916), SocMSs and EcoSus (β = 0.297; t = 3.925), and SocMSs and EnvSus (β = 0.189; t = 1.921), are highly significant. Therefore, all three hypotheses, $\mathbf{H_3a}$, $\mathbf{H_3b}$, and $\mathbf{H_3c}$ were supported.

In the same way, the relationship between environmental strategies (EnvMSs) and environmental sustainability outcome (EnvSus) was expected to be strong. But it was revealed from the statistical analysis that the link between these two constructs is not significant (β = 0.158; t = 1.346). Thus, $\mathbf{H_2}\boldsymbol{a}$ was not supported.

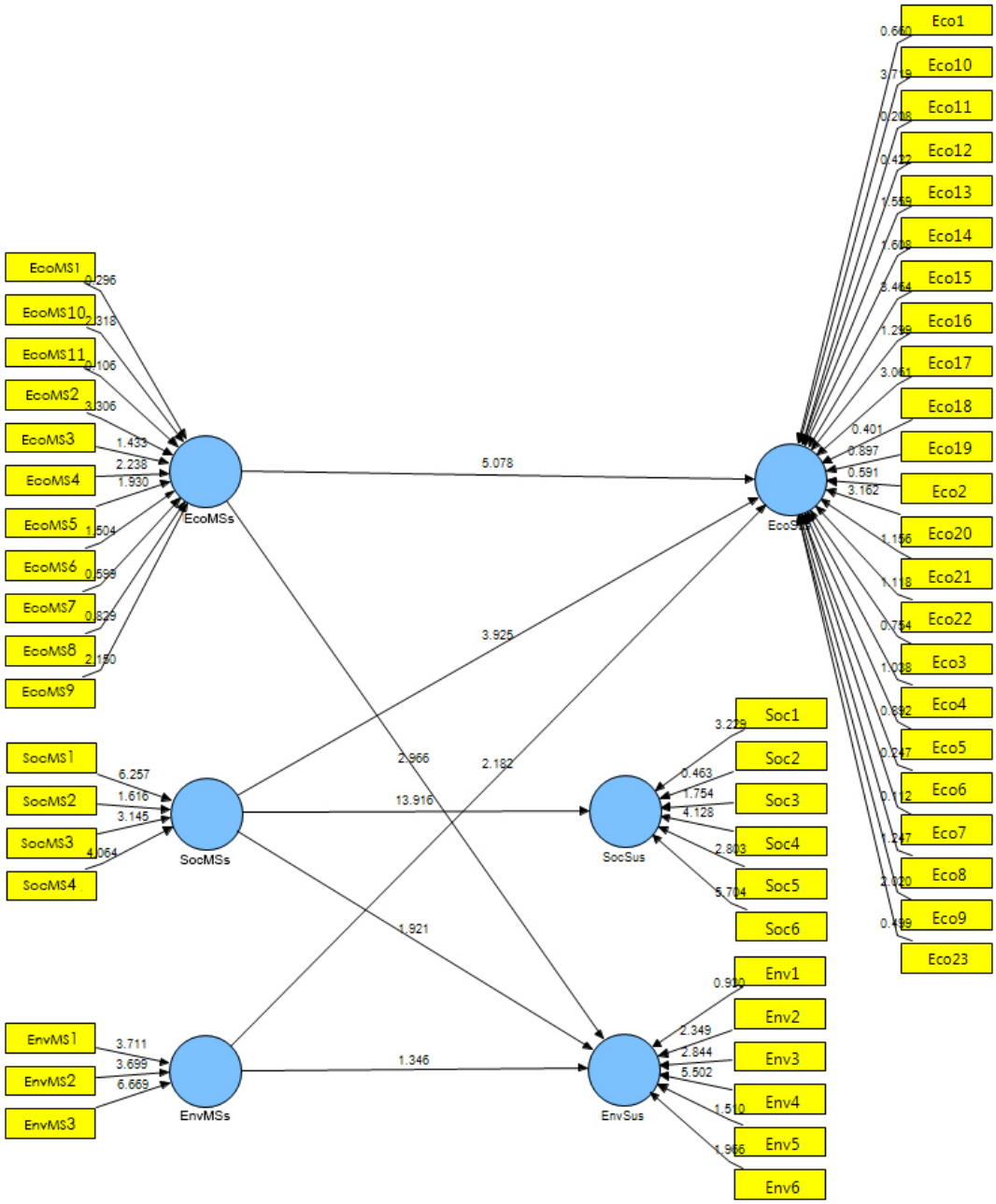


Figure 7.3: The structural model

Based on the expectations generated from the outcomes of the field study, the QFD analysis, and optimisation of mitigation strategies in the early stages of this study, environmental strategies should have strong influence on environmental sustainability outcome. The reason for having weak effect of EnvMSs on EnvSus is the influence of EcoMSs on EnvSus. EcoMSs construct has more indicators (11 indicators) than EnvMSs construct (3 indicators) which have significant impact on EnvSus (β = 0.342; t = 2.966). Because of the significant influence of EcoMSs on EnvSus, the impact of EnvMSs on EnvSus is affected and becomes insignificant.

Table 7.26: Evaluation of research hypotheses

Hypothesis	Link	*β*-value	*t*-value	Decision
H_1a	EcoMSs to EcoSus	0.430	5.078***	Supported
H_1b	EcoMSs to EnvSus	0.342	2.966***	Supported
H_2a	EnvMSs to EnvSus	0.158	1.346	Not supported
H_2b	EnvMSs to EcoSus	0.164	2.182**	supported
H_3a	SocMSs to SocSus	0.603	13.916***	Supported
H_3b	SocMSs to EcoSus	0.297	3.925***	Supported
H_3c	SocMSs to EnvSus	0.189	1.921*	Supported

*Significant *p<0.1, **p<0.05, ***p<0.01*

Thus, if the influence of EcoMSs on EnvSus is retracted, which means the link between EcoMSs and EnvSus is withdrawn, the effect of EnvMSs on EnvSus becomes highly significant. To confirm this, in SmartPLS the link between EcoMSs and EnvSus was deleted and bootstrapping was performed again. The outcome shows that the hypothesis **H_2a** is now supported with significant effect (β = 0.345; t = 3.305). The result revealed that not only **H_2a**, but also all other hypotheses were supported in this situation with statistically significant β-values and t-values (see Figure 7.4 and Table 7.27).

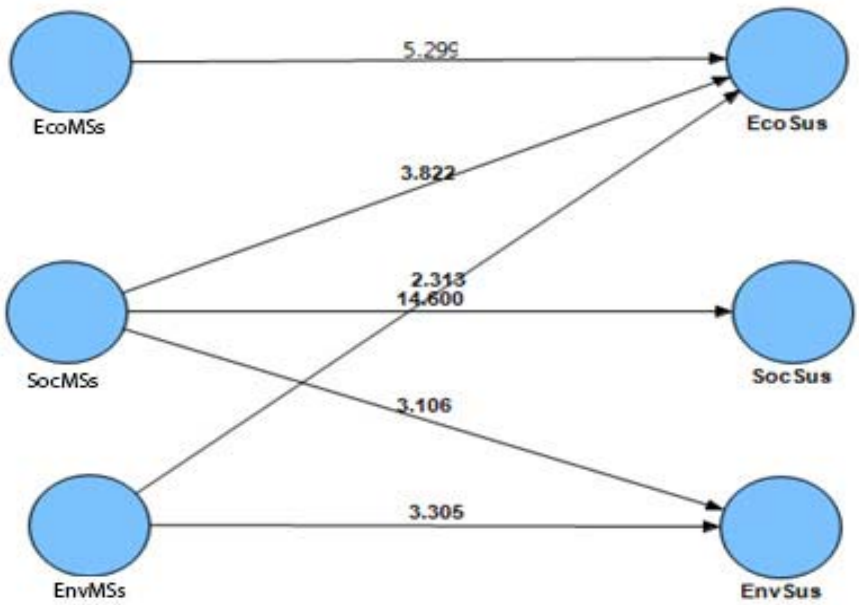


Figure 7.4: The structural model without link between EcoMSs and EnvSus

This statistical outcome confirmed that the effect of EcoMSs on EnvSus has strong influence on the EnvSus for which the link between EnvMSs and EnvSus becomes

insignificant. This indicates that optimised environmental strategies will have significant impact on the environmental sustainability of the case bank.

Table 7.27: Evaluation of research hypotheses without link between EcoMSs and EnvSus

Hypothesis	Link	*β*-value	*t*-value	Decision
H_1a	EcoMSs to EcoSus	0.433	5.299***	Supported
H_2a	EnvMSs to EnvSus	0.345	3.305***	Supported
H_2b	EnvMSs to EcoSus	0.163	2.313**	Supported
H_3a	SocMSs to SocSus	0.604	14.600***	Supported
H_3b	SocMSs to EcoSus	0.295	3.822***	Supported
H_3c	SocMSs to EnvSus	0.301	3.107***	Supported

*Significant *p<0.1, **p<0.05, ***p<0.01*

As proposed earlier, the research hypotheses were developed to explain the relationship among the constructs in the research model. In the model, there are 7 hypotheses that describe the relationships among the constructs. PLS based SEM analysis was employed to test these hypotheses by examining the data that was gathered from the research survey. In consistent with research objectives the hypotheses related to the optimal mitigation strategies and sustainability outcome have been tested. The following table (Table 7.28) shows the evaluation of research hypotheses with the statements.

Table 7.28: Evaluation of research hypotheses with statements

Hypothesis	Statement	Decision
H_1a	Economic strategies positively impact the perceived economic sustainability outcome	Supported
H_1b	Economic strategies positively impact the perceived environmental sustainability outcome	Supported
H_2a	Environmental strategies positively impact the perceived environmental sustainability outcome	Supported (conditionally)
H_2b	Environmental strategies positively impact the perceived economic sustainability outcome	Supported
H_3a	Social strategies positively impact the perceived social sustainability outcome	Supported
H_3b	Social strategies positively impact the perceived economic sustainability outcome	Supported
H_3c	Social strategies positively impact the perceived environmental sustainability outcome	Supported

7.10 FINDINGS

The main data analysis started with the descriptive tests to portray the demographics profile of the survey respondents. Among the samples, 94.1% of the total respondents were male and 5.9% were female; and the majority of participants are aged between 31 years and 40 years which is more than 62% of the total respondents. The average age of the respondents is 36.53. The result also shows that majority of the respondents (59.4%) have at least 5 years of banking experience and 37% of the respondents have been working at the case bank for more than 5 years. The positions of the survey respondents are found almost equally divided into five groups: manager (20.5%), deputy manager (20.5%), customer service manager (20.5%), accounts manager (20.1%), and IT personnel (18.4%).

To examine the impacts of optimal strategies on sustainability outcome of the case bank, the research analysis identified 6 formative constructs for the quantitative data analysis: EcoMSs (economic strategies) with 11 items, EnvMSs (environmental strategies) with 3 items, SocMSs (social strategies) with 4 items, EcoSus (economic sustainability outcome) with 23 items, EnvSus (environmental sustainability outcome) with 6 items, and SocSus (social sustainability outcome) with 6 items.

PLS based SEM analysis was used in assessing the measurement model. SmartPLS version 2.0.M3 was used as the PLS analysis tool for both the measurement model and the structural model assessment. Since, this study has identified only formative constructs, two parameters were examined in measurement model to assess construct validity and evaluate reliability: weightings and loadings, and multicollinearity. It was revealed from the analysis that some of the item's weights were not significant but the loadings of all the items of all the constructs were significant. So, there was no need to consider of dropping any item at this level of analysis based on the weights and loadings. In multicollinearity diagnostics, the maximum value of VIF that was detected is 2.535 which is well below the threshold of 3.3. Hence, multicollinearity issue did not pose any threat to the validity of formative measures. In assessing the structural model, bootstrapping was performed in SmartPLS to obtain the standardised path loadings and to determine the significance of these paths. The statistical analysis outcome also showed that all endogenous (economic sustainability outcome, environmental sustainability outcome, social sustainability outcome) constructs met the minimum R^2 value of 0.1 individually.

As mentioned above, a total of seven hypotheses were proposed in the research model. Based on the results from measurement model and structural model, the developed hypotheses were tested and evaluated. It was found from the results that 6 out of 7 hypotheses were supported at first instance and one was rejected. But when the influence of economic strategies on environmental sustainability was withdrawn, all the hypotheses were supported with significant effect. Therefore, the result of the quantitative analysis confirms that optimal strategies that were identified in Chapter 6 would have significant impact on the sustainability outcome of the bank.

7.11 SUMMARY

This chapter is presented with the hypotheses development and quantitative tests. In the first part of this chapter hypotheses and questionnaire development are presented, and in the second part of this chapter quantitative data analysis is presented. A total of seven hypotheses were developed for this study based on the relationships between the constructs. The validation and justification of the hypotheses were also observed in this chapter.

The second part of this chapter has presented the results of the quantitative data analysis that was conducted by using SPSS and PLS based SEM. Employees at the managerial levels of the branches of case bank were surveyed for quantitative data analysis to see how the optimal mitigation strategies impacts on the sustainability outcome of the company. A pilot test using PLS analysis and a non-response bias test using SPSS were conducted before conducting the full data analysis. The outcome of the quantitative analysis confirms that optimal mitigation strategies will have significant impact on the sustainability outcome of e-business of the bank. The implication of these outcomes is discussed in the next chapter based on the theoretical development and practical significance.

CHAPTER 8

DISCUSSION AND INTERPRETATION

8.1 INTRODUCTION

The previous chapter (Chapter 7) presented the hypotheses development and quantitative tests (Analysis Part 2) to confirm the findings of QFD based analysis (Analysis Part 1). Mitigation strategies development and optimisation based on QFD analysis were completed in 'Analysis Part 1' which is presented in Chapter 6; and hypotheses development and tests employing PLS (Partial Least Squares) based SEM (Structural Equation Modelling) were completed in 'Analysis Part 2' which is presented in Chapter 7. The findings obtained from 'Analysis Part 1' and 'Analysis Part 2' are discussed in this chapter.

The research questions that led this study are: (i) What are the optimal mitigation strategies to fulfil the value requirements of customer, business, and process in developing a model for e-business sustainability? and (ii) How can the sustainability dimensions be integrated with the value dimensions in developing a model for e-business sustainability? To answer these research questions a comprehensive research model for e-business sustainability was developed which consists of two prone analyses: 'Analysis Part 1' and 'Analysis Part 2'. This comprehensive research model fulfil the value requirements of customer, business, and process and integrates the sustainability dimensions with the value dimensions. 'Analysis Part 1' developed and optimised mitigation strategies based on the three dimensional blended value requirements identified by the field study. 'Analysis Part 2' developed hypotheses based on the mitigation impacts of the optimised strategies on the blended value requirements and conducted quantitative tests to see how the managers of the case bank at operational levels perceive about these optimised strategies and their contributions to sustainability outcome. The outcome of the quantitative tests confirmed that optimal strategies will have significant impacts on the sustainability outcome of e-business of the case bank.

The findings from 'Analysis Part 1' are discussed first followed by the findings from 'Analysis Part 2'. In explaining the findings of 'Analysis Part 1', the findings from the prioritisation of blended value requirements are described at first followed by the findings from mitigation strategies development and optimisation. In explicating the

findings from mitigation strategies optimisation, the findings from relationship matrix analysis, roof matrix analysis, and cost analysis are discussed followed by the findings from sensitivity analyses. The findings from sensitivity analyses include the findings from 'sensitivity analysis with budget constraint' and 'sensitivity analysis with mandatory implementations of mitigation strategies'. Lastly, the findings from the comparison between the proposed optimisation model and the Knapsack optimisation model are described.

In elucidating the findings of 'Analysis Part 2', the findings from hypotheses related to economic strategies are discussed in the beginning followed by the findings from the hypotheses related to environmental strategies and hypotheses related to social strategies. This chapter also discusses and debates the results in light of the respective findings.

8.2 FINDINGS FROM 'ANALYSIS PART 1'

'Analysis Part 1' completed QFD based analysis to develop and determine the optimal strategies for the sustainability of the e-business. In determining the optimal strategies, the blended value based e-business sustainability requirements were prioritised using Analytic Hierarchy Process (AHP). Then based on the prioritised value requirements, mitigation strategies were developed, prioritised, and optimised by using QFD analysis and non-linear quadratic integer programming method. The sensitivity analysis was also conducted in 'Analysis Part 1' to clearly demonstrate how variations in investment amount or available budget and mandatory implementations of strategies influence the total implementations of the mitigation strategies. Lastly, it showed how the proposed optimisation model is better than others. The findings from these analyses are explicated below.

8.2.1 Prioritised Sustainability Value Requirements

Field study identified a total of 63 blended value requirements (21 sustainability requirements of customer, 23 sustainability requirements of business, and 19 sustainability requirements of process). To rank the importance of these sustainability value requirements of each group, prioritisation process was completed using AHP analysis (see Section 6.2.5 in Chapter 6). This process was supported by the previous studies. For instance, according to Han et al. (2001), detailed categorisation and prioritisation is needed to really grasp the value requirements.

From the analysis it was observed that when comparing the sustainability value requirements of customer, the economic value requirements received the highest importance (0.465) followed by the social value requirements (0.270) and environmental value requirements (0.265). Similar results was observed from the comparisons of the business value requirements (economic: 0.482; social: 0.271; environmental: 0.247). But when comparing the sustainability value requirements of process, unlike customer value requirements and business value requirements, economic value requirements received the highest weight (0.473) followed by the environmental value requirements (0.279) and social value requirements (0.248). Hence, what was obtained from the analysis is that in all three comparisons of sustainability value requirements, economic value requirements considered to be the highest priority. These findings are consistent with the findings of Zeithaml (1988), Schechter (1984) and Bishop (1984) where customers were found to measure value of the product or service with price; thereby, economic aspect of sustainability was preferred by the customers. The findings from business value requirements are consistent with the statement of Sahota (2013) that considers the economic aspect of sustainability as the most vital since without economic performance companies will cease to exist. Similarly, findings from the process value requirements are supported by the literature where scholars emphasised about the economic aspects of process for sustainability (e.g., Bakshi and Fiksel 2003). Therefore, it is realised from the findings that economic dimension of the sustainability must be given priority along with social and environmental dimensions to achieve sustainability by the e-businesses.

8.2.2 Prioritised Blended Value Requirements

After ranking the sustainability value requirements of customer, business, and process, the weights were synthesised to get the blended value weights. It was observed from the synthesised results that among the top 40 blended value requirements, 18 of them were customer value requirements (7 economic, 5 social, 6 environmental), 12 of them were business value requirements (7 economic, 3 social, 2 environmental), and 10 of them were process value requirements (6 economic, 2 social, 2 environmental). This indicates that customer value requirements were given more priority than other value requirements. This finding is consistent with the findings of Wang and Hong (2007) in which customer value requirements received 60% weight and rest of the value requirements received 40% weight.

It was found from the synthesised weights that two economic value requirements of customer gained maximum importance which are 'Security of the services for customer' and 'Quality of the services for customer'. These findings are supported by the previous studies. For instance, many scholars (e.g., Jones et al. 2000; Aladwani 2001) identified security of the services as one of the main driver for adopting electronic banking. A study by Yousafzai et al. (2003) also observed that security of e-banking services is considered as the top priority by the customers. Likewise, quality of the banking services for customer was also stressed by many scholars (e.g., González et al. 2004; Wang, Lo and Hui 2003; Anderson, Fornell and Lehmann 1994).

The above two economic value requirements of customer were followed by 'Security of the processes' (process value requirement) and 'Simplicity of the services and complexity level' (economic value requirement). The fifth position was obtained by 'Reputation of the organisation' which is an economic value requirement of business. The importance of these value requirements were also mentioned in the past studies. The ranks of other blended value requirements are explained in Section 6.2.5 in Chapter 6. This finding indicates that firms need to focus more on fulfilling value requirements of customer along with the value requirements of business and process for achieving e-business sustainability. It is important to note that if the blended value requirements are not prioritised precisely, it will be difficult to determine the optimal strategies to fulfil the value requirements of customer, business, and process for e-business sustainability.

8.2.3 Mitigation Strategies Development

Once the blended value requirements were prioritised, the corresponding mitigating strategies were developed for QFD analysis. For this purpose, the literature was extensively reviewed and the strategic managers who were involved in decision making of the case bank were interviewed. For the mitigation of identified blended value requirements a total of 18 strategies were developed of which 11 were economic strategies, 4 were social strategies, and 3 were environmental strategies. These mitigation strategies were supported by the literature (see Section 6.3 in Chapter 6).

8.2.4 Finalised Blended Value Requirements for QFD Analysis

After developing the mitigation strategies it was revealed that some of the value requirements in the prioritised list were same or very similar to some other value requirements and could be mitigated by the same strategies (see Section 6.4.2 in

Chapter 6). It was also revealed that some of the value requirements carried very little weight compared to their similar value requirements in the prioritised blended value requirements list. Therefore, the value requirements which were carrying low weight and were signifying other value requirements with greater weights, and if they could be mitigated by the same strategy or strategies, then value requirements with lower weight were not considered and the value requirements with greater weight were considered with other unique value requirements for the QFD analysis. Based on this criterion 23 blended value requirements were excluded from the prioritised blended value requirements list and a total of 40 blended value requirements were finally considered for the QFD analysis. Table 6.6 in Chapter 6 shows the criteria for not including 23 blended value requirements for the QFD analysis. The prioritisation and finalisation of requirements (WHATs) for QFD analysis was consistent with the prior studies (e.g., Chien and Su 2003).

8.2.5 Relationship Matrix Analysis

In line with the QFD steps, after blended value requirements were prioritised and finalised, and the mitigation strategies were generated, the relationship matrix was developed based on the mitigating impacts of the strategies on the blended value requirements (see Section 6.4.3.1 in Chapter 6). It was observed from the relationship matrix that all the strategies was impacting on more than one blended value requirements. Each of the strategies was mitigating more than one blended value requirements fully or partially. Consequently, most of the blended value requirements were found to be impacted by more than one strategies. For instance, MS11 ('Establish green banking cell') was found to be impacting on maximum number (10) of blended value requirements (BR1, CR13, CR14, CR15, PR9, CR16, CR17, BR11, BR12, PR10). Likewise CR2 ('Quality of the services for customer') was found to be mitigated by maximum number (6) of strategies (MS1, MS2, MS3, MS6, MS12, MS13) (see Table 6.7 in Chapter 6).

From the relationship matrix analysis, it was also revealed that some of the social strategies were partially mitigating economic and environmental value requirements along with social value requirements. For example, MS17 was mitigating economic value requirements BR1 and PR3, and environmental value requirements PR9, BR12, CR16, and CR17. Likewise, it was also observed that economic strategies were partially mitigating environmental value requirements; and environmental strategies were partially mitigating economic value requirements (see Section 6.4.3 in Chapter 6).

These findings were consistent with the findings of past studies as explained in Section 7.2 in Chapter 7. Therefore, businesses must consider the multi-dimensional contributions of the strategies towards sustainability achievement while developing a particular strategy for mitigating a particular type of value requirements.

8.2.6 Ranked Mitigation Strategies by QFD Analysis

It was revealed from the results of relationship matrix analysis that among all the mitigation strategies MS8 ('Invest more on potential value added services') ranked first, MS2 ('Learning and development of the employee') ranked second, and MS1 ('Outsource high security software and hardware') ranked third with maximum relative weights followed by other mitigation strategies (see Table 6.8 in Chapter 6). MS8 has strong mitigation impacts on BR2 ('Profitability, liquidity and investment capability'), BR3 ('Economic performance of the company including share performance, market growth, and ROI'), CR6 ('Potential value added services for customer'), PR4 ('Financial structure of the process division'), BR6 ('Potential benefits for the business from overall improvements'), and PR6 ('Potential benefits for the process from technological improvements'). This finding indicates that the company must consider investing more on potential value added services before considering any other strategies to significantly increase the profitability, liquidity and investment capability of the business and process; economic performance of the company including share performance, market growth, and ROI; and value added services for the customer. Similarly, MS2 and MS1 have strong mitigation impacts on several blended value requirements. Hence, the result from QFD analysis implies that the case bank must give priority to the higher ranked mitigation strategies while considering implementing them for sustainability.

8.2.7 Roof Matrix Analysis

Roof matrix analysis was completed based on the correlations among the mitigation strategies to exploit the trade-offs that exist among them. The trade-offs were determined based on the influence of one strategy on achieving other strategies. It was observed from the correlation matrix or roof matrix that majority of the mitigation strategies were correlated with other mitigation strategies (see Table 6.9 in Chapter 6). For instance, it was found that MS1 ('Outsource high security software and hardware') was highly correlated with MS2 ('Learning and development of the employee') and MS4 ('Maintain privacy of information'); and moderately correlated with MS16 ('Improve efficiency of internal processes'). This suggests that implementation of MS1 will

significantly facilitate the implementations of MS2 and MS4; and will reasonably facilitate the implementation of MS16. Similarly, several other mitigation strategies were found correlated with each other (see Section 6.4.3.3 in Chapter 6). Findings from the roof matrix analysis indicated the amount of savings that could be achieved from the simultaneous implementations of correlated strategies. These findings are consistent with the findings from earlier studies (e.g., Chien and Su 2003; Delice and Güngör 2010; Vinodh and Chintha 2011) where roof matrix analysis was successfully applied in identifying the correlations between the strategies for efficient implementations.

8.2.8 Cost Analysis

Cost analysis was conducted to get the relative implementation cost of each mitigation strategies and the cost-savings from simultaneous implementations. Thus, cost analysis was completed in two parts: (i) estimating relative cost of strategy implementation; and (ii) estimating savings from simultaneous implementations of strategies. Findings from the cost analyses are discussed below.

8.2.8.1 Estimated relative costs of mitigation strategies

It was observed from the cost analysis that the total cost (relative) of implementing all 18 mitigation strategies was 663 if they are implemented individually (see Table 6.10). It was also found that the most expensive mitigation strategy was MS1 ('Outsource high security software and hardware'). It was justified by the fact that the local suppliers cannot supply the standard software and hardware required by the company; they were bought from the overseas suppliers, and therefore, the cost was very high. The least expensive strategy was MS14 ('Improve efficiency in supply chain management and use of goods, materials, and services') since improvement of supply chain did not require much investment for the case bank. Relative costs of all other mitigation strategies and their justifications are explicated in Section 6.4.4.1 in Chapter 6.

8.2.8.2 Estimated savings by implementing the mitigation strategies simultaneously

Some savings in resource consumption are most likely expected when two or more correlated strategies are simultaneously installed (Park and Kim 1998). Hence, this analysis was conducted to identify the savings from simultaneous implementations of mitigation strategies. It was revealed from the analysis that implementations of 8

strategies were correlated with other strategies moderately or strongly (see Table 6.9). As stated above, this indicated that there would be some cost-savings if they were implemented simultaneously. For instance, If MS5 ('Increase CSR activities for national development') and MS18 ('Increase environmental CSR activities for future generation') are individually implemented the estimated total relative cost would be 80, whereas if both of them are implemented together the relative cost would be 65, and therefore, there was a cost-saving of 15 from simultaneous implementations (see Table 6.11). More findings on savings from simultaneous implementations of mitigation strategies are explained in Section 6.4.4.2 in Chapter 6. Findings from this analysis are consistent with the findings from previous studies (e.g., Park and Kim 1998). These findings are important for the optimisation of the strategies since 'available resource, or 'available budget' plays crucial role in implementing the strategies by the businesses for sustainability.

8.2.9 Optimisation Using Non-linear Quadratic Integer Programming Method

Since the case bank has resource limitation, it was necessary for this bank to optimise the strategies for sustainability based on the QFD ranking, budgetary constraint, and cost-savings from simultaneous implementations of the strategies. Non-linear quadratic integer programming method was used for the optimisation process (see Section 6.4.5.1 in Chapter 6). It was revealed that the bank could afford only 70% to 80% of the total cost required to implement all the mitigation strategies proposed.

It was observed from the optimisation results that with the availability of 80% of the total cost, all 18 mitigation strategies could be implemented (see Table 6.12). In that case, the estimated available budget was 530, the normal cost was 663, and the optimised total cost to would be 508 with the maximum objective function value of 10.825. This finding was justified by the fact that though the total normal cost was 663, significant cost savings of 155 was achieved from simultaneous implementations of the strategies. Likewise, it was observed from the optimisation results that with the availability of 70% of the total implementation cost, all mitigation strategies except MS6 ('Improve efficiency of internal processes') could be implemented (see Table 6.13). These findings were also consistent with the findings of Park and Kim (1998). Hence, the case bank needs to carefully allocate budget for the implementations of strategies for achieving sustainability.

8.2.9.1 Sensitivity analysis

Using optimisation process, a sensitivity analysis (see Section 6.4.5.2 in Chapter 6) was conducted to see the variances in outcome based on the variances in budget. The sensitivity analysis results presented (see Figure 6.9 and Table 6.14) that if, for some reason, the company could afford only 25% of the total cost of implementing all the strategies, a maximum of 9 of them could be implemented with the optimised saving of 33% (normal cost: 241; optimised cost: 161). If the company could invest 50% of the total cost, a maximum of 14 strategies could be implemented with the optimised saving of 25.78% (normal cost: 446; optimised cost: 331). Likewise, if 75% of the total cost was invested then 17 out of 18 strategies could be implemented with the optimised saving of 22.8% (normal cost: 636; optimised cost: 491). The findings from the sensitivity analysis depicted that there is an increase in optimised outcome if there is an increase in investment until all the mitigation strategies are covered. For instance, if the investment is increased from 200 to 300, the objective function value increases from 6.513 to 8.409; that is 29.01% increase in optimised outcome. Similarly, if the investment is increased from 300 to 400, the objective function value increases from 8.409 to 9.709 which is 15.45% increase. Therefore, the implication of these findings is that based on the optimised outcome discussed above the bank will have to cautiously consider the amount of investments for e-business sustainability.

8.2.9.2 Optimisation with mandatory implementation of mitigation strategies

It was noticed from the field study, QFD analysis, and optimisation process that mitigation strategies with higher importance may require higher implementation costs. For example, MS1 and MS7 was not covered in the optimised implementation list unless until the budget was increased to 400. The reason for this type of behaviour is that though the importance rating was high for MS1 (0.931), the cost was the highest (100). As mentioned in Section 4.7.4.3 in Chapter 4 that it was not unlikely for the case bank to consider some of the mitigation strategies as top priority while implementing them. For example, 'outsource high security software and hardware' (MS1) was considered very crucial for e-business of the case bank. The importance of this strategy was also reflected by the field study and the QFD analysis. In this regard, it was important to analyse and see the results of optimisation with mandatory implementations of strategies crucial to the e-business of the case bank.

Field study and the QFD analysis identified 6 important mitigation strategies (MS1, MS2, MS8 MS10, MS11, and MS13) which were considered essential to the e-business of

the case bank. The results from the optimisation with mandatory implementations of 6 strategies revealed that the minimum budget that was required to implement them was 245 (see Table 6.15). The results also showed that until a certain amount of investment is considered, the optimised outcome with mandatory implementations of strategies was inferior to the optimised outcome without mandatory implementations of strategies (see Figure 6.10). For instance, with the available budget of 350, the maximised objective function value was 8.953 with mandatory implementations of strategies (13 strategies could be implemented), and 9.097 without any mandatory implementations of strategies (15 strategies could be implemented). The difference in optimised outcome continued until the investment was increased to 400 and then, the difference was diminished. Therefore, these findings suggest that if the available budget is less than 400 the case bank needs to select mitigation strategies carefully for mandatory implementations. But if the budget is more than 400 the bank may go ahead with the mandatory implementations of 6 strategies without much thinking since there is no difference in the optimised outcome.

8.2.9.3 Comparison with the Knapsack Model

To demonstrates how this proposed optimisation model is more efficient and productive than other models, this optimisation model is compared with the 'Knapsack' model proposed by Gary Wasserman (1993) (see Section 6.4.5.4 in Chapter 6). It was found from the comparison that the optimised outcome by the Knapsack model was inferior at every budget point to the outcome by the proposed model (see Table 6.16, and Figure 6.11). It was observed that to achieve maximum objective function value of 10.825 and to implement all 18 mitigation strategies the Knapsack model costs 663 whereas the proposed optimisation model costs only 508. Thus, there is a significant cost-saving of 155 achieved by the proposed model which is about 23.38% of the total cost that cannot be offered by the Knapsack model. Similarly, if the bank invests 25%, 50%, and 75% of the total implementation costs, the Knapsack model outcome could implement only 6, 11, and 14 strategies respectively; whereas, with the same investments outcome from this proposed optimisation model could implement 9, 14, and 17 strategies respectively. Therefore, it can be summed up that the optimised outcomes by the proposed optimisation model are more efficient than the outcomes produced by the Knapsack model. These findings are consistent with the findings of Park and Kim (1998).

In this part of the analysis, mitigation strategies are identified and optimised for e-business sustainability. These strategies are identified and optimised based on the prioritised value requirements of customer, business, and process; and these value requirements of customer, business, and process include sustainability dimensions which are social, environmental, and economic requirements. Thus, both the research questions that led this study are initially answered.

8.3 FINDINGS FROM 'ANALYSIS PART 2'

To confirm the findings of 'Analysis Part1', quantitative tests were completed in 'Analysis Part 2'. For this purpose, hypotheses were developed based on the impacts of the mitigation strategies on the e-business sustainability outcome of the case bank. Partial Least Square (PLS) based Structural Equation Modelling (SEM) technique (Chin 1998a) was employed for the quantitative tests.

Based on the mitigation impacts of the optimised strategies on the blended value requirements for e-business sustainability, the hypotheses were developed. To develop the hypotheses, all the economic strategies were considered as one construct (EcoMSs). Likewise, all the environmental strategies (EnvMSs) and all the social strategies (SocMSs) were considered as another two constructs. Similar to the mitigation strategies, all the economic value requirements (EcoSus), all the environmental value requirements (EnvSus), and all the social value requirements (SocSus) for sustainability were also considered as three different constructs. Based on the relationships between the constructs a total of 7 hypotheses were developed for this study (see Figure 7.1). The impacts of mitigation strategies on the sustainability outcomes are indicated by these relationships between the constructs (see Table 7.1). To test these hypotheses, the questionnaire was developed based on the findings from the QFD analysis and the prior literature in this field. Based on these hypotheses the findings from the PLS-based statistical analysis are discussed below.

8.3.1 Hypotheses Related to Economic Strategies

Based on the impacts of economic strategies on sustainability outcome these hypotheses were developed. To find out the exact relationship between exogenous construct 'Economic Strategies' and endogenous constructs 'Economic Sustainability'; and the relationship between exogenous construct 'Economic Strategies' and endogenous constructs 'Environmental Sustainability', H_1a and H_1b were developed. The results in light of these hypotheses are discussed below.

8.3.1.1 Hypothesis H_1a

According to this hypothesis, economic strategies were expected to have significant positive impact on the economic sustainability outcome of e-business. The PLS-based statistical analysis demonstrated strong support for this hypothesis (β = 0.430; t = 5.078). This confirms that there is significant positive impact of economic strategies on the economic sustainability outcome of e-business of the bank.

This finding is supported by the previous studies (e.g., Anderson, Fornell and Lehmann 1994; González et al. 2004; Wang, Lo and Hui 2003; Zeithaml, Berry and Parasuraman 1996). For instance, Levesque and McDougall (1996) emphasised that improvement in convenience of the banking services contributes strongly to the customer satisfaction which improves the economic performance of the business. According to Zeithaml et al. (1996), improvement in quality of products and services improves a bank's reputation and its customer retention, attract new customers, and increases its financial performance and profitability.

This finding is consistent with the findings of QFD analysis presented in Chapter 6 (Analysis Part 1). Out of a total of 18 mitigation strategies, 11 of them were economic strategies which were optimised to mitigate a total of 23 economic value requirements of customer, business, and process. For example, according to QFD analysis, economic strategy MS12 ensures efficient availability of service delivery point for the convenience of customers; and economic strategies MS1, MS2, MS3, MS6, MS12, and MS13 have positive impacts on the quality of products and services of the bank.

This finding is also consistent with the findings of field study where customers, business managers, and process managers expressed the importance of implementing economic strategies to mitigate economic value requirements for sustainability. The strategic management of the bank should consider implementing all the economic strategies (MS1, MS2, MS3, MS6, MS7, MS8, MS9, MS12, MS13, MS14, and MS16), if financially feasible, for improving economic sustainability (see Table 6.5). Therefore, this result has some implications for the strategic managers and policy makers of the case bank. This result will also assist the other banks in Bangladesh in implementing strategies who are thinking of enabling and improving sustainability for their e-businesses.

8.3.1.2 Hypothesis H_1b

In line with hypothesis H_1b, economic strategies were expected to have positive impact on environmental sustainability outcome. The findings of the PLS-based structural model estimation confirmed the sound relationship between economic strategies and environmental sustainability outcome (β = 0.342; t = 2.966), supporting hypothesis H_1b. This indicates that economic strategies have strong positive impact on the environmental sustainability outcome of the e-business.

This finding is consistent with the statements of previous studies (e.g., Lee, Lye and Khoo 2001; Kuo, Wu and Shieh 2009; Veleva and Ellenbecker 2001; Enticott and Walker 2008). For example, Schaefer and Crane (2005) explained that efficient consumption helps to achieve economic and environmental sustainability. According to Beamon and Ware (1998), Veleva and Ellenbecker (2001) and Zhou et al. (2000), efficient supply chain management results in reduced costs, improved resource utilisation, and improved process efficiency; and can contribute to the reductions of energy usage, raw materials, and waste generation and therefore, improving environmental sustainability.

This finding is also supported by the findings of QFD analysis presented in Chapter 6 (Analysis Part 1) where economic strategies were optimised to not only mitigate the economic value requirements but also environmental value requirements. For instance, economic strategy MS14 ('Improve efficiency in supply chain management and use of goods, materials, and services') showed strong mitigation impact on the environmental value requirements BR11 ('Total consumption of fuel and power') and PR10 ('Process related fuel and power consumption').

Findings from the field study with the business and process managers also demonstrated that economic strategies would have effective mitigation impacts on the environmental value requirements. Thus, based on this finding strategic management of the case bank must consider the efficacy of implementing economic strategies in respect to environmental sustainability. This finding has some implications for the policy makers and strategic managers of other banks who are planning to shift towards sustainability. Because this shifting gives the organisations not only the opportunity to show their willingness for fulfilling the environmental expectations but also to manage reputation risks, to protect brand value, and to achieve competitive advantage.

The economic strategies were optimised with budget constraint for sustainability. Moreover, these strategies have relationships with or impacts on the economic and environmental value requirements of customer, business, and process. Hence, findings from H_1a and H_1b complies with the notions of Resource-based View, Stakeholder theory, and Triple Bottom Line.

8.3.2 Hypotheses Related to Environmental Mitigation Strategies

These hypotheses were developed based on the mitigation impacts of environmental strategies on the environmental value requirements and economic value requirements. H_2a and H_2b were developed in this regard which are discussed as follows:

8.3.2.1 Hypothesis H_2a

It was expected from this hypothesis that environmental strategies have strong positive impact on the environmental sustainability outcome of e-business. Surprisingly, at the first circumstance, the PLS-based statistical analysis demonstrated that environmental strategies do not have significant positive impact on the environmental sustainability outcome (β = 0.158; t = 1.346). Thus, hypothesis was not supported in this situation. The reason for producing this result was the stronger influence of economic strategies on environmental strategies. Because of the stronger influence of economic strategies, the impact of environmental strategies on environmental sustainability was affected and became insignificant. But when the influence of economic strategies on environmental sustainability was withdrawn, this hypothesis was supported with significant effect (β = 0.345; t = 3.305) which indicates the strong positive mitigation impact of environmental strategies on environmental sustainability.

This finding from the analysis is supported by the previous studies (e.g., Holliday, Schmidheiny and Watts 2002b; Veleva and Ellenbecker 2001; Stanwick and Stanwick 1998). For instance, Epstein and Wisner (2001) stated that environmental strategies, such as, environmental research and development, investment in cleaner technology, etc. are essential to mitigate the barriers (e.g., air pollution, discharge to water) of environmental sustainability.

QFD analysis presented in Chapter 6 (Analysis Part 1) where environmental strategies were optimised to mitigate environmental value requirements also supports this result. For example, MS15 ('Reducing the impact on air') was optimised to mitigate

environmental value requirements CR13 ('Usage of energy resources by the organisation'), CR14 ('Organisation's impact on air resources'), BR11 ('Total consumption of fuel and power'), and PR10 ('Process related fuel and power consumption').

Field study findings of this research also showed that business managers and process managers emphasised on implementing environmental strategies to mitigate the environmental value requirements. Therefore, the implications of this finding is that the strategic management of the case bank should consider implementing the environmental strategies MS11 ('Establish green banking cell') and MS18 ('Increasing environmental CSR activities for future generation') along with MS15 for the mitigation of environmental value requirements CR13, CR14, CR15 ('Usages of materials'), CR16 ('Proper environmental policy and management'), CR17 ('Compliance of environmental legislation'), BR11, BR12 ('Environmental legislation compliance'), PR9 ('Environmental legislation compliance by the process division'), and PR10 to improve sustainability.

8.3.2.2 Hypothesis H_2b

Based on this hypothesis, it was anticipated that environmental strategies would have positive impact on the economic sustainability outcome. The results from the PLS-based statistical analysis also showed a significant positive impact of environmental strategies on the environmental value requirements (β = 0.164; t = 2.182).

This finding is consistent with the findings of earlier studies as the scholars evidenced positive link between environmental performance and financial performance (Hamilton 1995; Hart and Ahuja 1996; Blacconiere and Patten 1994). More studies support this finding by arguing that environmental considerations and cost effectiveness of the business, such as, resource and energy conservation are closely linked (e.g., Lee, Lye and Khoo 2001; Kuo, Wu and Shieh 2009; Veleva and Ellenbecker 2001; Enticott and Walker 2008).

The findings from the field study and QFD analysis (Analysis Part 1) also showed positive mitigation impacts of environmental strategies on economic sustainability requirements. For example, MS15 ('Reducing the impact on air') is an environmental strategies and has impact on economic sustainability requirements BR4 ('Cost of goods, materials and services consumed') and PR5 ('Process related costs').

This finding has some implications for the strategic managers and policy makers of the bank. Based on this finding strategic management of the case bank must consider the efficacy of implementing environmental strategies in respect to economic sustainability. Therefore, along with MS15, MS11 ('Establishing green banking cell') and MS18 ('Increasing environmental CSR activities for future generation') which are environmental strategies and have impact on economic value requirements, need to be implemented for the mitigation of environmental value requirements as well as economic value requirements.

The results from H_2a and H_2b indicate that implementations of environmental strategies will not only improve the environmental sustainability outcome of e-business but also the economic sustainability outcome. Similar to H_1a and H_1b, the findings from H_2a and H_2b, also comply with the notions of Resource-based View, Stakeholder theory, and Triple Bottom Line as these strategies were optimised for sustainability with budgetary constraint and have impacts on the environmental and economic value requirements of customer, business, and process.

8.3.3 Hypotheses Related to the Social Mitigation Strategies

Based on the impacts of social strategies on the blended value requirements these hypotheses were developed. It was found that social strategies have positive impacts not only on social sustainability outcomes but also on economic sustainability outcomes and environmental sustainability outcomes. In this regard, hypotheses H_3a, H_3b, and H_3c were developed which are conferred below.

8.3.3.1 Hypothesis H_3a

It was proposed in hypothesis H_3a that social strategies would have significant positive impact on the social sustainability outcome of e-business. The PLS-based structural model estimation revealed a significant positive association between social strategies and social sustainability outcome (β = 0.603; t = 13.916), strongly supporting hypothesis H_3a.

Epstein and Roy (2001) emphasised the importance of appropriate strategies for social sustainability performances. For improving social sustainability performance Nelson (1998) proposes strategies based on socially responsible decisions, community development, and contribution to social policies and frameworks. Thus, the finding of this hypothesis is supported by the previous studies.

This finding is also consistent with the findings of field study and QFD analysis (Analysis Part 1) that revealed the strong mitigation impacts of social strategies on social value requirements. For instance, MS4 ('Maintaining privacy of information') is a social strategy and it was strongly mitigating social value requirements CR9 ('Accountability of products and services for customers'), BR9 ('Maintaining products and services responsibilities by the bank'), and PR8 ('Fulfilment of products and services requirements by process').

The results from this hypothesis confirms that for improving social sustainability of e-business, optimised social strategies need to be implemented. Hence, to mitigate social value requirements and to improve social sustainability, strategic management of the case bank should consider implementing MS5 ('Increasing CSR activities for national development'), MS10 ('Improving vigilance to illegal actions'), and MS17 ('Ensuring socially responsible actions throughout the organisation') along with MS4.

8.3.3.2 Hypothesis H_3b

With regards to the relationship between social strategies and economic sustainability outcome of e-business, it was hypothesised that social strategies would have positive impact on the economic sustainability outcome. The PLS-based statistical analysis of this study has demonstrated a significant result. The proposed hypothesis is accepted with β = 0.297; t = 3.925 which indicates a very strong positive impact of social strategies on economic sustainability outcome.

This finding is consistent with the literature. The positive link between social sustainability and economic performance has been mentioned by many previous studies (e.g., Preston and O'Bannon 1997; Ruf et al. 2001; Simpson and Kohers 2002; Nussbaum 2009; Smith 2008; Leisinger 2005; Kotler and Lee 2005). Griffin and Mahon (1997) provide the empirical evidence on the relationship between social performance and economic performance.

It was also attained from the field study and QFD analysis (Analysis Part 1) that social strategies have positive impacts on economic sustainability outcomes. For instance, MS17 ('Ensure socially responsible action throughout the organisation') is a social strategy and has impacts on economic sustainability outcomes BR1 ('Reputation of the organisation'), PR3 ('Productivity of the processes'), and BR7 ('Overall productivity of the business for cost efficiency'). Likewise, MS4 ('Maintaining privacy of information')

and MS5 ('Increasing CSR activities for national development') are social strategies and contribute to economic sustainability outcomes BR1 ('Reputation of the organisation').

Social strategies were mainly developed for mitigating social value requirements. But findings from this hypothesis confirmed that these strategies will simultaneously contribute to economic sustainability outcome along with social sustainability outcome. Therefore, based on the findings above top management of the case bank should prudently consider the importance of implementing social strategies MS4, MS5, and MS17.

8.3.3.3 Hypothesis H_3c

It was anticipated from hypothesis H_3c that social strategies would have positive impact on the environmental sustainability outcome of e-business. The result from PLS-based structural model estimation depicted significant positive link between social strategies and environmental sustainability outcome, supporting hypothesis H_3c (β = 0.189; t = 1.921).

The finding from this hypothesis is consistent with the prior studies which suggest positive link between social sustainability and environmental sustainability (e.g., Shrivastava 1995; Stanwick and Stanwick 1998; Poduska, Forbes and Bober 1992; Reilly 1992; Van Leeuw and Scheerlinck 2011). Poduska et al. (1992) and Reilly (1992) found a positive relationship between social performance and environmental protection, which indicates that strategies for social sustainability would improve environmental sustainability outcome.

The field study with the managers explored this view and found social strategies were positively associated with environmental sustainability outcome of e-business. Similar results were obtained from the QFD analysis (Analysis Part 1'), too. For instance, MS10 ('Improving vigilance to illegal actions') is a social strategy and was strongly impacting on environmental sustainability outcomes PR9 ('Environmental legislation compliance by the process division'), BR12 ('Environmental legislation compliance'), CR16 ('Proper environmental policy and management'), CR17 ('Compliance of environmental legislation'). Similarly, MS5 ('Increasing CSR activities for national development') is a social strategy and has impact on CR18 ('Organisation's commitment for future generations').

The above findings from field study, QFD analysis, and PLS-based statistical analysis confirmed that implementations of optimised social strategies would not only significantly improve the social sustainability outcome but also contribute to the environmental sustainability outcome. Therefore, these findings recommend the strategic management of the case bank to implement social strategies MS5 and MS10.

For the sustainability of e-business of the case bank, social strategies were optimised based on the resource available (budgetary constraint). According to the findings from H_3a, H_3b, and H_3c, implementations of social strategies would mitigate not only the sustainability value requirements of business, but also the sustainability value requirements of customers. Hence, findings from these three hypotheses are consistent with the notions of Resource-based View, Stakeholder Theory, and Triple-Bottom-Line.

8.4 OVERALL FINDINGS AND IMPLICATIONS

This study identified a total of 63 blended value requirements for e-business sustainability through field study which were prioritised using AHP analysis in 'Analysis Part 1'. Based on these blended value requirements a total of 18 corresponding mitigation strategies were developed. Then, based on the prioritised importance weight and corresponding mitigation strategies, blended value requirements were finalised for QFD analysis. From the finalisation process it was found that 23 out of 63 blended value requirements were excluded and not required to be considered for the optimisation of strategies. Based on the finalised blended value requirements and corresponding mitigation strategies relationship matrix analysis and roof matrix analysis were conducted. It was observed from the relationship matrix analysis that all the strategies were mitigating more than one blended value requirements partially or fully; and consequently, one blended value requirement was mitigated by more than one strategies. The absolute importance and relative importance of the strategies were then weighted and ranked based on the mitigation impacts of the strategies on the blended value requirement. The findings from the roof matrix analysis revealed the correlations between the strategies and indicated the amount of savings that could be achieved from the simultaneous implementations of the correlated strategies. Then cost analysis was conducted to get the relative costs of the strategies and the cost-savings from simultaneous implementations of the strategies.

Based on the absolute importance of mitigation strategies, cost of implementations, cost-savings from simultaneous implementations, and available budget, optimisation process was completed using non-linear quadratic integer programming method. It was observed from the optimisation results that significant savings can be achieved by the case bank if strategies are implemented simultaneously. It was also observed that there was an increase in optimised outcome if there was an increase in investment until all the strategies are covered. The results also depicted that until a certain amount of investment is considered, the optimised outcome with mandatory implementations of strategies was inferior to the optimised outcome without mandatory implementations of strategies. Lastly, by comparing the results it was found that the optimised outcomes by the proposed optimisation model are more efficient than the Knapsack model.

In 'Analysis Part 2', quantitative tests were completed to confirm the findings of 'Analysis Part1'. For this purpose hypotheses were developed and PLS-based SEM technique was employed. Six constructs were used for the tests which are economic strategies (EcoMSs), social strategies (SocMSs), environmental strategies (EnvMSs), economic sustainability outcome (EcoSus), social sustainability outcome (SocSus), and environmental sustainability outcome (EnvSus). Based on the impacts of mitigating strategies on the blended value requirements and sustainability outcome, a total of 7 hypotheses were developed. The PLS-based statistical analysis demonstrated significant results for all the hypotheses, supporting all of them.

Therefore, it can be summed up that, optimal strategies to fulfil the value requirements of customer, business, and process were developed and optimised for developing a model for e-business sustainability. These optimal mitigation strategies for e-business sustainability are developed by integrating the sustainability dimensions with the organisational value dimensions as mentioned in the research question that led this study. Findings of 'Analysis Part 1' and 'Analysis Part 2' indicate that implementations of the optimal strategies will have significant impact on the sustainability outcome of e-business of the case bank while mitigating the blended value requirements. These findings suggest the case bank to implement all the optimal strategies simultaneously for e-business sustainability, if budget allows.

As stated earlier, because of the two main reasons (the sustainability activities are done discretely by the e-business without following a particular model; and customer value requirements, business value requirements, and process value requirements for sustainability are not considered combinedly while making decisions or developing

strategies for the sustainability activities) the case bank was not successful in achieving e-business sustainability. Hence, for achieving sustainability, an e-business sustainability model was required by the case bank which will integrate the sustainability dimensions (economic, social, and environmental) with the organisational value dimensions (customer value requirements, business value requirements, and process value requirements). Moreover, allocation of investments for achieving sustainability was not efficient as the sustainability activities are done discretely. This study developed a comprehensive framework or model for e-business sustainability by integrating the customer value requirements, business value requirements, and process value requirements for sustainability that will enable the case bank to achieve sustainability. Through optimisation process, the developed model by this study also demonstrates the efficient way of allocating investments for achieving sustainability.

The findings of this study have significant implications for the policy makers and strategic managers of other organisations who are thinking of shifting towards sustainability. Based on the framework or model developed by this study other e-businesses and businesses can efficiently identify and prioritise their blended value requirements for achieving sustainability. Then based on the prioritised blended value requirements appropriate strategies can be developed. This developed model also shows how the sustainability strategies can be optimised with consideration to available organisational resources and ranking of importance. Along with e-businesses and businesses, this model can be used by other government and non-government organisations for achieving sustainability as it clearly show sustainability requirements can be efficiently identified and prioritised for mitigating with optimal strategies. As stated earlier, most of the past studies in this area mainly discussed the importance of sustainability or provided theoretical framework or conceptual idea for achieving sustainability; and none of them provide comprehensive guidelines. But this blended value model for e-business sustainability provides clear and step-by-step guidelines for achieving sustainability from efficiently identifying sustainability requirements to effectively mitigating them.

Literature indicates that there is growing demand for researches that concentrate on the sustainability practices by the businesses within the context of developed countries; and a few conceptual studies can be found on 'sustainability of ICT' or 'e-business sustainability'. But there is a general lack of research-focus on the sustainability practices by the businesses within the context of a developing country

where majority of the population lives in rural areas and is not aware of the importance of sustainability. But, inclusion of the rural community along with the urban community is very important for the sustainable development. This study developed a 'value-sustainability' framework for modelling e-business sustainability in conjunction with the organisational values and sustainability concepts that can be implemented by any business, both in developed and developing country contexts, for achieving sustainability.

8.5 SUMMARY

This chapter discussed the findings of 'Analysis Part 1' and 'Analysis Part 2' along with the overall study findings and implications for the case bank. Findings of 'Analysis Part 1' were based QFD based analysis and findings of 'Analysis Part 2' were based on PLS based analysis. The outcome from 'Analysis Part 1' determines the optimal mitigation strategies for e-business sustainability of the case bank and the outcome from 'Analysis Part 2' confirms that these determined optimal mitigation strategies will have significant impacts on the sustainability outcome of e-business of the bank. Based on the findings from 'Analysis Part 1' and 'Analysis Part 2', the overall findings of the study suggest the case bank to implement all the optimal mitigation strategies simultaneously for achieving e-business sustainability, if budget allows. The next chapter comprises the conclusion and presents future research directions.

CHAPTER 9

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

9.1 INTRODUCTION

The main objective of this research is to explore and determine the optimal mitigation strategies of an e-business model based on the prioritised sustainability value requirements. The research objectives also include investigating how the sustainability dimensions can be integrated with the organisational value dimensions in developing a 'value-sustainability' framework or model for e-business sustainability. These research objectives are accomplished in the context of a large commercial bank in Bangladesh.

To investigate the important blended value requirements and determine mitigating optimal strategies for e-business sustainability of a commercial bank in Bangladesh, Chapter 3 developed a conceptual research model based on the review of relevant literature. To identify and contextualise the important blended value requirements a field study was conducted; and based on the findings of the field study a comprehensive research-model was developed in Chapter 5. Then based on the blended value requirements mitigation strategies were developed and optimised in Chapter 6 by employing QFD based analysis. To confirm the findings of QFD based analysis, PLS based quantitative tests were conducted in Chapter 7. In this regard, hypotheses were drawn (Chapter 7) based on the impacts of optimal mitigation strategies on the sustainability outcome of e-business of the case bank. Discussion on the findings of QFD based analysis and PLS based quantitative tests were presented in Chapter 8.

This final chapter delivers the summary and conclusion of this research. This chapter also addresses how the research findings contribute to the existing body of relevant knowledge. In order to state the contribution of the research, a summary of the entire research process and outcomes is provided. In addition, the research methodology, analysis, results, and interpretation of this research are discussed. Furthermore, the implications of this research are identified, followed by the limitations of the research. Thus, this chapter is structured as follows. Based on the research questions and objectives, the next section describes the research summary. This is followed by a discussion on methodological, theoretical, and practical contributions of this research. Then, final section of this chapter states the limitations of this research followed by the directions for future research.

9.2 SUMMARY OF RESEARCH

The main purpose of this research was to identify the important blended value requirements and determine optimal mitigating strategies for e-business sustainability. Previous studies have clearly reported that the changing requirements of the stakeholders are increasingly putting the e-businesses in challenges in the scope of eco-awareness and social consciousness; and an e-business needs to fulfil blended value requirements of multiple stakeholders, namely customer value requirements for sustainability, business value requirements for sustainability, and process value requirements for sustainability, to be competitive and sustainable. Although a number of studies can be found on sustainability and it's indicators (e.g., Shrivastava 1995; Setthasakko 2009; Ageron, Gunasekaran and Spalanzani 2012; Enticott and Walker 2008; Veleva et al. 2003; Labuschagne, Brent and van Erck 2005), review of literature suggests that the coherent link between e-business sustainability and blended value requirements has not been explored yet. Prior studies also suggest that in addition to the identification of blended value requirements, development and selection of appropriate strategies for mitigating the blended value requirements is very crucial for achieving sustainability. Determining optimal sustainability strategies is important as they could allow businesses to not only differentiate their products but also earn above normal returns that would apply to both economic and other sustainable performance criteria (Pullman, Maloni and Carter 2009). To identify the blended value requirements and to determine the optimal mitigation strategies, this study used a case of a commercial bank in Bangladesh. This study identified important blended value requirements, determined optimal mitigating strategies, and conducted quantitative tests to confirm the findings. In developing the theoretical framework of the study, Stakeholder theory (Freeman 1984), Triple-bottom-line (Elkington 1994), and Resource-based View (Wernerfelt 1984) were employed (see Chapter 3).

As discussed earlier in the methodological section (Chapter 4), to attain the research objectives this study employed a mixed-method research approach by combining qualitative and quantitative methods of data collection and analysis. It is not unlikely that due to contextual differences the subject of this study may have a manifestation which differs from and may be beyond the scope of the existing literature. Hence, it was important to contextualise the blended value requirements for this particular case study. In this regard, a field study was conducted by interviewing customers, business managers, and process managers (as described in Chapter 5). Content analysis was used to analyse the field study data. The field study findings, in general, supported the

initial research model. However, some adjustments were made to the initial model to build a comprehensive and integrated research model (Figure 5.5). The comprehensive research model comprised of two main parts: 'Analysis Part 1' and 'Analysis Part 2'. Quality Function Deployment (QFD) based analysis, in which mitigation strategies were developed and optimised, was completed in 'Analysis Part 1' (described in Chapter 6); and Partial Least Square (PLS) based quantitative tests were completed in 'Analysis Part 2' (described in Chapter 7).

QFD based analysis found a total of 18 optimal strategies for mitigating 63 blended value requirements identified by the field study (described in Chapter 5). In determining optimal mitigation strategies, blended value requirements were prioritised using Analytic Hierarchy Process (AHP); then relationship matrix analysis, roof matrix analysis, and cost analysis were conducted for the optimisation of mitigation strategies (as described in Chapter 6). Non-linear quadratic integer programming method was employed to determine the optimal mitigation strategies. Based on the findings of 'Analysis Part 1' a total of 7 hypotheses were developed for quantitative tests.

'Analysis Part 2' of this research employed PLS based Structured Equation Modelling (SEM) technique to confirm the findings of 'Analysis Part 1'. This phase of the research involved the development of survey instrument, questionnaire pre-testing, data collection, data coding, pilot study, and data analysis (as described in Chapter 7). Findings from this phase of the research strongly supported the findings from 'Analysis Part 1' by supporting most of the hypotheses initially and all the hypotheses conditionally (see Section 7.9.5.2). The outcome from this phase confirmed that optimal mitigation strategies will have significant impact on the sustainability outcome of e-business of the case bank.

9.3 CONTRIBUTIONS OF THE RESEARCH

9.3.1 Methodological Contributions

One of the major contributions of this research is the method that has been employed to conduct the study. As opposed to the most studies in the e-business sustainability area, which commonly engage mono-method approach, this research applied mixed-method approach by combining qualitative and quantitative approaches in the data collection process. For the qualitative method a field study was employed and for the quantitative methods QFD analysis and a survey study was used.

The adoption of mixed-method approach for this research was appropriate in the sense that the 'e-business sustainability research' is still in its infant stage. Most of the studies in this research domain provides only with the hypothetical frameworks. Recent studies in this area are curious to find out the significant factors of e-business sustainability and their mitigation strategies. To address this issue, this study explored and identified significant blended value requirements for e-business sustainability and determined corresponding optimal mitigation strategies. Qualitative method was employed to identify the blended value requirements, and quantitative methods were employed to determine corresponding optimal mitigation strategies (QFD analysis), their impacts on sustainability outcome, and to confirm the findings (survey study).

Hence, mixed method approach has made significant contributions in this research by exploring the blended value requirements, constructing the comprehensive research model (contextualised and fine-tuned), developing mitigation strategies, exploring the links between the mitigation strategies and sustainability outcomes; testing of hypotheses; and drawing inferences by reliable and valid research outcomes. This research, therefore, suggests that the mixed method technique should be employed for the researches where sufficient work has not been done yet and/or tuning the contextual factors in a particular context. Moreover, mixed-method approach offers the essential information for fully-fledged explanatory arguments in order to confirm or revise the existing theory, especially when the literature on the research topic is not enough.

9.3.2 Theoretical Contributions

This study investigated and shown how the concept of blended value dimensions can be used in developing an e-business model for sustainability. This study integrated the sustainability dimensions with the organisational value dimensions in developing the model (see Figure 5.5). To develop the model this research explored and determined the optimal strategies for mitigating the blended value requirements. As stated above, in developing the theoretical framework of this study, Stakeholder theory (Freeman 1984), Triple-bottom-line (Elkington 1994), and Resource-based View (Wernerfelt 1984) were engaged.

This research established a few major theoretical contributions. Firstly, this research identified three dimensional value requirements for e-business sustainability. This study found that to be competitive and to maintain the sustainability a firm must consider value requirements (economic, social, and environmental) from all three

dimensions: customer value requirements, business value requirements, and process value requirements. It was also clear from the findings that each of the value elements (customer value, business value, and process value) must include all three elements of triple-bottom-line to achieve overall sustainability of the e-business. Hence, the concept of *blended value* has been established by this study. Through field study, a total of 63 blended value requirements (21 sustainability requirements of customer, 23 sustainability requirements of business, and 19 sustainability requirements of process) were identified and prioritised by this study. When prioritised, it was revealed that among the top 40 blended value requirements, 18 of them were customer value requirements (7 economic, 5 social, 6 environmental), 12 of them were business value requirements (7 economic, 3 social, 2 environmental), and 10 of them were process value requirements (6 economic, 2 social, 2 environmental).

Secondly, this research found that in addition to the identification and selection of three dimensional blended value requirements, development and selection of optimal strategies for mitigating the blended value requirements is very crucial for achieving sustainability. To address this issue this research determined optimal strategies for mitigating the blended value requirements. In optimising the mitigation strategies it was observed that strategies were correlated and related to more than one value requirements. It was also observed that strategies developed for a particular type of value requirements, partially mitigated other type of value requirements. For example, *'Ensure socially responsible action throughout the organisation'* is a social strategy and partially mitigated economic value requirements *'Reputation of the organisation'*, *'Productivity of the processes'*, and *'Overall productivity of the business for cost efficiency'*.

Thirdly, this study confirmed the findings of QFD analysis by employing PLS based quantitative tests. A survey study was conducted for this purpose. The results from the quantitative tests confirmed that mitigation strategies optimised for social value requirements have strong impact on the social sustainability outcome. Likewise, economic strategies have strong impact on the economic sustainability outcome and environmental strategies have strong impact on the environmental sustainability outcome. It was also confirmed that social strategies have significant impact on the economic sustainability outcome and environmental sustainability outcome. Similarly, it was found that economic strategies have significant impact on the environmental sustainability outcome and environmental strategies have strong impact on the economic sustainability outcome.

Finally, the development of the blended value based model for e-business sustainability, not just from data but scrutinised data and factors from qualitative and quantitative studies, is a major theoretical contribution. More clearly, the result from this mixed-method approach (i.e., qualitative and quantitative) is methodologically significant contribution to the relevant body of knowledge.

9.3.3 Practical Contributions

This research has developed blended value based model for e-business sustainability of a commercial bank. It was observed from the literature that businesses including e-businesses nowadays are concerned about the importance of sustainability and are showing willingness to adopt sustainability practices. But because of the lack of clear framework (what can be done, how it can be done) businesses are facing difficulty in adopting sustainability practices. This research address these issues by developing a framework to identify the important value requirements required to be mitigated for e-business sustainability, and determined optimal mitigation strategies based on the importance and resources available. Though this research developed 'blended value-sustainability framework' for e-business, the framework can be employed by other industries for adopting sustainability.

The study found that three dimensional blended value requirements for sustainability were emphasised by numerous scholars in a standalone fashion and not in integrated way. This study established the concept of three dimensional blended value requirements for sustainability. Hence, the study suggests that for achieving sustainability, businesses and e-businesses must consider identifying and mitigating process value requirements along with business value requirements and customer value requirements. This study also suggests businesses and e-businesses that after identifying the three dimensional sustainability value requirements, they need to be prioritised according to their importance as every business has its limited resource for investment.

The study explored and developed strategies for mitigating prioritised blended value requirements for sustainability. In developing the mitigation strategies, the study observed that each of the strategies was mitigating more than one blended value requirements fully or partially. Consequently, most of the blended value requirements were found to be impacted by more than one strategies. The study also revealed that mitigation strategies developed for particular type of value requirements (e.g., social)

may also mitigate other types of value requirements (e.g., economic/environmental). Thus, a particular type of mitigation strategies may also have impact on the other type of sustainability outcome. For instance, in this research economic strategies *'Improve efficiency in supply chain management and use of goods, materials, and services'* showed strong mitigation impact on the environmental value requirements *'Total consumption of fuel and power'*. Thus, this research suggests that businesses and e-businesses should consider these partial mitigation impacts on the blended value requirements while developing and selecting the mitigation strategies for sustainability.

This research revealed that correlations or trade-offs exist among the mitigation strategies. This means, implementation of one mitigation strategy may facilitate the implementations of other mitigation strategies. The correlations or trade-offs indicate the amount of savings that could be achieved from the simultaneous implementations of correlated strategies. For instance, it was revealed from this study that implementations of 8 strategies were correlated with other strategies. As stated above, this indicated that there would be some cost-savings if they are implemented simultaneously by the bank. Therefore, this study suggests businesses and e-businesses that trade-offs among the strategies need to be carefully identified while selecting the strategies for mitigating blended value requirements.

Through sensitivity analyses, this study also showed how the management of the bank should determine optimal mitigation strategies with budget constraint and with mandatory implementations of strategies. The same process can be followed by other businesses and e-businesses while determining optimal mitigation strategies for sustainability.

The above suggestions are made based on the findings of this study on the case bank in Bangladesh. However, based on the findings of this study and the suggestions above, other banks as well as other businesses and e-businesses may consider planning their future strategies and policies for achieving sustainability. They may also compare their perception and/or experience with the findings of this study.

9.4 RESEARCH LIMITATIONS

Despite the substantial contribution of this study in determining optimal strategies for e-business sustainability, it has some limitations. Firstly, it is noted that to maintain the originality of each value requirements (factor), field study identified them in *item level*. But due to the vast number of *items* identified by the field study value requirements

were considered only up to *variable level* for further analysis to avoid complexity and to keep the analysis simple. Hence, this study could not clearly show how the optimal strategies mitigated the value requirements in *item level.*

Secondly, the sample size for PLS based quantitative tests was just acceptable but a higher sample size covering all the branches of the case bank would produce more accurate results about the impact of optimal mitigation strategies on the sustainability outcome. Moreover, the homogenous distribution of the respondents (from the branch offices of the case bank located around the country) was not guaranteed in this survey.

Finally, the developed blended value based model for sustainability is case bank specific, particularly for the e-business of the case bank. The framework developed by this study can be implemented by any business in any context. Even the results from this study might be applicable for other similar banks in Bangladesh, but it might not explain the same problem in a different context, even for another bank in a different country.

9.5 FUTURE RESEARCH DIRECTIONS

This study developed blended value based model for e-business sustainability of a particular bank. Acknowledging the findings of this research, further study can be conducted to develop blended value based model for e-business sustainability of the overall banking industry in Bangladesh with larger sample size and homogenous distribution of the respondents. Moreover, following the framework developed in this study, blended value based model for sustainability can be developed for other similar industries in the country.

This research developed blended value based model in a particular country context which may not be suitable for application in another country. But this study provides the stepping stone for such a study in different country contexts. Hence, further study can be conducted to test this model in similar industries in different country contexts.

It was revealed from this study that mitigation strategies developed for a particular sustainability outcome have positive influence on other sustainability outcomes. For instance, it was found that social strategies have positive influence on economic value requirements and environmental value requirements. Thus, further study could be conducted to see whether strategies developed for a particular sustainability outcome have negative influence on other sustainability outcomes and to what extent.

This study developed optimal mitigation strategies based on the prioritised blended value requirements. Among the optimal mitigation strategies some were economic strategies, some were social strategies, and some were environmental strategies. Future studies can be conducted to see which type of mitigation strategies get maximum priority by the banks to be implemented for e-business sustainability and why. Similar, studies can be conducted for other industries, too.

9.6 CONCLUDING REMARKS

This chapter concludes the study by briefly outlining the research summary, research contributions, research limitations, and further research directions. This study was initiated to identify the important blended value requirements and determine corresponding optimal mitigating strategies for e-business sustainability of a commercial bank. The study attained the research objectives by adopting a mixed-method approach (qualitative and quantitative) of data collection and analysis. The outcome of this research strongly contributes methodologically, theoretically, and practically to the body of relevant knowledge. The findings of the study have several implications for the case bank, the banking industry of Bangladesh, and other similar industries for adopting sustainability.

REFERENCES

Adams, C. A., and Geoffrey R. Frost 2006. "The Internet and Change in Corporate Stakeholder Engagement and Communication Strategies on Social and Environmental Performance." *Journal of Accounting & Organizational Change* 2 (3): 281.

Agarwal, Reeti, Sanjay Rastogi, and Ankit Mehrotra. 2009. "Customers' Perspectives Regarding E-Banking in an Emerging Economy." *Journal of Retailing and Consumer Services* 16 (5): 340-351.

Ageron, Blandine, Angappa Gunasekaran, and Alain Spalanzani. 2012. "Sustainable Supply Management: An Empirical Study." *International Journal of Production Economics* 140 (1): 168-182.

Aggelis, V. G. 2005. *The Bible of E-Banking*. Athens: New Technologies Publications (in Greek).

Akao, Yoji. 1990. *Quality Function Deployment (QFD): Integrating Customer Requirements into Product Design*. Cambridge, MA: Productivity Press.

———. 1994. "Development History of Quality Function Deployment." *The Customer Driven Approach to Quality Planning and Deployment*: 339-351.

Akkermans, H. 2001. "Intelligent E-Business: From Technology to Value." *Intelligent Systems, IEEE* 16 (4): 8-10.

Aladwani, Adel M. 2001. "Online Banking: A Field Study of Drivers, Development Challenges, and Expectations." *International Journal of Information Management* 21 (3): 213-225.

Alam, Syed Shah, Ali Khatibi, A. Solucis Santhapparaj, and Mohammad Talha. 2007. "Development and Prospects of Internet Banking in Bangladesh." *Competitiveness Review: An International Business Journal incorporating Journal of Global Competitiveness* 17 (1/2): 56-66.

Alatrista, José, and James Arrowsmith. 2004. "Managing Employee Commitment in the Not-for-Profit Sector." *Personnel Review* 33 (5): 536-548.

Ali, Muhammad Mahboob. 2010. *E-Business and on line banking in Bangladesh: An Analysis*. Office of Research and Publications (ORP), American International University, Bangladesh. http://EconPapers.repec.org/RePEc:aiu:abewps:83

Alpert, Frank, Michael Kamins, Tomoaki Sakano, Naoto Onzo, and John Graham. 2001. "Retail Buyer Beliefs, Attitude and Behavior toward Pioneer and Me-Too Follower Brands: A Comparative Study of Japan and the USA." *International Marketing Review* 18 (2): 160-187.

Alreach, P. L., and R. B. Settle. 1995. *The Survey Research Handbook*. 2nd ed. Illinois, USA: Irwin.

Amit, Raphael, and Christoph Zott. 2001. "Value Creation in E-Business." *Strategic Management Journal* 22 (6-7): 493-520. doi: 10.1002/smj.187.

Anderson, Eugene W., Claes Fornell, and Donald R. Lehmann. 1994. "Customer Satisfaction, Market Share, and Profitability: Findings from Sweden." *The Journal of Marketing*: 53-66.

Andreasen, Alan R., and Minette E. Drumwright (eds.). 2001. *Alliances and Ethics in Social Marketing*. Edited by Alan R. Andreasen, *Ethics in Social Marketing*. Washington DC: Georgetown University Press.

Andronikidis, Andreas, Andreas C. Georgiou, Katerina Gotzamani, and Konstantina Kamvysi. 2009. "The Application of Quality Function Deployment in Service Quality Management." *The TQM Journal* 21 (4): 319-333.

Angelakopoulos, Georgios, and Athanassios Mihiotis. 2011. "E-Banking: Challenges and Opportunities in the Greek Banking Sector." *Electronic Commerce Research* 11 (3): 297-319.

Ansari, A., and Batoul Modarress. 1994. "Quality Function Deployment: The Role of Suppliers." *Journal of Supply Chain Management* 30 (4): 27-35.

Ansari, N. L., M. M. Ashraf, B. T. Malik, and H. Grunfeld. 2010. "Green IT Awareness and Practices: Results from a Field Study on Mobile Phone Related E-Waste in Bangladesh" *Technology and Society (ISTAS), 2010 IEEE International Symposium on*, doi: 10.1109/istas.2010.5514618.

Aragón-Correa, J. Alberto, and Sanjay Sharma. 2003. "A Contingent Resource-Based View of Proactive Corporate Environmental Strategy." *The Academy of Management Review* 28 (1): 71-88.

Aras, G., and D. Crowther. 2009. "Corporate Sustainability Reporting: A Study in Disingenuity?" *Journal of Business Ethics* 87 (1): 279-288.

Argandoña, Antonio. 1998. "The Stakeholder Theory and the Common Good." *Journal of Business Ethics* 17 (9-10): 1093-1102.

Arlbjorn, Jan Stentoft, and Anders Haug. 2010. *Business Process Optimization*. 1st ed. Denmark: Academica.

Armacost, Robert L., Paul J. Componation, Michael A. Mullens, and William W. Swart. 1994. "An AHP Framework for Prioritizing Customer Requirements in QFD: An Industrialized Housing Application " *IIE Transactions* 26 (4): 72-79. doi: 10.1080/07408179408966620.

Azam, Md. Shah, and Mohammed Quaddus. 2009. "Adoption of E-Commerce by the SMEs in Bangladesh: The Effects of Innovation Characteristics and Perceived Risk." In *Australian and New Zealand Marketing Academy Conference*, Melbourne, Australia, 30 Nov-02 Dec

Azapagic, A., A. Millington, and A. Collett. 2006. "A Methodology for Integrating Sustainability Considerations into Process Design." *Chemical Engineering Research and Design* 84 (6): 439-452.

Azapagic, Adisa, Alan Millington, and Aaron Collett. 2004. "Process Design for Sustainability: The Case of Vinyl Chloride Monomer." *Sustainable Development in Practice: Case Studies for Engineers and Scientists*: 201-249.

Babbie, E. 2004. *The Practice of Social Research* 10th ed. Wadsworth: Thomson.

Babbie, Earl. 2010. *The Practice of Social Research*. 12th ed. Belmont, CA: Wadsworth.

Babiak, Kathy, and Sylvia Trendafilova. 2011. "CSR and Environmental Responsibility: Motives and Pressures to Adopt Green Management Practices." *Corporate Social Responsibility and Environmental Management* 18 (1): 11-24.

Bagozzi, Richard P. 1994. *Principles of Marketing Research*: Blackwell Cambridge, Oxford, Mass.

Bagozzi, Richard P., and Lynn W. Phillips. 1982. "Representing and Testing Organizational Theories: A Holistic Construal." *Administrative Science Quarterly*: 459-489.

Bakos, J. Yannis. 1987. "Dependent Variables for the Study of Firm and Industry-Level Impacts of Information Technology", *Proceedings of the Eigth International Conference on Information Systems,* December 1987, 10-23.

Bakshi, Bhavik R., and Joseph Fiksel. 2003. "The Quest for Sustainability: Challenges for Process Systems Engineering." *AIChE Journal* 49 (6): 1350-1358.

Bangladesh Bank. 2011. "Bangladesh Electronic Fund Transfer Network Inauguration: Speech of the Governor of Central Bank of Bangladesh." Bangladesh Bank. Accessed 28/04/2012, ttp://www.bangladeshbank.org/governor/speech/feb282011gs.pdf

———. 2012a. *Annual Report on Green Banking.* Dhaka: Green Banking and CSR Department.

———. 2012b. *Review of CSR Initiatives of Banks 2011*. Dhaka: Agricultural Credit & Financial Inclusion Department.

———. 2013. *Quarterly Review Report on Green Banking Activities of Banks and Financial Institutions.* Dhaka: Green Banking and CSR Department.

———. 2014. "Recent Developments in Financial Sector of Bangladesh: Automation and Technological Development." http://www.bangladeshbank.org/fnansys/recent_dev.php.

Barclay, D., C. Higgins, and R. Thompson. 1995. "Partial Least Squares Approach to Causal Modeling: Personal Computer Adoption and Use as an Illustration." *Technology Studies* 2 (2): 285-324.

Barney, J. 1991. "Firm Resources and Sustained Competitive Advantage." *Journal of Management* 17 (1): 99.

Barney, Jay B. 1986. "Organizational Culture: Can It Be a Source of Sustained Competitive Advantage?" *The Academy of Management Review* 11 (3): 656-665.

Barua, Anitesh, Prabhudev Konana, Andrew B. Whinston, and Fang Yin. 2004. "An Empirical Investigation of Net-Enabled Business Value." *MIS Quarterly* 28 (4): 585-620.

Bateman, Nicola. 2005. "Sustainability: The Elusive Element of Process Improvement." *International Journal of Operations & Production Management* 25 (3): 261-276.

Bates, Kimberly A., and E. James Flynn. 1995. "Innovation History and Competitive Advantage: A Resource-Based View Analysis of Manufacturing Technology Innovations" *Academy of Management Proceedings*: Academy of Management.

Bauer, Hans H., Maik Hammerschmidt, and Tomas Falk. 2004. "Measuring the Quality of E-Banking Portals." *International Journal of Bank Marketing* 23 (2): 153-175.

Bauer, H. H., Matthias Staat, and Maik Hammerschmidt. 2003. "Value Based Benchmarking and Market Partitioning." In *Exploratory Data Analysis in Empirical Research*, 422-432. Springer.

Beamon, Benita M. 1999. "Designing the Green Supply Chain." *Logistics Information Management* 12 (4): 332-342.

Beamon, Benita M, and Tonja M Ware. 1998. "A Process Quality Model for the Analysis, Improvement and Control of Supply Chain Systems." *Logistics Information Management* 11 (2): 105-113.

Beheiry, Salwa M., Wai Kiong Chong, and Carl T. Haas. 2006. "Examining the Business Impact of Owner Commitment to Sustainability." *Journal of Construction Engineering and Management* 132 (4): 384-392.

Belal, Attaur Rahman. 2006. "Stakeholders' Perceptions of CSR in Bangladesh." In *Eighth Interdisciplinary Perspective on Accounting Conference*, Kuala Lumpur, April 2006.

Bell, Simon, and Stephen Morse. 2009. *Sustainability Indicators: Measuring the Immeasurable*. London: Earthscan Publications.

Berg, Bruce Lawrence. 2008. *Qualitative Research Methods for the Social Sciences*. 7th ed: Allyn & Bacon.

Berglund, R. L. 1993. "QFD: A Critical Tool for Environmental Decision Making." In *47th Annual Quality Congress of the American Society for Quality Control (ASQC)*, Boston, MA, 593-599.

Bharadwaj, Anandhi S. 2000. "A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation." *MIS Quarterly* 24 (1).

Bhattacharya, Arijit, Bijan Sarkar, and Sanat Kumar Mukherjee. 2005. "Integrating AHP with QFD for Robot Selection under Requirement Perspective." *International Journal of Production Research* 43 (17): 3671-3685. doi: 10.1080/00207540500137217.

Bichler, Martin. 2001. *Future of E-Markets Multi Dimensional Market Mechanism*. UK: Cambridge University Press.

Bieker, Thomas, Thomas Dyllick, Carl-Ulrich Gminder, and Kai Hockerts. 2001. "Towards a Sustainability Balanced Scorecard Linking Environmental and Social Sustainability to Business Strategy." *Proceedings of Business Strategy and the Environment Conference*, University of Leeds, UK.

Birkinshaw, Julian, Allen Morrison, and John Hulland. 1995. "Structural and Competitive Determinants of a Global Integration Strategy." *Strategic Management Journal* 16 (8): 637-655.

Bishop, Willard R. 1984. "Competitive Intelligence." *Progressive Grocer* 63 (3): 19-20.

Biswas, Nasrin R., Mohammed Naim Ahmed Dewan, and Mohammed A. Quaddus. 2014. "Developing Design Requirements for Social Sustainability of the Pharmaceutical Industry of Bangladesh: A Conceptual Approach." In the *12th Eurasia Business and Economic Society Conference (EBES 2014)*, Nanyang Technological University, Singapore, January 9-11. 851-871.

Biswas, Shyamapada, Abu Taleb, and Salman Salem Shinwary. 2011. "Electronic Banking in Bangladesh: Security Issues, Forms, Opportunities and Challenges." *Canadian Journal on Scientific and Industrial Research* 2 (5): 181-194.

Blacconiere, Walter G, and Dennis M Patten. 1994. "Environmental Disclosures, Regulatory Costs, and Changes in Firm Value." *Journal of Accounting and Economics* 18 (3): 357-377.

Bloemer, Josée, Ko de Ruyter, and Pascal Peeters. 1998. "Investigating Drivers of Bank Loyalty: The Complex Relationship between Image, Service Quality and Satisfaction." *International Journal of Bank Marketing* 16 (7): 276-286.

Bloom, P. N. , and G. T. Gundlach. 2000. *Handbook of Marketing and Society*. Thousand Oaks, CA: Sage.

Blum-Kusterer, Martina, and S. Salman Hussain. 2001. "Innovation and Corporate Sustainability: An Investigation into the Process of Change in the Pharmaceuticals Industry." *Business Strategy and the Environment* 10 (5): 300-316.

Bogdan, Robert C., and Sari Knopp Biklen. 1998. *Qualitative Research for Education: An Introduction to Theory and Methods*. 3rd ed. Boston, USA: Allyn & Bacon.

Bollen, Kenneth A. 1998. *Structural Equation Models*: Wiley Online Library.

Bollen, Kenneth, and Richard Lennox. 1991. "Conventional Wisdom on Measurement: A Structural Equation Perspective." *Psychological Bulletin* 110 (2): 305.

Bonini, Sheila, and Jed Emerson. 2005. "Maximizing Blended Value–Building Beyond the Blended Value Map to Sustainable Investing, Philanthropy and Organizations." http://www.blendedvalue.org/media/pdf-max-blendedvalue.pdf.

Bony, Shakila Zerin, and Faria Kabir. 2013. "Practice of E-Banking in Commercial Bank: An Empirical Study in Bangladesh." *International Journal of Business and Social Research* 3 (5): 168-177.

Borges, Mauro, Norberto Hoppen, and Fernando Bins Luce. 2009. "Information Technology Impact on Market Orientation in E-Business." *Journal of Business Research* 62 (9): 883-890.

Bovea, M. D., and R. Vidal. 2004. "Increasing Product Value by Integrating Environmental Impact, Costs and Customer Valuation." *Resources, Conservation and Recycling* 41 (2): 133-145.

Bowen, Harry P., and Margarethe F. Wiersema. 1999. "Matching Method to Paradigm in Strategy Research: Limitations of Cross-Sectional Analysis and Some Methodological Alternatives." *Strategic Management Journal* 20 (7): 625-636.

Bowen, Howard, R. 1953. "Social Responsibilities of the Businessman." New York, Harper.

Boyes, Gary, and Merlin Stone. 2003. "E-Business Opportunities in Financial Services." *Journal of Financial Services Marketing* 8 (2): 176-189.

Boztepe, Suzan. 2004. "User-Value-Based Product Adaptation." PhD, Dissertation, Chicago, IL, Illinois Institute of Technology, USA.

Braga, Carlos A. Primo. 1996. "The Impact of the Internationalization of Services on Developing Countries." *Finance and Development* 33 (1): 34-37.

Broderick, Anne J., and Supattra Vachirapornpuk. 2002. "Service Quality in Internet Banking: The Importance of Customer Role." *Marketing Intelligence & Planning* 20 (6): 327-335.

Brønn, P. S., and D. Vidaver-Cohen. 2009. "Corporate Motives for Social Initiative: Legitimacy, Sustainability, or the Bottom Line?" *Journal of Business Ethics* 87 (S1): 91.

Brown, Judy, and Michael Fraser. 2006. "Approaches and Perspectives in Social and Environmental Accounting: An Overview of the Conceptual Landscape." *Business Strategy and the Environment* 15 (2): 103-117.

Bryson, John R., and Rachel Lombardi. 2009. "Balancing Product and Process Sustainability against Business Profitability: Sustainability as a Competitive Strategy in the Property Development Process." *Business Strategy and the Environment* 18 (2): 97-107.

Burgers, Henri, and Sukanlaya Sawang. 2012. "Strategic Renewal and Competitive Advantage in Opportunity-Driven and Conservative New Ventures" *Proceedings of AOM2012 Academy of Management Annual Meeting: The Informal Economy*.

Burns, R. B. 1997. *Introduction to Research Methods*. 3rd ed. Australia: Longman.

Byrne, Barbara M., and Sunita M. Stewart. 2006. "Teacher's Corner: The MACS Approach to Testing for Multigroup Invariance of a Second-Order Structure: A Walk through the Process." *Structural Equation Modeling* 13 (2): 287-321.

Caldelli, Andrea, and Marisa Luisa Parmigiani. 2004. "Management Information System–a Tool for Corporate Sustainability." *Journal of Business Ethics* 55 (2): 159-171.

Caniato, Federico, Maria Caridi, Luca Crippa, and Antonella Moretto. 2012. "Environmental Sustainability in Fashion Supply Chains: An Exploratory Case Based Research." *International Journal of Production Economics* 135 (2): 659-670.

Carlisle, Ysanne M., and David O. Faulkner. 2005. "The Strategy of Reputation." *Strategic Change* 14 (8): 413-422.

Carroll, A. B. . 1979. "A Three-Dimensional Conceptual Model of Corporate Social Performance." *Academy of Management Review* 4: 497-505.

Carter, C. R., and P. Liane Easton. 2011. "Sustainable Supply Chain Management: Evolution and Future Directions." *International Journal of Physical Distribution & Logistics Management* 41 (1): 46.

Carter, C. R., and D. S. Rogers. 2008. "A Framework of Sustainable Supply Chain Management: Moving toward New Theory." *International Journal of Physical Distribution & Logistics Management* 38 (5): 360-387.

Cavana, Robert Y., Brian L. Delahaye, and U. Sekaran. 2001. "Applied Business Research." *Qualitative and Quantitative Methods*.

Chan, Kimmy Wa, Chi Kin Yim, and Simon S. K. Lam. 2010. "Is Customer Participation in Value Creation a Double-Edged Sword? Evidence from Professional Financial Services across Cultures." *Journal of Marketing* 74 (3): 48-64.

Chan, Lai-Kow, and Ming-Lu Wu. 1998. "Prioritizing the Technical Measures in Quality Function Deployment." *Quality Engineering* 10 (3): 467-479. doi: 10.1080/08982119808919160.

———. 2002. "Quality Function Deployment: A Literature Review." *European Journal of Operational Research* 143 (3): 463-497.

———. 2005. "A Systematic Approach to Quality Function Deployment with a Full Illustrative Example." *Omega: The International Journal of Management Science* 33 (2): 119-139.

Charter, Martin, Ken Peattie, Jacqueline Ottman, and Michael J. Polonsky. 2002. *Marketing and Sustainability*: Centre for Business Relationships, Accountability, Sustainability and Society in association with the Centre for Sustainable Design.

Chen, Adela J. W., Marie-Claude Boudreau, and Richard T. Watson. 2008. "Information Systems and Ecological Sustainability." *Journal of Systems and Information Technology* 10 (3): 186-201.

Chien, Te-King, and Chao-Ton Su. 2003. "Using the QFD Concept to Resolve Customer Satisfaction Strategy Decisions." *The International Journal of Quality & Reliability Management* 20 (3): 345-359.

Chin, Wynne. W. 1998a. "The Partial Least Squares Approach for Structural Equation Modeling." In *Modern Methods for Business Research*, ed. George A. Marcoulides, 295-336. New York: Lawrence Erlbaum Associates.

———. 1998b. "Commentary: Issues and Opinion on Structural Equation Modeling." *MIS Quarterly*: vii-xvi.

———. 2010. "How to Write up and Report PLS Analyses." In *Handbook of Partial Least Squares: Concepts, Methods, and Applications*, eds V. Esposito Vinzi, W. W. Chin, J. Hensler and H. Wang, 655-690. New York, USA: Springer.

Chin, Wynne W., and Abhijit Gopal. 1995. "Adoption Intention in GSS: Relative Importance of Beliefs." *ACM SigMIS Database* 26 (2-3): 42-64.

Chin, W. W., B. L. Marcolin, and P. R. Newsted. 1996. "A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and Voice Mail Emotion/Adoption Study." In *Proceedings of the Seventeenth International Conference on Information Systems*, Cleveland, Ohio.

Chisty, Nur Mohammad Ali. 2013. "A Literature Review on Green Banking in Bangladesh: Policy Guidelines for Banking and Issues." *Bangladesh Research Foundation Journal* 02 (01): 85-100.

Cho, Namjae, and Sanghyuk Park. 2001. "Development of Electronic Commerce User-Consumer Satisfaction Index (ECUSI) for Internet Shopping." *Industrial Management & Data Systems* 101 (8): 400-406.

Choi, Sungchul, and Alex Ng. 2011. "Environmental and Economic Dimensions of Sustainability and Price Effects on Consumer Responses." *Journal of Business Ethics* 104 (2): 269-282.

Choudhury, Tonmoy Toufic, Md. Salim, Md. Mamoon Al Bashir, and Prakash Saha. 2013. "Influence of Stakeholders in Developing Green Banking Products in Bangladesh." *Research Journal of Finance and Accounting* 4 (7): 67-77.

Chowdhury, Md. Maruf Hossan, Eijaz Ahmed Khan, and Mohammed Naim Ahmed Dewan. 2014. "Conceptualization and Development of an Instrument to Measure Supply Chain Sustainability." In the *5th Asia-Pacific Business Research Conference*, Kuala Lumpur, Malaysia, Feb 17-18

Chowdhury, Md. Maruf Hossan, Mohammed Naim Ahmed Dewan, Md. Moazzem Hossain, and Mohammed A. Quaddus. 2012. "An AHP-QFD Integrated Approach for Mitigating Barriers of Corporate Sustainability." In the *26th Annual Australian and New Zealand Academy of Management Conference*, Perth, Australia, 5-7 December.

Chowdhury, Md. Shahnur Azad, and Md. Maruf Ullah. 2013. "Usage of Information Technology by the Commercial Banks Operating in Bangladesh – Current Situation and Its Future." In *3rd Asia-Pacific Business Research Conference,* Kuala Lumpur, Malaysia*,* 25-26 February.

Chowdhury, Rizwana Afnan. 2012. "Products of NCC Bank." BRAC Business School, BRAC University.

Chowdhury, Tanbir Ahmed, and Kashfia Ahmed. 2009. "Performance Evaluation of Selected Private Commercial Banks in Bangladesh." *International Journal of Business and Management* 4 (4): 86-97.

Clement, Ronald W. 2005. "The Lessons from Stakeholder Theory for US Business Leaders." *Business Horizons* 48 (3): 255-264.

Cohen, Nevin. 1999. "Greening the Internet: Ten Ways E-Commerce Could Affect the Environment." *Environmental Quality Management* 9 (1): 1-16.

Colbert, Barry A. 2004. "The Complex Resource-Based View: Implications for Theory and Practice in Strategic Human Resource Management." *Academy of Management Review* 29 (3): 341-358.

Coletti, Elisa, and Virginia Tirri. 2005. "The Serbian Banking System: Recent Development and Major Players." *Transition Studies Review* 12 (2): 201-221.

Collier, Joel E., and Carol C. Bienstock. 2006. "Measuring Service Quality in E-Retailing." *Journal of Service Research* 8 (3): 260-275.

Compeau, Deborah R., and Christopher A. Higgins. 1995. "Computer Self-Efficacy: Development of a Measure and Initial Test." *MIS Quarterly* 19 (2).

Cox, J, and Barrie G Dale. 2001. "Service Quality and E-Commerce: An Exploratory Analysis." *Managing Service Quality* 11 (2): 121-131.

Cravens, David W., Gordon Greenley, Nigel F. Piercy, and Stanley Slater. 1997. "Integrating Contemporary Strategic Management Perspectives." *Long Range Planning* 30 (4): 474-506.

Creswell, John W. 2003. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 2nd ed. Thousand Oaks: SAGE.

Creyer, Elizabeth H. 1997. "The Influence of Firm Behavior on Purchase Intention: Do Consumers Really Care About Business Ethics?" *Journal of Consumer Marketing* 14 (6): 421-432.

Crowe, Thomas J., and Chao-Chun Cheng. 1996. "Using Quality Function Deployment in Manufacturing Strategic Planning." *International Journal of Operations & Production Management* 16 (4): 35-48.

Crowston, Kevin, and Michael E. Treacy. 1986. *Assessing the Impact of Information* Technology on Enterprise Level Performance: Citeseer.

Csikszentmihalyi, Mihaly. 1988. "The Flow Experience and Its Significance for Human Psychology." In M. Csikszentmihalyi & I. S. Csikszentmihalyi (Eds.), Optimal experience (pp. 15–35). New York: Cambridge University Press.

Cumps, Bjorn, Stijn Viaene, Guido Dedene, and Jacques Vandenbulcke. 2006. "An Empirical Study on Business/ICT Alignment in European Organisations" System Sciences, 2006. HICSS'06. Proceedings of the 39th Annual Hawaii International Conference on: IEEE.

Daniel, E. M., J. Hoxmeier, A. White, and A. Smart. 2004. "A Framework for the Sustainability of E-Marketplaces." Business Process Management Journal 10 (3): 277-289.

Dao, Viet, Ian Langella, and Jerry Carbo. 2011. "From Green to Sustainability: Information Technology and an Integrated Sustainability Framework." *The Journal of Strategic Information Systems* 20 (1): 63-79.

Darnall, Nicole, and Joann Carmin. 2005. "Greener and Cleaner? The Signaling Accuracy of US Voluntary Environmental Programs." *Policy Sciences* 38 (2-3): 71-90.

Darnall, Nicole, G. Jason Jolley, and Robert Handfield. 2008. "Environmental Management Systems and Green Supply Chain Management: Complements for Sustainability?" *Business Strategy and the Environment* 17 (1): 30-45.

Das, Debadyuti, and Kampan Mukherjee. 2008. "Development of an AHP-QFD Framework for Designing a Tourism Product." *International Journal of Services and Operations Management* 4 (3): 321-344.

Dawans, Vincent, and Kim Alter. 2009. *The Four Lenses Strategic Framework. Toward an Integrated Social Enterprise Methodology.* Virtue Ventures LLC: A Building the Field Initiative, Version 1.1, March.

De Giovanni, Pietro, and Vincenzo Esposito Vinzi. 2012. "Covariance Versus Component-Based Estimations of Performance in Green Supply Chain Management." *International Journal of Production Economics* 135 (2): 907-916.

De Ruyter, Ko, Martin Wetzels, Jos Lemmink, and Jan Mattson. 1997. "The Dynamics of the Service Delivery Process: A Value-Based Approach." *International Journal of Research in Marketing* 14 (3): 231-243.

Dees, J. Gregory. 2008. "Philanthropy and Enterprise: Harnessing the Power of Business and Social Entrepreneurship for Development." *Innovations* 3 (3): 119-132.

Deitel, H. M. , P. J. Deitel, and K. Steinbuhler. 2001. *E-Business and E-Commerce for Managers*. Sydney: Prentice-Hall.

Delai, Ivete, and Sérgio Takahashi. 2011. "Sustainability Measurement System: A Reference Model Proposal." *Social Responsibility Journal* 7 (3): 438-471.

Delice, Elif Kılıç, and Zülal Güngör. 2010. "A Mixed Integer Goal Programming Model for Discrete Values of Design Requirements in QFD." *International Journal of Production Research* 49 (10): 2941-2957.

Demirdogen, R. Esra. 2007. "The Role, Responsibility and Impact of Business in Eco-Efficient Technologies and Bio-Trade" *International Conference on Environment: Survival and Sustainability,* Nicosia, Northern Cyprus.

Denton, D. Keith. 1994. *Enviro-Management: How Smart Companies Turn Environmental Costs into Profits*. NJ: Prentice Hall.

Deutsch, Claudia H. 2007. "Companies Giving Green an Office." *New York Times* 3.

DeVellis, Robert F. 2012. *Scale Development: Theory and Applications*. Edited by Leonard Bickman and Debra J. Rog. Third ed, *Applied Social Research Methods*. Thousand Oaks, California: Sage Publications, Inc.

Diamantopoulos, Adamantios, Petra Riefler, and Katharina P. Roth. 2008. "Advancing Formative Measurement Models." *Journal of Business Research* 61 (12): 1203-1218.

Diamantopoulos, Adamantios, and Judy A. Siguaw. 2006. "Formative Versus Reflective Indicators in Organizational Measure Development: A Comparison and Empirical Illustration." *British Journal of Management* 17 (4): 263-282.

Diamantopoulos, Adamantios, and Heidi M. Winklhofer. 2001. "Index Construction with Formative Indicators: An Alternative to Scale Development." *Journal of Marketing Research*: 269-277.

Dias-Sardinha, Idalina, and Lucas Reijnders. 2005. "Evaluating Environmental and Social Performance of Large Portuguese Companies: A Balanced Scorecard Approach." *Business Strategy and the Environment* 14 (2): 73-91.

Dierickx, Ingemar, and Karel Cool. 1989. "Asset Stock Accumulation and Sustainability of Competitive Advantage." *Management Science* 35 (12): 1504-1511.

Dillman, Don A. 1978. *Mail and Telephone Surveys*. Vol. 3: Wiley New York.

———. 1991. "The Design and Administration of Mail Surveys." *Annual Review of Sociology* (17): 225-249.

Diwekar, Urmila. 2005. "Green Process Design, Industrial Ecology, and Sustainability: A Systems Analysis Perspective." *Resources, Conservation and Recycling* 44 (3): 215-235.

Dolan, Robert J., and John M. Matthews. 1993. "Maximizing the Utility of Customer Product Testing: Beta Test Design and Management." *Journal of Product Innovation Management* 10 (4): 318-330.

Donaldson, T., and L. E. Preston. 1995. "The Stakeholder Theory of the Corporation: Concepts, Evidence and Implications." *Academy of Management Review* 20 (1): 65-91.

Dow Jones. 2005. "Dow Jones Sustainability World Indexes Guide V. 7.0." http://www.sustainability-index.com/

Dwivedi, Yogesh Kumar, Naureen Khan, and Anastasia Papazafeiropoulou. 2007. "Consumer Adoption and Usage of Broadband in Bangladesh." *Electronic Government, an International Journal* 4 (3): 299-313.

Dyllick, T., and K. Hockerts. 2002. "Beyond the Business Case for Corporate Sustainability." *Business Strategy and the Environment* 11 (2): 130.

Earl, Michael J. 2000. "Evolving the E-Business." *Business Strategy Review* 11 (2): 33-38.

Eastern Bank Ltd. 2014. "Our Approach to Sustainability." http://www.ebl.com.bd/home/green_banking_sustainability

Economist, The. 2008. "The Next Question." 386 (8563): 8. www.economist.com/displaystory.cfm?story_id¼10491055

Edwards, Jeffrey R., and Richard P. Bagozzi. 2000. "On the Nature and Direction of Relationships between Constructs and Measures." *Psychological Methods* 5 (2): 155.

Ehnert, Ina. 2009. "Linking the Idea of Sustainability to Strategic HRM." In *Sustainable Human Resource Management*, 33-78. Springer.

Eisenhardt, Kathleen M. 1989. "Building Theories from Case Study Research." *Academy of management review* 14 (4): 532-550.

Elkington, John. 1994. "Towards the Suitable Corporation: Win-Win-Win Business Strategies for Sustainable Development." *California Management Review* 36 (2): 90-100.

———. 2006. "The Value Palette: A Tool for Full Spectrum Strategy (Corporate Strategy and Corporate Social Responsibility)." *Strategic Direction* 22 (8).

Elliot, Steve. 2007. "Environmentally Sustainable ICT: A Critical Topic for IS Research?" In *11th Pacific Asia Conference on Information Systems*, Auckland, New Zealand, 3-6 July.

———. 2009. "Developing Organizational Capabilities in SMEs: Enabling Environmentally Sustainable ICT." In *22nd Bled eConference*, Bled, Slovenia, 14-17 June.

———. 2011. "Transdisciplinary Perspectives on Environmental Sustainability: A Resource Base and Framework for IT-Enabled Business Transformation." *MIS Quarterly.* 35 (1): 197-236.

Elliot, Steve, and Derek Binney. 2008. "Environmentally Sustainable ICT: Developing Corporate Capabilities and an Industry-Relevant IS Research Agenda." In *Pacific Asia Conference on Information Systems*, Suzhou, China, 4-6 July.

Emerson, Jed. 2003. "The Blended Value Proposition: Integrating Social and Financial Results." *California Management Review* 45 (4): 35-51.

———. 2006. *Moving Ahead Together: Implications of a Blended Value Framework for the Future of Social Entrepreneurship*. Edited by A. Nicholls, *Social Entrepreneurship, New Models of Sustainable Social Change*. Oxford: Oxford University Press.

Emerson, Jed, and Sheila Bonini. 2003. *The Blended Value Map: Tracking the Intersects and Opportunities of Economic, Social and Environmental Value Creation*. Menlo Park, CA.: Hewlett Foundation.

Enticott, Gareth, and Richard M. Walker. 2008. "Sustainability, Performance and Organizational Strategy: An Empirical Analysis of Public Organizations." *Business Strategy and the Environment* 17 (2): 79-92.

Epstein, Marc J., and Marie-Josée Roy. 2001. "Sustainability in Action: Identifying and Measuring the Key Performance Drivers." *Long Range Planning* 34 (5): 585-604.

Epstein, Marc J., and Priscilla S. Wisner. 2001. "Using a Balanced Scorecard to Implement Sustainability." *Environmental Quality Management* 11 (2): 1-10. doi: 10.1002/tqem.1300.

Erek, Koray. 2011. "From Green IT to Sustainable Information Systems Management: Managing and Measuring Sustainability in IT Organisations." In *European, Mediterranean & Middle Eastern Conference on Information Systems*, Athens, Greece, 30-31 May.

Erek, Koray, Nils-Holger Schmidt, Ruediger Zarnekow, and Lutz M Kolbe. 2009. "Sustainability in Information Systems: Assortment of Current Practices in IS Organizations." *AMCIS 2009 Proceedings,* Available at: http://aisel. aisnet. org/amcis2009/123, San Francisco, USA.

Ethos. 2005. "Ethos Indicators of Corporate Social Responsibility." http://www.ethos.org.br/

Expert Choice Inc. 2004. Expert Choice 11: Quick Start Guide and Tutorials. http://expertchoice.com/.

Fahey, Liam, Rajendra Srivastava, Joyce Shems Sharon, and David E. Smith. 2001. "Linking E-Business and Operating Processes: The Role of Knowledge Management." *IBM Systems Journal* 40 (4): 889-907.

Falk, R. Frank, and Nancy B. Miller. 1992. *A Primer for Soft Modeling*: University of Akron Press.

Figge, Frank, and Tobias Hahn. 2004. "Sustainable Value Added – Measuring Corporate Contributions to Sustainability Beyond Eco-Efficiency." *Ecological Economics* 48 (2): 173-187.

Figge, Frank, Tobias Hahn, Stefan Schaltegger, and Marcus Wagner. 2002. "The Sustainability Balanced Scorecard – Linking Sustainability Management to Business Strategy." *Business Strategy and the Environment* 11 (5): 269-284.

Fisher, Thomas J. 1990. "Business Productivity Measurement Using Standard Cost Accounting Information." *International Journal of Operations & Production Management* 10 (8): 61-69.

Foerstl, Kai, Carsten Reuter, Evi Hartmann, and Constantin Blome. 2010. "Managing Supplier Sustainability Risks in a Dynamically Changing Environment – Sustainable Supplier Management in the Chemical Industry." *Journal of Purchasing and Supply Management* 16 (2): 118-130.

Forbis, John L., and Nitin T. Mehta. 2000. "Economic Value to the Customer." *The McKinsey Quarterly* 3: 49-52.

Forman, Ernest H. 1983. "The Analytic Hierarchy Process as a Decision Support System." *Proceedings of the IEEE Computer Society*.

Forman, Ernest H., and Mary Ann Selly. 2001. *Decision by Objectives: How to Convince Others That You Are Right*: World Scientific.

Fornell, C., and F. L. Bookstein. 1982. "Two Structural Equations Models: LISREL and PLS Applied to Consumer Exit-Voice Theory." *Journal of Marketing Research* 18: 39-50.

Foxon, Timothy J., G. McIlkenny, D .Gilmour, C. Oltean-Dumbrava, N. Souter, R. Ashley, D. Butler, P. Pearson, P. Jowitt, and Jim Moir. 2002. "Sustainability Criteria for Decision Support in the UK Water Industry." *Journal of Environmental Planning and Management* 45 (2): 285-301.

Frazer, Lorelle, and Meredith Lawley. 2000. *Questionnaire Design & Administration: A Practical Guide*: Wiley New York.

Freeman, R .Edward. 1984. *Strategic Management: A Stakeholder Approach*. Boston, MA: Pitman.

Freeman, R. Edward. 2010. Strategic Management: A Stakeholder Approach. New York: Cambridge University Press

Freeman, R. Edward, Andrew C. Wicks, and Bidhan Parmar. 2004. "Stakeholder Theory and "the Corporate Objective Revisited"." *Organization Science* 15 (3): 364-369.

Fuchs, Christian. 2008. "The Implications of New Information and Communication Technologies for Sustainability." *Environment, Development and Sustainability* 10 (3): 291-309.

Furst, Karen, William W. Lang, and Daniel E. Nolle. 2002. "Internet Banking." *Journal of Financial Services Research* 22 (1-2): 95-117.

Fussler, Claude, and Peter James. 1996. *Driving Eco-Innovation: A Breakthrough Discipline for Innovation and Sustainability*: Pitman London.

Fylstra, Daniel, Leon Lasdon, John Watson, and Allan Waren. 1998. "Design and Use of the Microsoft Excel Solver." *Interfaces* 28 (5): 29-55.

Gallagher, Anthony, David Johnson, Gillian Glegg, and Colin Trier. 2004. "Constructs of Sustainability in Coastal Management." *Marine Policy* 28 (3): 249-255.

Gangopadhyay, Aryya, and Monica Adya. 1999. "Protecting Sensitive Information in Electronic Commerce." In *Doing Business on the Internet*, 77-86. Springer.

Garg, Amit, and Hau L. Lee. 1999. *Managing Product Variety: An Operations Perspective*: Springer.

Garvare, Rickard, and Peter Johansson. 2010. "Management for Sustainability – a Stakeholder Theory." *Total Quality Management* 21 (7): 737-744.

Gefen, D., D. W. Straub, and M. C. Boudreau. 2000. "Structural Equation Modeling and Regression: Guidelines for Research Practice." *Communications of the Association for Information Systems* 4 (7): 1-77.

Geng, Xiuli, and Xuening Chu. 2012. "A New Importance–Performance Analysis Approach for Customer Satisfaction Evaluation Supporting PSS Design." *Expert Systems with Applications* 39 (1): 1492-1502.

Georgiou, Andreas C., Katerina Gotzamani, Andreas Andronikidis, and George N. Paltayian. 2008. "A Combined QFD, AHP and ANP Approach for Quality Improvement and Capacity Expansion in the Greek Banking Sector: Some Preliminary Results" *11th QMOD Conference: Quality Management and Organizational Development Attaining Sustainability From Organizational Excellence to SustainAble Excellence*, Helsingborg, Sweden: Linköping University Electronic Press, Linköpings Universitet.

Giaglis, G. M., R. J. Paul, and D. I. Doukidis. 1999. "Dynamic Modeling to Assess the Business Value of Electronic Commerce." *International Journal of Electronic Commerce* 3 (3): 35-51.

Giménez Leal, Gerusa, Martí Casadesús Fa, and Jaume Valls Pasola. 2003. "Using Environmental Management Systems to Increase Firms' Competitiveness." *Corporate Social Responsibility and Environmental Management* 10 (2): 101-110.

Glavas, Ante, and Jenny Mish. 2014. "Resources and Capabilities of Triple Bottom Line Firms: Going over Old or Breaking New Ground?" *Journal of Business Ethics*: 1-20.

Global Reporting Initiative (GRI). 2006. Reporting Principles and Guidance G3. Accessed 1 June 2010, http://www.globalreporting.org/ReportingFramework/G3Guidelines/

———. 2011. Sustainability Reporting Guidelines. https://www.globalreporting.org/resourcelibrary/G3.1-Guidelines-Incl-Technical-Protocol.pdf

Godfrey, Paul C., and Nile W. Hatch. 2007. "Researching Corporate Social Responsibility: An Agenda for the 21st Century." *Journal of Business Ethics* 70 (1): 87-98.

Goi, Chai Lee. 2005. "E-Banking in Malaysia: Opportunity and Challenges." *Journal of Internet Banking and Commerce* 10 (3): 2006-02.

Goldsmith, Arthur A., and Derick W. Brinkerhoff. 1990. "Institutional Sustainability Strategies: A Global View." *Institutional Sustainability in Agriculture and Rural Development: a Global Perspective*: 229.

González, M. E., G. Quesada, F. Picado, and C. A. Eckelman. 2004. "Customer Satisfaction Using QFD: An E-Banking Case." *Managing Service Quality* 14 (4): 317-330.

Gonzalez, Michael A, and Raymond L Smith. 2003. "A Methodology to Evalwte Process Sustainability." *Environmental Progress* 22 (4): 269-276.

Goodland, R. 1995. "The Concept of Environmental Sustainability." *Annual Review of Ecology and Systematics* 26: 1-24.

Gorard, Stephen, and Chris Taylor. 2004. *Combining Methods in Educational and Social Research*: McGraw-Hill International.

Gordijn, Jaap, and Hans Akkermans. 2001. "E³ Value: A Conceptual Value Modeling Approach for E-Business Development" *First International Conference on Knowledge Capture, Workshop Knowledge in e-Business*.

Government of Bangladesh (GoB) 2009. "Digital Bangladesh." http://www.a2i.pmo.gov.bd/digital-bangladesh

Grant, R. M. 1991. "The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation." *California Management Review* 33: 114-35.

Green Banking and CSR Department, Bangladesh Central Bank 2011. "Policy Guidelines for Green Banking." http://www.bb.org.bd/mediaroom/circulars/brpd/feb272011brpd02e.pdf

Greene, Jennifer C., and Valerie J. Caracelli. 1997. *Advances in Mixed-Method Evaluation: The Challenges and Benefits of Integrating Diverse Paradigms: New Directions for Evaluation*: San Francisco: Jossey-Bass.

Greene, Jennifer C., Valerie J. Caracelli, and Wendy F. Graham. 1989. "Toward a Conceptual Framework for Mixed-Method Evaluation Designs." *Educational Evaluation and Policy Analysis* 11 (3): 255-274.

Griffin, Abbie, and John R. Hauser. 1993. "The Voice of the Customer." *Marketing Science* 12 (1): 1-27.

Griffin, Jennifer J., and John F. Mahon. 1997. "The Corporate Social Performance and Corporate Financial Performance Debate Twenty-Five Years of Incomparable Research." *Business & Society* 36 (1): 5-31.

Guba, Egon G. 1990. *The Paradigm Dialog*. Newbury Park, CA: Sage.

Guba, E. G., and Y. S. Lincoln. 1994. *Competing Paradigms in Qualitative Research*. Edited by N. K. Denzin and Y. S. Lincoln, *Handbook of Qualitative Research 2*. CA:Sage: Thousand Oaks: 163-194.

Haigh, Nardia. 2004. "Linkages between E-Business and Sustainability Outcomes: An Exploratory Study." *Innovation: Management, Policy & Practice* 6 (2): 236-246.

Haigh, Nardia, and Andrew Griffiths. 2008. "The Environmental Sustainability of Information Systems: Considering the Impact of Operational Strategies and Practices." *International Journal of Technology Management* 43 (1): 48-63.

Hair, Joseph F., Rolph E. Anderson, Ronald L. Tatham, and W. C. Black. 1998. *Multivariate Data Analysis with Readings*. Fifth ed. Englewood Cliffs, NJ: Prentice-Hall

Hair, Joseph F., William C. Black, Barry E. Babin, Rolph E. Anderson, and Ronald L. Tatham. 2006. *Multivariate Data Analysis*. Sixth ed. NJ: Pearson Prentice Hall

Hair, Joseph F., Christian M. Ringle, and Marko Sarstedt. 2011. "PLS-SEM: Indeed a Silver Bullet." *Journal of Marketing Theory & Practice* 19 (2): 139-152. doi: 10.2753/mtp1069-6679190202.

Halperin, K. 2001. "Balancing Act," *Company Business and Marketing*. February.

Hamilton, James T. 1995. "Pollution as News: Media and Stock Market Reactions to the Toxics Release Inventory Data." *Journal of Environmental Economics and Management* 28 (1): 98-113.

Han, Chang Hee, Jae Kyeong Kim, Sang Hyun Choi, and Soung Hie Kim. 1998. "Determination of Information System Development Priority Using Quality Function Development." *Computers & Industrial Engineering* 35 (1–2): 241-244.

Han, S. Bruce, Shaw K. Chen, Maling Ebrahimpour, and Manbir S. Sodhi. 2001. "A Conceptual QFD Planning Model." *The International Journal of Quality & Reliability Management* 18 (8): 796.

Hanumaiah, Naga, B. Ravi, and N. P. Mukherjee. 2006. "Rapid Hard Tooling Process Selection Using QFD-AHP Methodology." *Journal of Manufacturing Technology Management* 17 (3): 332-350.

Harmon, Robert R., and Nora Auseklis. 2009. "Sustainable IT Services: Assessing the Impact of Green Computing Practices" *Management of Engineering & Technology, 2009. PICMET 2009. Portland International Conference on*: IEEE.

Harmon, Robert R., Haluk Demirkan, and David Raffo. 2012. "Roadmapping the Next Wave of Sustainable IT." *Foresight* 14 (2): 121-138.

Harmon, Robert R., and Greg Laird. 1997. "Linking Marketing Strategy to Customer Value: Implications for Technology Marketers" *Innovation in Technology Management – The Key to Global Leadership. PICMET'97: Portland International Conference on Management and Technology*: IEEE.

Harold, Jacob, Joshua Spitzer, and Jed Emerson (eds.). 2007. *Blended Value Investing: Integrating Environmental Risks and Opportunities into Securities Valuation*. Oxford, UK: Saïd Business School, University of Oxford.

Hart, Stuart L. 1995. "A Natural-Resource-Based View of the Firm." *Academy of Management Review* 20 (4): 986-1014.

Hart, Stuart L., and Gautam Ahuja. 1996. "Does It Pay to Be Green? An Empirical Examination of the Relationship between Emission Reduction and Firm Performance." *Business Strategy and the Environment* 5 (1): 30-37.

Hart, Stuart L., and Mark B. Milstein. 2003. "Creating Sustainable Value." *The Academy of Management Executive* 17 (2): 56-67.

Hartley, J. F. (ed.) 1994. *Case Studies in Organizational Research*. Edited by C. Cassell and G. Symon, *Qualitative Methods in Organizational Research*. London: Sage.

Harvey, Brian, and Anja Schaefer. 2001. "Managing Relationships with Environmental Stakeholders: A Study of UK Water and Electricity Utilities." *Journal of Business Ethics* 30 (3): 243-260.

Hasan, A. H. M. Saidul, Md. Azizul Baten, Anton Abdulbasah Kamil, and Sanjida Parveen. 2010. "Adoption of E-Banking in Bangladesh: An Exploratory Study." *African Journal of Business Management* 4 (13): 2718-2727.

Heim, G., and O. Zenklusen. 2005. "Sustainable Finance: Strategy Options for Development Financing Institutions." *Eco:* Fact, Stampfenbachstrass, Zurich.

Heinonen, Sirkka, Pekka Jokinen, and Jari Kaivo-oja. 2001. "The Ecological Transparency of the Information Society." *Futures* 33 (3): 319-337.

Henseler, Jörg, Christian Ringle, and Rudolf Sinkovics. 2009. "The Use of Partial Least Squares Path Modeling in International Marketing." *Advances in International Marketing (AIM)* 20: 277-320.

Hessler, Richard M. 1992. *Social Research Methods*: Thomson Learning.

Hewlett, Sylvia Ann, Laura Sherbin, and Karen Sumberg. 2009. "How Gen Y & Boomers Will Reshape Your Agenda." *Harvard Business Review* 87 (7/8): 71-76.

Hill, Anthony, Julian Roberts, Paul Ewings, and David Gunnell. 1997. "Non-Response Bias in a Lifestyle Survey." *Journal of Public Health* 19 (2): 203-207.

Hilty, Lorenz M. 2008. "Information Technology and Sustainability." In *Essays on the Relationship between ICT and Sustainable Development.* Norderstedt Books on Demand GmbH.

Hilty, Lorenz, and Magda Hercheui. 2010. "ICT and Sustainable Development." *What Kind of Information Society? Governance, Virtuality, Surveillance, Sustainability,*

Resilience. eds Jacques Berleur, Magda Hercheui and Lorenz Hilty, 227-235. Springer Boston.

Hilty, Lorenz M, Eberhard K Seifert, and René Treibert. 2005. *Information Systems for Sustainable Development*: IGI Global.

Hinterhuber, Andreas. 2004. "Towards Value-Based Pricing – an Integrative Framework for Decision Making." *Industrial Marketing Management* 33 (8): 765-778.

———. 2008. "Value Delivery and Value-Based Pricing in Industrial Markets." *Advances in Business Marketing and Purchasing* 14: 381-448.

Hlupic, Vlatka, and Stewart Robinson. 1998. "Business Process Modelling and Analysis Using Discrete-Event Simulation" *Proceedings of the 30th Conference on Winter Simulation*: IEEE Computer Society Press.

Hockerts, Kai. 1999. "The Sustainability Radar." *Greener Management International* (25): 29-49.

Hoffman, Gene D. 1984. "Our Competitor Is Our Environment." *Progressive Grocer – Value Executive Repor*t: 28-30.

Hoggarth, Glenn, Jack Reidhill, and Peter Sinclair. 2004. *On the Resolution of Banking Crises: Theory and Evidence*: Bank of England, London.

Hohenthal, Jukka. 2006. "Integrating Qualitative and Quantitative Methods in Research on International Entrepreneurship." *Journal of International Entrepreneurship* 4 (4): 175-190.

Holliday, Charles O., Stephan Schmidheiny, and Philip Watts. 2002a. *Walking the Talk: The Business Case for Sustainable Development*: Berrett-Koehler Publishers.

Holliday, Charles, Stephen Schmidheiny, and Philip Watts. 2002b. "Cumprindo O Prometido: Casos De Sucesso De Desenvolvimento Sustentável." *Rio de Janeiro: Campus*.

Houghton, John. 2009. "ICT and the Environment in Developing Countries: An Overview of Opportunities and Developments." *Communications & Strategies* (76): 39-60.

———. 2010. "ICT and the Environment in Developing Countries: A Review of Opportunities and Developments" In *What Kind of Information Society? Governance, Virtuality, Surveillance, Sustainability, Resilience*. eds. Jacques Berleur, Magda Hercheui and Lorenz Hilty, 236-247. Springer Boston.

Hubbard, Graham. 2006. "Sustainable Organisation Performance: Towards a Practical Measurement System." *Monash Business Review* 2 (3): 1-19.

———. 2009. "Measuring Organizational Performance: Beyond the Triple Bottom Line." *Business Strategy and the Environment* 18 (3): 177-191.

Huberman, A. Michael, and Matthew B. Miles. 2002. *The Qualitative Researcher's Companion*. London: Sage Publications.

Huda, Shakil, Mohammad Abdul Momen, and Mushtaque Ahmed. 2004. "On Line Banking System." *Finance and Banking* 6 (1).

Hulland, J. 1999. "Use of Partial Least Squares (PLS) in Strategic Management Research: A Review of Four Recent Studies." *Strategic Management Journal* 20 (2): 195-204.

Hutchins, Margot J., and John W. Sutherland. 2008. "An Exploration of Measures of Social Sustainability and Their Application to Supply Chain Decisions." *Journal of Cleaner Production* 16 (15): 1688-1698.

Hutchinson, Kelly, and Alemayehu Molla. 2009. "Mapping the Dynamics of Social Enterprises and ICTD in Cambodia" *Information and Communication Technologies and Development (ICTD), 2009 International Conference on*: IEEE.

Hwarng, H. Brian, and Cynthia Teo. 2001. "Translating Customers' Voices into Operations Requirements – a QFD Application in Higher Education." *The International Journal of Quality & Reliability Management* 18 (2): 195-225.

Hway-Boon, Ong, and Cheng Ming Yu. 2003. "Success Factors in E-Channels: The Malaysian Banking Scenario." *International Journal of Bank Marketing* 21 (6/7): 369-377.

Igbaria, Magid, Tor Guimaraes, and Gordon B. Davis. 1995. "Testing the Determinants of Microcomputer Usage Via a Structural Equation Model." *Journal of Management Information Systems* 11 (4): 87-114.

Innes, John and Falconer Mitchell. 1997. "The Application of Activity-Based Costing in the United Kingdom's Largest Financial Institutions." *The Service Industries Journal* 17 (1): 190-203.

Institution of Chemical Engineeers (IChemE). 2005. "The Sustainability Metrics." http://www.icheme.org.

Isaak, Robert. 2002. "The Making of the Ecopreneur." *Greener Management International* 2002 (38): 81-91.

Islam, Farjana, Sigma Islam, and Jahid Hasan. 2014. "Antecedents Behind Internet-Banking Adoption: An Empirical Study on Private Banking Sector of Bangladesh." *World Journal of Social Sciences* 4 (3): 183-198.

Islami Bank Bangladesh Limited. 2012. *Green Banking Guidelines*. Dhaka: Green Banking Department Risk Management Wing. http://www.islamibankbd.com/docs/Greeen%20Banking%20of%20IBBL.pdf

Jackson, E. L. 2008. "Behaviourial Determinants of the Adoption of Forward Contracts by Western Australian Wool Producers." Curtin Graduate School of Business, Curtin University, Perth, Australia.

Jackson, Tim. 1996. *Material Concerns: Pollution, Profit and Quality of Life*. London/New York: Routledge.

Jamal, Ahmad, and Kamal Naser. 2002. "Customer Satisfaction and Retail Banking: An Assessment of Some of the Key Antecedents of Customer Satisfaction in Retail Banking." *International Journal of Bank Marketing* 20 (4): 146-160.

Jamali, Dima. 2006. "Insights into Triple Bottom Line Integration from a Learning Organization Perspective." *Business Process Management Journal* 12 (6): 809-821.

James, Peter. 1997. "The Sustainability Circle: A New Tool for Product Development and Design." *Journal of Sustainable Product Design* 2: 52-57.

Jarvis, Cheryl Burke, Scott B. MacKenzie, and Philip M. Podsakoff. 2003. "A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research." *Journal of Consumer Research* 30 (2): 199-218.

Javalgi, Rajshekhar G., Robert L. Armacost, and Jamshid C. Hosseini. 1989. "Using the Analytic Hierarchy Process for Bank Management: Analysis of Consumer Bank Selection Decisions." *Journal of Business Research* 19 (1): 33-49.

Jawahir, I. S, F. Badurdeen, T. Goldsby, and D. Iyengar. 2009. "Assessment of Product and Process Sustainability: Towards Developing Metrics for Sustainable Manufacturing" *Proceedings of the National Institute of Standards and Technology (NIST) Workshop on Sustainable Manufacturing,* Washington, USA,

Jenkin, Tracy A., Lindsay McShane, and Jane Webster. 2011. "Green Information Technologies and Systems: Employees' Perceptions of Organizational Practices." *Business & Society* 50 (2): 266-314.

Jensen, Michael. 2001. "Value Maximisation, Stakeholder Theory, and the Corporate Objective Function." *European Financial Management* 7 (3): 297-317.

Jeucken, M. 2004. *Sustainability in Finance: Banking on the Planet*. First ed. Delft: Eburon Academic Publishers.

Jeucken, Marcel H. A., and Jan Jaap Bouma. 1999. "The Changing Environment of Banks." *Greener Management International* 1999 (27): 20-35.

Johansson, Magnus, and Linn Andersson. 2012. "Pricing Practices and Value Creation Logics." *Journal of Revenue & Pricing Management* 11 (1): 64-75.

Johnson, R. Burke, and Anthony J. Onwuegbuzie. 2004. "Mixed Methods Research: A Research Paradigm Whose Time Has Come." *Educational Researcher* 33 (7): 14-26.

Johnston, Robert. 1995. "The Determinants of Service Quality: Satisfiers and Dissatisfiers." *International Journal of Service Industry Management* 6 (5): 53-71.

Jokinen, Pekka, Pentti Malaska, and Jari Kaivo-oja. 1998. "The Environment in An Information Society': A Transition Stage Towards More Sustainable Development?" *Futures* 30 (6): 485-498.

Jones, Sara, Marc Wilikens, Philip Morris, and Marcelo Masera. 2000. "Trust Requirements in E-Business." *Communications of the ACM* 43 (12): 81-87.

Jugulum, Rajesh, and Mustafa Sefik. 1998. "Building a Robust Manufacturing Strategy." *Computers & Industrial Engineering* 35 (1-2): 225-228.

Kabir, G., and AI Madugu. 2010. "Assessment of Environmental Impact on Air Quality by Cement Industry and Mitigating Measures: A Case Study." *Environmental Monitoring and Assessment* 160 (1-4): 91-99.

Kadembo, Ernest. 2008a. "Corruption and the Distortion of Technology Transfer and Marketing Processes: An Insight into Africa's Economic Malaise and the Decadence of Its Social Fabric." *Journal of Sustainable Development* 1 (1).

Kadembo, Ernest M. 2008b. "Positioning the HIV/AIDS Menace: Challenges for Marketing Communications Led Behavioural Change in Zimbabwe." *Journal of Sustainable Development* 1 (2).

Kahai, Surinder S., and Randolph B. Cooper. 2003. "Exploring the Core Concepts of Media Richness Theory: The Impact of Cue Multiplicity and Feedback Immediacy on Decision Quality." *Journal of Management Information Systems* 20 (1): 263-300.

Kalakota, Ravi, and Marcia Robinson. 2003. *Electronic Commerce: A Managers's Guide*: John Wiley and Sons Ltd.

Kalakota, Ravi, and Andrew B. Whinston. 1997. *Electronic Commerce: A Manager's Guide*. Reading, MA: Addison-Wesley.

Kalitventzeff, Boris, François Maréchal, and Hervé Closon. 2001. "Better Solutions for Process Sustainability through Better Insight in Process Energy Integration." *Applied Thermal Engineering* 21 (13): 1349-1368.

Kamel, Sherif. 2005. "The Use of Information Technology to Transform the Banking Sector in Developing Nations." *Information Technology for Development* 11 (4): 305-312.

Kaplan, Robert S., and David P. Norton. 1996. "Using the Balanced Scorecard as a Strategic Management System." *Harvard Business Review* 74 (1): 75-85.

Kaplan, Robert S., and David P. Norton. 2004. *Strategy Maps: Converting Intangible Assets into Tangible Outcomes*. Boston, Massachusetts, USA: Harvard Business School Press.Karyda, Maria, Evangelia Mitrou, and Gerald Quirchmayr. 2006. "A Framework for Outsourcing IS/IT Security Services." *Information Management & Computer Security* 14 (5): 402-415.

Kettinger, William J., Varun Grover, Subashish Guha, and Albert H. Segars. 1994. "Strategic Information Systems Revisited: A Study in Sustainability and Performance." *MIS Quarterly* 18 (1): 31-58.

Khalifa, Azaddin Salem. 2004. "Customer Value: A Review of Recent Literature and an Integrative Configuration." *Management Decision* 42 (5): 645-666.

Khan, Md. Habib-Uz-Zaman. 2010. "The Effect of Corporate Governance Elements on Corporate Social Responsibility (CSR) Reporting: Empirical Evidence from Private Commercial Banks of Bangladesh." *International Journal of Law and Management* 52 (2): 82-109.

Khan, Md. Habib-Uz-Zaman, Abdel K. Halabi, and Martin Samy. 2009. "Corporate Social Responsibility (CSR) Reporting: A Study of Selected Banking Companies in Bangladesh." *Social Responsibility Journal* 5 (3): 344-357.

Khan, Md. Habib-Uz-Zaman, Muhammad Azizul Islam, Johra Kayeser Fatima, and Khadem Ahmed. 2011. "Corporate Sustainability Reporting of Major Commercial Banks in Line with GRI: Bangladesh Evidence." *Social Responsibility Journal* 7 (3): 347-362.

Kim, Sangmook. 2011. "Testing a Revised Measure of Public Service Motivation: Reflective Versus Formative Specification." *Journal of Public Administration Research and Theory* 21 (3): 521-546.

King, Bob. 1989. *Better Designs in Half the Time: Implementing QFD Quality Function Deployment in America*: GOAL/QPC Methuen, MA.

King, Nigel (ed.). 1994. *The Qualitative Research Interview*. Edited by C. Cassell and G. Symon, *Qualitative Methods in Organizational Research: A Practical Guide*. London, UK: SAGE.

Kitchenham, Barbara A., and Shari Lawrence Pfleeger. 2002. "Principles of Survey Research: Part 3: Constructing a Survey Instrument." *ACM SIGSOFT Software Engineering Notes* 27 (2): 20-24.

Klassen, Robert D., and D. Clay Whybark. 1999. "The Impact of Environmental Technologies on Manufacturing Performance." *The Academy of Management Journal* 42 (6): 599-615.

Kleindorfer, Paul R., Kalyan Singhal, and Luk N. Wassenhove. 2005. "Sustainable Operations Management." *Production and Operations Management* 14 (4): 482-492.

Kohli, Rajiv, and Varun Grover. 2008. "Business Value of IT: An Essay on Expanding Research Directions to Keep up with the Times." *Journal of the Association for Information Systems* 9 (1).

Köksal, Gülser, and Alpay Eğitman. 1998. "Planning and Design of Industrial Engineering Education Quality." *Computers & Industrial Engineering* 35 (3-4): 639-642.

Konar, Shameek, and Mark A. Cohen. 2001. "Does the Market Value Environmental Performance?" *Review of Economics and Statistics* 83 (2): 281-289.

Konings, Jozef, and Filip Roodhooft. 2002. "The Effect of E-Business on Corporate Performance: Firm Level Evidence for Belgium." *De Economist* 150 (5): 569-581.

Kontic, Ljiljana, and Jovan Kontic. 2012. "Sustainability and Readiness for Change: Insights from a Banking Case Study in Serbia." *Amfiteatru Economic (Economic Interferences)* 14 (32): 537-548.

Kotler, Philip, and Gary Armstrong. 2004. *Principles of Marketing*. Vol. 10. Englewood Cliffs, NJ: Prentice-Hall.

Kotler, P., and N. Lee. 2005. *Corporate Social Responsibility: Doing the Most Good for Your Company and Your Cause*. Hoboken, NJ, USA: John Wiley & Sons, Inc.Krauss, S. E. 2005. "Research Paradigms and Meaning Making: A Primer." *The Qualitative Report* 10 (4): 758.

Krosnick, Jon A. 1999. "Survey Research." *Annual review of Psychology* 50 (1): 537-567.

Kuhndt, Michael, Justus von Geibler, V. Türk, S. Moll, K. O. Schallaböck, and S. Steger. 2003. *"Virtual Dematerialisation: Ebusiness and Factor X."* Final Report to the European Commission. Wuppertal Institute. Wuppertal, Germany.

Kulatilaka, Nalin, and N. Venkatraman. 2001. "Strategic Options in the Digital Era." *Business Strategy Review* 12 (4): 7-15.

Kuo, Tsai-Chi, Hsin-Hung Wu, and Jiunn-I. Shieh. 2009. "Integration of Environmental Considerations in Quality Function Deployment by Using Fuzzy Logic." *Expert Systems with Applications* 36 (3, Part 2): 7148-7156.

Kwan, Simon, and Robert Eisenbeis. 1997. "Bank Risk, Capitalization and Operating Inefficiency." *Journal of Financial Services Research 12(2-3)*: 117-131.

Kwong, C. K., and H. Bai. 2002. "A Fuzzy AHP Approach to the Determination of Importance Weights of Customer Requirements in Quality Function Deployment." *Journal of Intelligent Manufacturing* 13 (5): 367-377.

Labuschagne, Carin, Alan C. Brent, and Ron P. G. van Erck. 2005. "Assessing the Sustainability Performances of Industries." *Journal of Cleaner Production* 13 (4): 373-385.

Laisuzzaman, Ijaj Md., Nahid Imran, Abdullah Al Nahid, Md. Ziaul, and Md. Alim. 2010. "The Framework for Implementing Ecommerce: The Role of Bank and Telecom in Bangladesh." *Journal of Telecommunications* 1 (1): 57-62.

Lam, Kokin, and Xiande Zhao. 1998. "An Application of Quality Function Deployment to Improve the Quality of Teaching." *The International Journal of Quality & Reliability Management* 15 (4): 389-413.

Lee, S. G., S. W. Lye, and M. K. Khoo. 2001. "A Multi-Objective Methodology for Evaluating Product End-of-Life Options and Disassembly." *The International Journal of Advanced Manufacturing Technology* 18 (2): 148-156.

Leisinger, Klaus M. 2005. "The Corporate Social Responsibility of the Pharmaceutical Industry: Idealism without Illusion and Realism without Resignation." *Business Ethics Quarterly*: 577-594.

Lems, S., H. J. van der Kooi, and Jakob de Swaan Arons. 2003. "Quantifying Technological Aspects of Process Sustainability: A Thermodynamic Approach." *Clean Technologies and Environmental Policy* 5 (3-4): 248-253.

Lepoutre, Jan, and Aimé Heene. 2006. "Investigating the Impact of Firm Size on Small Business Social Responsibility: A Critical Review." *Journal of Business Ethics* 67 (3): 257-273.

Levesque, Terrence, and Gordon H. G. McDougall. 1996. "Determinants of Customer Satisfaction in Retail Banking." *International Journal of Bank Marketing* 14 (7): 12-20.

Lewis, Bruce R., Gary F. Templeton, and Terry Anthony Byrd. 2005. "A Methodology for Construct Development in MIS Research." *European Journal of Information Systems* 14 (4): 388-400.

Li, Jizi, Ling Yuan, and Jun Guo. 2009. "Business Integrated Architecture for Dynamic Supply Chain Management with Web Service" *New Trends in Information and Service Science, 2009. NISS'09. International Conference on*: IEEE.

Liao, Ziqi, and Michael Tow Cheung. 2002. "Internet-Based E-Banking and Consumer Attitudes: An Empirical Study." *Information & Management* 39 (4): 283-295.

Lin, YuanHsu, Hui-Ping Cheng, Ming-Lang Tseng, and Jim C. C. Tsai. 2010. "Using QFD and ANP to Analyze the Environmental Production Requirements in Linguistic Preferences." *Expert Systems with Applications* 37 (3): 2186-2196.

Liozu, Stephan M., Andreas Hinterhuber, Richard Boland, and Sheri Perelli. 2012. "The Conceptualization of Value-Based Pricing in Industrial Firms." *Journal of Revenue & Pricing Management* 11 (1): 12-34.

Little, Todd D., Ulman Lindenberger, and John R. Nesselroade. 1999. "On Selecting Indicators for Multivariate Measurement and Modeling with Latent Variables: When" Good" Indicators Are Bad and "Bad" Indicators Are Good." *Psychological Methods* 4 (2): 192.

Lo, Shih-Fang, and Her-Jiun Sheu. 2007. "Is Corporate Sustainability a Value-Increasing Strategy for Business?" *Corporate Governance: An International Review* 15 (2): 345-358.

Love, Peter E. D., and Zahir Irani. 2004. "An Exploratory Study of Information Technology Evaluation and Benefits Management Practices of SMEs in the Construction Industry." *Information & Management* 42 (1): 227-242.

Lovins, A. B., L. H. Lovins, and P. Hawken. 1999. "A Road Map for Natural Capitalism." *Harvard Business Review* 77 (3): 145-158.

Lowell Center for Sustainable Production. 1998. "Sustainable Production: A Working Definition." Informal Meeting of the Committee Members.

Lu, Min Hua, Christian N. Madu, Chu-hua Kuei, and Dena Winokur. 1994. "Integrating QFD, AHP and Benchmarking in Strategic Marketing." *Journal of Business & Industrial Marketing* 9 (1): 41-50.

Luo, Xueming, and Chitra Bhanu Bhattacharya. 2006. "Corporate Social Responsibility, Customer Satisfaction, and Market Value." *Journal of Marketing* 70 (4): 1-18.

Mackenzie, N., and S. Knipe. 2006. "Research Dilemmas: Paradigms, Methods and Methodology." *Issues In Educational Research* 16 (2): 193-205.

Mahmood, M. Adam, Kallol Bagchi, and Timothy C Ford. 2004. "On-Line Shopping Behavior: Cross-Country Empirical Research." *International Journal of Electronic Commerce* 9 (1): 9-30.

Mahmood, M. Adam, and Gary J. Mann. 2000. "Impacts of Information Technology Investment on Organizational Performance." *Journal of Management Information Systems* 16 (4): 3-10.

Malhotra, Bhavya. 2014. "E-Business: Issues & Challenges in Indian Perspective." *Global Journal of Business Management and Information Technology* 4 (1): 11-16.

Martin, Linda R., and Sandra Morgan. 1995. "Middle Managers in Banking: An Investigation of Gender Differences in Behavior, Demographics, and Productivity." *Quarterly Journal of Business and Economics* 34 (1): 55-68.

Masui, Keijiro, Tomohiko Sakao, Mitsuru Kobayashi, and Atsushi Inaba. 2003. "Applying Quality Function Deployment to Environmentally Conscious Design." *International Journal of Quality & Reliability Management* 20 (1): 90-106.

Maugis, Vincent, Nazli Choucri, Stuart E. Madnick, Michael D. Siegel, Sharon E. Gillett, Farnaz Haghseta, Zhu Hongwei, and Michael L. Best. 2005. "Global E-Readiness – for What? Readiness for E-Banking." *Information Technology for Development* 11 (4): 313-342.

Maxwell, Dorothy, and Rita Van der Vorst. 2003. "Developing Sustainable Products and Services." *Journal of Cleaner Production* 11 (8): 883-895.

Mazur, Glenn. 2003. "Voice of the Customer (Define): QFD to Define Value ." In *Proceedings of the 57th American Quality Congress*, Kansas City.

McDonald, Lynette M., and Chia Hung Lai. 2011. "Impact of Corporate Social Responsibility Initiatives on Taiwanese Banking Customers." *International Journal of Bank Marketing* 29 (1): 50-63.

McDonald, Lynette M., and Sharyn Rundle-Thiele. 2008. "Corporate Social Responsibility and Bank Customer Satisfaction: A Research Agenda." *International Journal of Bank Marketing* 26 (3): 170-182.

McDonough, William, and Michael Braungart. 2002. "Design for the Triple Top Line: New Tools for Sustainable Commerce." *Corporate Environmental Strategy* 9 (3): 251-258.

Meade, Adam W., Aaron M. Watson, and Christina M. Kroustalis. 2007. "Assessing Common Methods Bias in Organizational Research" *22nd Annual Meeting of the Society for Industrial and Organizational Psychology,* New York.

Mehrjerdi, Yahia Zare. 2010. "Applications and Extensions of Quality Function Deployment." *Assembly Automation* 30 (4): 388-403.

Melville, Nigel P. 2010. "Information Systems Innovation for Environmental Sustainability." *MIS Quarterly* 34 (1): 1-21.

Melville, Nigel, Kenneth Kraemer, and Vijay Gurbaxani. 2004. "Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value." *MIS Quarterly* 28 (2): 283-322.

Mertens, Donna M. 2005. *Research Methods in Education and Psychology: Integrating Diversity with Quantitative and Qualitative Approaches*. 2nd ed. Thousand Oaks: SAGE.

Mia, Mohammad Abdul Hannan, Mohammad Anisur Rahman, and Nitai Chandra Debnath. 2007. "Consumer Behavior of Online Banking in Bangladesh." *Journal of Business Studies, Faculty of Business Studies, University of Dhaka* 28 (2): 168-178.

Mia, Md. Abdul Hannan, Mohammad Anisur Rahman, and Md. Main Uddin. 2007. "E-Banking: Evolution, Status and Prospects." *The Cost and Management* 35 (1): 36-48.

Michalisin, Michael D., Robert D. Smith, and Douglas M. Kline. 1997. "In Search of Strategic Assets." *International Journal of Organizational Analysis* 5 (4): 360-387.

Mihelis, G., E. Grigoroudis, Y. Siskos, Y. Politis, and Y. Malandrakis. 2001. "Customer Satisfaction Measurement in the Private Bank Sector." *European Journal of Operational Research* 130 (2): 347-360.

Min, Hokey, and Gengui Zhou. 2002. "Supply Chain Modeling: Past, Present and Future." *Computers & Industrial Engineering* 43 (1): 231-249.

Mingers, John. 2001. "Combining IS Research Methods: Towards a Pluralist Methodology." *Information Systems Research* 12 (3): 240-259.

———. 2003. "The Paucity of Multimethod Research: A Review of the Information Systems Literature." *Information Systems Journal* 13 (3): 233-249.

Molina, Arturo, David Martín-Consuegra, and Águeda Esteban. 2007. "Relational Benefits and Customer Satisfaction in Retail Banking." *International Journal of Bank Marketing* 25 (4): 253-271.

Molla, Alem. 2009. "Organizational Motivations for Green IT: Exploring Green IT Matrix and Motivation Models" *PACIS*.

Möller, Andreas, and Stefan Schaltegger. 2005. "The Sustainability Balanced Scorecard as a Framework for Eco-Efficiency Analysis." *Journal of Industrial Ecology* 9 (4): 73-83.

Montgomery, Stuart A., and Marie Asberg. 1979. "A New Depression Scale Designed to Be Sensitive to Change." *The British Journal of Psychiatry* 134 (4): 382-389.

Mooney, John G., Vijay Gurbaxani, and Kenneth L. Kraemer. 1996. "A Process Oriented Framework for Assessing the Business Value of Information Technology." *ACM SIGMIS Database* 27 (2): 68-81.

Movassaghi, Hormoz, and Alka Bramhandkar. 2012. "Sustainability Strategies of Leading Global Firms and Their Financial Performance: A Comparative Case Based Analysis." *Journal of Applied Business & Economics* 13 (5).

Mukherjee, Kampan. 2011. "House of Sustainability (HOS): An Innovative Approach to Achieve Sustainability in the Indian Coal Sector." In *Handbook of Corporate Sustainability: Frameworks, Strategies and Tools*, eds. M. A. Quaddus and M. A. B. Siddique, 57-76. Massachusetts, USA: Edward Elgar.

Munoz, A. A., and P. Sheng. 1995. "An Analytical Approach for Determining the Environmental Impact of Machining Processes." *Journal of Materials Processing Technology* 53 (3-4): 736-758.

Murphy, Doina Olaru Jamie, and Charles F. Hofacker. 2009. "Rigor in Tourism Research: Formative and Reflective Constructs." *Annals of Tourism Research* 36 (4): 730-734.

Mustamil, Norizah Mohd. 2010. "The Influence of Culture and Ethical Ideology on Ethical Decision Making Process of Malaysian Managers." PhD thesis, Graduate School of Business, Curtin University of Technology, Perth.

Myers, Michael D. 1997. "Qualitative Research in Information Systems." *Management Information Systems Quarterly* 21: 241-242.

Nagle, Thomas T., and Reed K. Holden. 1995. *The Strategy and Tactics of Pricing*. Vol. 29: Prentice-Hall Englewood Cliffs, NJ.

Nakao, Yuriko, Akihiro Amano, Kanichiro Matsumura, Kiminori Genba, and Makiko Nakano. 2007. "Relationship between Environmental Performance and Financial Performance: An Empirical Analysis of Japanese Corporations." *Business Strategy and the Environment* 16 (2): 106-118.

Nasrullah, Nakib Muhammad, and Mia Mahmudur Rahim. 2014. "CSR in Private Enterprises in Developing Countries : Evidences from the Ready-Made Garments Industry in Bangladesh." In *CSR, Sustainability, Ethics & Governance*, eds. Samuel O. Idowu and René Schmidpeter. Heidelberg: Springer.

Nath, Ravi, Paul Schrick, and Monica Parzinger. 2001. "Bankers' Perspectives on Internet Banking." *e-Service Journal* 1 (1): 21-36.

Nelson, J. 1998. "Leadership Companies in the 21st Century: Creating Shareholder Value and Societal Value." *Visions of Ethical Business* 1: 21-26.

Netseva-Porcheva, Tatyana. 2011. "Value-Based Pricing: A Success Factor in the Competitive Struggle." *Marketing* 42 (4): 227-236.

Neuman, W. Lawrence. 2010. *Social Research Methods Qualitative and Quantitative Approaches*. 7th ed: Pearson.

Newbert, Scott L. 2007. "Empirical Research on the Resource-Based View of the Firm: An Assessment and Suggestions for Future Research." *Strategic Management Journal* 28 (2): 121-146.

Nikolaou, I., K. Evangelinos, Danasis Emmanouil, and Walter Leal. 2012. "Voluntary Versus Mandatory EMS Implementation: Management Awareness in EMS-Certified Firms." *Asia-Pacific Journal of Management Research and Innovation* 8 (1): 1-12.

Norman, Wayne, and Chris MacDonald. 2004. "Getting to the Bottom of "Triple Bottom Line"." *Business Ethics Quarterly*: 243-262.

Nunnally, J. C. , and I. H. Bernstein. 1994. *Psychometric Theory*. 3rd ed. New York: McGraw-Hill.

Nussbaum, Alexander Sascha K. 2009. "Ethical Corporate Social Responsibility (CSR) and the Pharmaceutical Industry: A Happy Couple?" *Journal of Medical Marketing: Device, Diagnostic and Pharmaceutical Marketing* 9 (1): 67-76.

O'Leary, Zina. 2004. *The Essential Guide to Doing Research*. London: Sage.

Onwuegbuzie, Anthony J., and Nancy L. Leech. 2007. "A Call for Qualitative Power Analyses." *Quality & Quantity* 41 (1): 105-121.

Opitz, Nicky, Henning Krup, and Lutz M. Kolbe. 2014. "Green Business Process Management – a Definition and Research Framework" *System Sciences (HICSS), 2014 47th Hawaii International Conference on*: IEEE.

Orlikowski, Wanda J., and Jack J. Baroudi. 1991. "Studying Information Technology in Organizations: Research Approaches and Assumptions." *Information Systems Research* 2 (1): 1-28.

Osterwalder, Alexander, Sarra Ben Lagha, and Yves Pigneur. 2002. "An Ontology for Developing E-Business Models" *Decision Making and Decision Support in the Internet Age* (*DSIage) 2002*.

Osterwalder, Alexander, and Yves Pigneur. 2003. "Modelling Value Propositions in E-Business" *The proceedings of the Fifth International Conference on Electronic Commerce (ICEC)*, Pittsburgh, PA.

Paige, Hilliard W. 1963. "How PERT-Cost Helps the General Manager." *Harvard Business Review* 41 (6): 87-95.

Panayiotou, Nikolaos A., Konstantin G. Aravossis, and Peggy Moschou. 2009. "A New Methodology Approach for Measuring Corporate Social Responsibility Performance." *Water, Air, & Soil Pollution: Focus* 9 (1-2): 129-138.

Papakiriakopoulos, D., A. Poulymenakou, and G. Doukidis. 2001. "Building E-Business Models: An Analytical Framework and Development Guidelines" *The Proceedings of 14th Bled Electronic Commerce Conference*, Bled, Slovenia.

Parasuraman, A., V. A. Zeithaml, and L. L. Berry. 1988. "SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality." *Journal of Retailing* 64 (1): 12-40.

Parasuraman, Ananthanarayanan, Valarie A. Zeithaml, and Arvind Malhotra. 2005. "E-S-QUAL: a Multiple-Item Scale for Assessing Electronic Service Quality." *Journal of Service Research* 7 (3): 213-233.

Park, Taeho, and Kwang-Jae Kim. 1998. "Determination of an Optimal Set of Design Requirements Using House of Quality." *Journal of Operations Management* 16 (5): 569-581. doi: 10.1016/s0272-6963(97)00029-6.

Patton, Michael Quinn. 2005. "Qualitative Research." In *Encyclopedia of Statistics in Behavioral Science*. John Wiley & Sons, Ltd.

Pedhazur, E. J., and L. P. Schmelkin. 1991. *Measurement, Design, and Analysis: An Integrated Approach*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Perrini, Francesco, and Antonio Tencati. 2006. "Sustainability and Stakeholder Management: The Need for New Corporate Performance Evaluation and Reporting Systems." *Business Strategy and the Environment* 15 (5): 296-308.

Peterson, Robin T., and Charles M. Hermans. 2004. "The Communication of Social Responsibility by US Banks." *International Journal of Bank Marketing* 22 (3): 199-211.

Petter, Stacie, Detmar Straub, and Arun Rai. 2007. "Specifying Formative Constructs in Information Systems Research." *MIS Quarterly* 31 (4): 623-656.

Philips, M., P. Sander, and C. Govers. 1994. "Policy Formulation by Use of QFD Techniques: A Case Study." *International Journal of Quality & Reliability Management* 11 (5): 46-58.

Piotrowicz, Wojciech, and Richard Cuthbertson. 2009. "Sustainability – a New Dimension in Information Systems Evaluation." *Journal of Enterprise Information Management* 22 (5): 492-503.

Podsakoff, Philip M., Scott B. MacKenzie, Lee Jeong-Yeon, and Nathan P. Podsakoff. 2003. "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies." *Journal of Applied Psychology* 88 (5): 879.

Poduska, Richard, Richard Forbes, and Maria Bober. 1992. "The Challenge of Sustainable Development." *Columbia Journal of World Business* 27 (3-4): 286-291.

Poon, Wai-Ching, and Christina Kwai-Choi Lee. 2012. "E-Service Quality: An Empirical Investigation." *Journal of Asia-Pacific Business* 13 (3): 229-262.

Pope, Jenny, David Annandale, and Angus Morrison-Saunders. 2004. "Conceptualising Sustainability Assessment." *Environmental Impact Assessment Review* 24 (6): 595-616.

Porter, Michael E. 1980. *Competitive Strategy: Techniques for Analysing Industries and Competitors*. New York: The Free Press.

———. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press.

Porter, Michael E., and Mark R. Kramer. 2006. "Strategy and Society." *Harvard Business Review* 84 (12): 78-92.

———. 2011. "The Big Idea: Creating Shared Value." *Harvard Business Review* 89 (1-2): 62-77.

Powell, Thomas. 1992. "Strategic Planning as Competitive Advantage." *Strategic Management Journal* 13 (7): 551-558.

Preston, Lee E., and Douglas P. O'Bannon. 1997. "The Corporate Social-Financial Performance Relationship." *Business and Society* 36 (4): 419-429.

Priem, Richard L., and John E. Butler. 2001. "Is the Resource-Based "View" a Useful Perspective for Strategic Management Research?" *Academy of Management Review* 26 (1): 22-40.

Pullman, Madeleine E., Michael J. Maloni, and Craig R. Carter. 2009. "Food for Thought: Social Versus Environmental Sustainability Practices and Performance Outcomes." *Journal of Supply Chain Management* 45 (4): 38-54.

Quaddus, Mohammed, and Glenn Hofmeyer. 2006. "Factors Influencing the Adoption of B2B Trading Exchanges in Small Businesses in Western Australia: A Field Study Approach" *PACIS*.

Quaddus, Mohammed, and Jun Xu. 2005. "Adoption and Diffusion of Knowledge Management Systems: Field Studies of Factors and Variables." *Knowledge-Based Systems* 18 (2): 107-115.

Radhakrishnan, Abirami, Xingxing Zu, and Varun Grover. 2008. "A Process-Oriented Perspective on Differential Business Value Creation by Information Technology: An Empirical Investigation." *Omega* 36 (6): 1105-1125.

Rai, Arun, Ravi Patnayakuni, and Nainika Seth. 2006. "Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities." *MIS Quarterly* 30 (2): 225-246.

Rao, Sally. 2004. "Building Inter-Firm Relationships Online: Perspectives from the Australian Internet Banking Industry." *International Journal of Internet Marketing and Advertising* 1 (4): 371-387.

Raven, Peter V., Xiaoqing Huang, and Ben B. Kim. 2007. "E-Business in Developing Countries: A Comparison of China and India." *International Journal of E-Business Research (IJEBR)* 3 (1): 91-108.

Rawstorne, Patrick, Rohan Jayasuriya, and Peter Caputi. 2000. "Issues in Predicting and Explaining Usage Behaviors with the Technology Acceptance Model and the Theory of Planned Behavior When Usage Is Mandatory" *Proceedings of the Twenty-first International Conference on Information Systems*: Association for Information Systems.

Reich, Robert B. 1998. "The New Meaning of Corporate Social Responsibility." *California Management Review* 40 (2).

Reilly, W. 1992. "Environment, Inc." *Business Horizons* 35 (2): 9-11.

Rigdon, Edward E. (ed.). 1998. *Structural Equation Modeling*. Edited by G. Marcoulides, *Modern Methods for Business Research*. Mahwah, NJ: Lawrence Erlbaum Associates.

Ringle, Christian Marc, Sven Wende, and Alexander Will. 2005. "Smartpls 2.0 (Beta)." http://www.smartpls.de

Riyadh, Al Nahian, Nayeema Islam, and Imranul Hoque. 2009. "Electronic Finance in Developing Countries: The Implementation and Development of Electronic Finance Systems in Bangladesh." *Journal of Business Studies* 30 (1).

Robeiro, Francisco Loforte, and Peter E. D. Love. 2003. "Value Creation through an E-Business Strategy: Implication for SMEs in Construction." *Construction Innovation: Information, Process, Management* 3 (1): 3-14.

Roberts, Nicholas, and Jason Thatcher. 2009. "Conceptualizing and Testing Formative Constructs: Tutorial and Annotated Example." *ACM SIGMIS Database* 40 (3): 9-39.

Roberts, R. W. 1992. "Determinants of Corporate Social Responsibility Disclosure: An Application of Stakeholder Theory." *Accounting, Organisations and Society* 17 (6): 595-612.

Roca, Laurence Clément, and Cory Searcy. 2012. "An Analysis of Indicators Disclosed in Corporate Sustainability Reports." *Journal of Cleaner Production* 20 (1): 103-118.

Rodríguez-Pinto, Javier, Ana Isabel Rodríguez-Escudero, and Jesús Gutiérrez-Cillán. 2008. "Order, Positioning, Scope and Outcomes of Market Entry." *Industrial Marketing Management* 37 (2): 154-166.

Roome, Nigel. 1994. "Business Strategy, R&D Management and Environmental Imperatives." *R&D Management* 24 (1): 065-082.

Roper, Kathy O., and Jeffrey L. Beard. 2006. "Justifying Sustainable Buildings – Championing Green Operations." *Journal of Corporate Real Estate* 8 (2): 91-103.

Rossiter, John R. 2002. "The C-OAR-SE Procedure for Scale Development in Marketing." *International Journal of Research in Marketing* 19 (4): 305-335.

Rowley, Timothy J. 1997. "Moving Beyond Dyadic Ties: A Network Theory of Stakeholder Influences." *Academy of Management Review* 22 (4): 887-910.

Rubin, Herbert J., and Irene S. Rubin. 2011. *Qualitative Interviewing: The Art of Hearing Data*. 3rd ed. USA: Sage.

Ruf, Bernadette M., Krishnamurty Muralidhar, Robert M. Brown, Jay J. Janney, and Karen Paul. 2001. "An Empirical Investigation of the Relationship between Change in Corporate Social Performance and Financial Performance: A Stakeholder Theory Perspective." *Journal of Business Ethics* 32 (2): 143-156.

Rumelt, R.. (ed.). 1984. *Towards a Strategic Theory of the Firm*. Edited by R. Lamb, *Competitive Strategic Management*. Englewood Cliffs, NJ: Prentice-Hall.

Russo, Michael V., and Paul A. Fouts. 1997. "A Resource-Based Perspective on Corporate Environmental Performance and Profitability." *Academy of Management Journal* 40 (3): 534-559.

Saaty, Thomas L. 1977. "A Scaling Method for Priorities in Hierarchical Structures." *Journal of Mathematical Psychology* 15 (3): 234-281.

———. 1980. *The Analytic Hierarchy Process*. New York: McGraw-Hill

———. 2008. "Decision Making with the Analytic Hierarchy Process." *International Journal of Services Sciences* 1 (1): 83-98. .

Saha, Prakash. 2013. *Developing Green Banking Products in Bangladesh: Involvement of Stakeholders: Reviewing the Stakeholder's Influence in Banking Sector of Bangladesh*: GRIN Verlag.

Sahota, Amarjit. 2013. "Future Outlook." *Sustainability: How the Cosmetics Industry is Greening Up*: 301.

Sakalauskas, Virgilijus, Dalia Kriksciuniene, Ferenc Kiss, and Attila Horváth. 2009. "Factors for Sustainable Development of E-Banking in Lithuania and Hungary" *5th International Vilnius Conference "Knowledge-Based Technologies and OR Methodologies for Strategic Decisions of Sustainable Development"*, Vilnius, Lithuania.

Sakao, T., K. Watanabe, and Y. Shimomura. 2003. "A Method to Support Environmentally Conscious Service Design Using Quality Function Deployment (QFD)" *3rd International Symposium on Environmentally Conscious Design and Inverse Manufacturing, 2003. Tokyo, December 8-11*.

Salkin, Harvey M. 1975. *Integer Programming*: Addison-Wesley Reading, MA.

Santosa, Paulus Insap, Kwok Kee Wei, and Hock Chuan Chan. 2005. "User Involvement and User Satisfaction with Information-Seeking Activity." *European Journal of Information Systems* 14 (4): 361-370.

Sarkar, Abdul Awwal. 2000. "Regulation of Islamic Banking in Bangladesh: Role of Bangladesh Bank." *International Journal of Islamic Financial Services* 2 (1): 67.

Sarkar, Runa. 2008. "Public Policy and Corporate Environmental Behaviour: A Broader View." *Corporate Social Responsibility and Environmental Management* 15 (5): 281-297.

Schaefer, Anja, and Andrew Crane. 2005. "Addressing Sustainability and Consumption." *Journal of Macromarketing* 25 (1): 76-92.

Schaltegger, S. , and R. L. Burritt. 2000. *Contemporary Environmental Accounting: Issues, Concepts and Practice (Special Issue)*. Sheffield: Greenleaf Publishing.

Schaltegger, Stefan, Florian Ludeke-Freund, and Erik G Hansen. 2012. "Business Cases for Sustainability: The Role of Business Model Innovation for Corporate Sustainability." *International Journal of Innovation and Sustainable Development* 6 (2): 95-119.

Schaltegger, Stefan, Sarah Elena Windolph, and Christian Herzig. 2012. "A Longitudinal Analysis of the Knowledge and Application of Sustainability Management Tools in Large German Companies." *Society and Economy* 34 (4): 549-579.

Schechter, Len. 1984. "A Normative Conception of Value." *Progressive Grocer Executive Report*: 12-14.

Schmidt, N.-H., Koray Erek, Lutz M. Kolbe, and Rüdiger Zarnekow. 2009. "Towards a Procedural Model for Sustainable Information Systems Management" *System Sciences, 2009. HICSS'09. 42nd Hawaii International Conference on*: IEEE.

Schmidt, Ralf. 1997. "The Implementation of Simultaneous Engineering in the Stage of Product Concept Development: A Process Orientated Improvement of Quality Function Deployment." *European Journal of Operational Research* 100 (2): 293-314.

Schneider, Jennifer L., Anna Wilson, and Joseph M. Rosenbeck. 2010. "Pharmaceutical Companies and Sustainability: An Analysis of Corporate Reporting." *Benchmarking: An International Journal* 17 (3): 421-434.

Schoeffler, Sidney. 1983. "The PIMS Program." *The Strategic Management Handbook*: 23.1-23.10.

Schwandt, Thomas A. (ed.). 1994. *Constructivist, Interpretivist Approaches to Human Inquiry*. Edited by N. K. Denzin and Y. S. Lincoln, *Handbook of Qualitative Research*. USA: Sage Publications, Inc.

Setthasakko, W. 2009. "Barriers to Implementing Corporate Environmental Responsibility in Thailand: A Qualitative Approach." *International Journal of Organizational Analysis (2005)* 17 (3): 169.

Seuring, Stefan, Joseph Sarkis, Martin Müller, and Purba Rao. 2008. "Sustainability and Supply Chain Management – an Introduction to the Special Issue." *Journal of Cleaner Production* 16 (15): 1545-1551.

Shamsuddoha, Mohammad. 2008. "Electronic Banking in Bangladesh." *Journal of Business Solutions* 1 (2): 2008.

Shani, David, and Sujana Chalasani. 1992. "Exploiting Niches Using Relationship Marketing." *Journal of Consumer Marketing* 9 (3): 33-42.

Shiralkar, Parag, and Bindiganavale S. Vijayaraman. 2003. "Digital Signature: Application Development Trends in E-Business." *Journal of Electronic Commerce Research* 4 (3): 94-101.

Shook, Christopher L., David J. Ketchen, G. Tomas M. Hult, and K. Michele Kacmar. 2004. "An Assessment of the Use of Structural Equation Modeling in Strategic Management Research." *Strategic Management Journal* 25 (4): 397-404.

Shrivastava, Paul. 1995. "The Role of Corporations in Achieving Ecological Sustainability." *The Academy of Management Review* 20 (4): 936-960.

Siegel, S. 1956. "The Mann–Whitney U Test." *Nonparametric Statistics for the Behavioral Sciences*: 116-127.

Siltaoja, MarjoElisa. 2006. "Value Priorities as Combining Core Factors between CSR and Reputation – a Qualitative Study." *Journal of Business Ethics* 68 (1): 91-111.

Simpson, W. Gary, and Theodor Kohers. 2002. "The Link between Corporate Social and Financial Performance: Evidence from the Banking Industry." *Journal of Business Ethics* 35 (2): 97-109.

Sin, Leo Y. M., C. B. Alan, and Frederick H. K. Yim. 2005. "CRM: Conceptualization and Scale Development." *European Journal of Marketing* 39 (11/12): 1264-1290.

Singhapakdi, Anusorn, Somboom Salyachivin, Busaya Virakul, and Vinich Veerayangkur. 2000. "Some Important Factors Underlying Ethical Decision Making of Managers in Thailand." *Journal of Business Ethics* 27 (3): 271-284.

Slaper, Timothy F., and Tanya J. Hall. 2011. "The Triple Bottom Line: What Is It and How Does It Work?" *Indiana Business Review* 86 (1): 4-8.

Smith, Alan D. 2008. "Corporate Social Responsibility Practices in the Pharmaceutical Industry." *Business Strategy Series* 9 (6): 306-315.

Smith, John K. 1983. "Quantitative Versus Qualitative Research: An Attempt to Clarify the Issue." *Educational Researcher* 12 (3): 6-13.

Snider, Jamie, Ronald Paul Hill, and Diane Martin. 2003. "Corporate Social Responsibility in the 21st Century: A View from the World's Most Successful Firms." *Journal of Business Ethics* 48 (2): 175-187.

Sobhani, Farid Ahammad, Azlan Amran, and Yuserrie Zainuddin. 2009. "Revisiting the Practices of Corporate Social and Environmental Disclosure in Bangladesh." *Corporate Social Responsibility and Environmental Management* 16 (3): 167-183.

———. 2012. "Sustainability Disclosure in Annual Reports and Websites: A Study of the Banking Industry in Bangladesh." *Journal of Cleaner Production* 23 (1): 75-85.

Sorsa, Ville-Pekka. 2008. "How to Explain Socially Responsible Corporate Actions Institutionally: Theoretical and Methodological Critique." *Electronic Journal of Business Ethics and Organization Studies* 13 (1).

Stahel, W. R. 1996. "Conditions of Demand and Supply with Dematerialization as a Key Strategy." *AFR-Report 136* Stockholm.

Stake, R. E. (ed.). 2000. *Case Studies*. Edited by N. K. Denzin and Y. S. Lincoln, *Handbook of Qualitative Research*. CA: Thousand Oaks.

Stanwick, Peter A., and Sarah D. Stanwick. 1998. "The Relationship between Corporate Social Performance, and Organizational Size, Financial Performance, and Environmental Performance: An Empirical Examination." *Journal of Business Ethics* 17 (2): 195-204.

Starik, Mark, and Patricia Kanashiro. 2013. "Toward a Theory of Sustainability Management: Uncovering and Integrating the Nearly Obvious." *Organization & Environment* 26 (1): 7-30.

Stephens, Carolyn, and Chris Skinner. 2013. "Banks for a Better Planet? The Challenge of Sustainable Social and Environmental Development and the Emerging Response of the Banking Sector." *Environmental Development* 5 (Complete): 175-179.

Stoddard, James E., Carol E. Pollard, and Michael R. Evans. 2012. "The Triple Bottom Line: A Framework for Sustainable Tourism Development." *International Journal of Hospitality & Tourism Administration* 13 (3): 233-258.

Stratton, B. 1989. "The Refined Focus of Automotive Quality." *Quality Progress* 22 (10): 47-50.

Stubbs, Wendy, and Chris Cocklin. 2008. "Conceptualizing a "Sustainability Business Model"." *Organization & Environment* 21 (2): 103-127.

Sullivan, L. P. 1986. "Quality Function Deployment." *Quality Progress* (June): 39-50.

Sweeney, Julian C., Geoffrey N. Soutar, and Lester W. Johnson. 1999. "The Role of Perceived Risk in the Quality–Value Relationship: A Study in a Retail Environment." *Journal of Retailing* 75 (1): 77-105.

Ta, Huu Phuong, and Kar Yin Har. 2000. "A Study of Bank Selection Decisions in Singapore Using the Analytical Hierarchy Process." *International Journal of Bank Marketing* 18 (4): 170-180.

Taha, Hamdy A. 1992. *Operations Research: An Introduction*. Fifth edn. New York: MacMillan Publishing Company.

Tallon, Paul P. 2007. "A Process-Oriented Perspective on the Alignment of Information Technology and Business Strategy." *Journal of Management Information Systems* 24 (3): 227-268.

Tanzil, Dicksen, and Beth R. Beloff. 2006. "Assessing Impacts: Overview on Sustainability Indicators and Metrics." *Environmental Quality Management* 15 (4): 41-56.

Tashakkori, Abbas, and Charles Teddlie. 1998. *Mixed Methodology: Combining Qualitative and Quantitative Approaches*. Vol. 46. Thousand Oaks: SAGE Publications.

———. 2003. *Handbook of Mixed Methods in Social and Behavioral Research*. Thousand Oaks, California: SAGE Publications.

Teddlie, Charles, and Abbas Tashakkori. 2012. "Common "Core" Characteristics of Mixed Methods Research a Review of Critical Issues and Call for Greater Convergence." *American Behavioral Scientist* 56 (6): 774-788.

Teece, D. J. 2010. "Business Models, Business Strategy and Innovation." *Long Range Planning* 43 (2-3): 172.

Tenenhaus, Michel, Vincenzo Esposito Vinzi, Yves-Marie Chatelin, and Carlo Lauro. 2005. "PLS Path Modeling." *Computational Statistics & Data Analysis* 48 (1): 159-205.

Teo, Hock-Hai, Kwok Kee Wei, and Izak Benbasat. 2003. "Predicting Intention to Adopt Interorganizational Linkages: An Institutional Perspective." *MIS Quarterly*: 19-49.

Titko, Jelena, and Natalja Lace. 2010. "Performance Measures for a Business Unit in Latvian Retail Banking" *6th International Scientific Conference, Business and Management*.

Tugnoli, Alessandro, Francesco Santarelli, and Valerio Cozzani. 2008. "An Approach to Quantitative Sustainability Assessment in the Early Stages of Process Design." *Environmental Science & Technology* 42 (12): 4555-4562.

Turban, Daniel B., and Daniel W. Greening. 1997. "Corporate Social Performance and Organizational Attractiveness to Prospective Employees." *The Academy of Management Journal* 40 (3): 658-672.

Tyteca, Daniel. 1998. "Sustainability Indicators at the Firm Level." *Journal of Industrial Ecology* 2 (4): 61-77.

Uddin, Mohammed Belal, Md. Riad Hassan, and Kazi Md. Tarique. 2008. "Three Dimensional Aspects of Corporate Social Responsibility." *Daffodil International University Journal of Business and Economics* 3 (1): 199-212.

Ullman, Jodie B., and Peter M. Bentler. 2012. "Structural Equation Modeling." In *Handbook of Psychology, Second Edition*. John Wiley & Sons, Inc.

United Nations Environment Programme (UNEP). 2011. "United Nations Environment Programme Finance Initiative." In *Guide to Banking and Sustainability*, Geneva, Switzerland.

Van Gorder, B. E. 1990. "Satisfying the Customer of the '90s'." *Credit* 16 (2): 10-15.

Van Leeuw, François, and Ilse Scheerlinck. 2011. "What Shapes Companies' Corporate Sustainability? Belgian Pharma Businesses' Views on Global Sustainable Development." *International Business & Economics Research Journal (IBER)* 2 (12): 65-78.

Vanclay, Frank. 2004. "Impact Assessment and the Triple Bottom Line: Competing Pathways to Sustainability?" *Sustainability and Social Science Round Table Proceedings*: 27-39.

Vasileiou, K., and J. Morris. 2006. "The Sustainability of the Supply Chain for Fresh Potatoes in Britain." *Supply Chain Management: An International Journal* 11 (4): 317-327.

Veleva, Vesela, and Michael Ellenbecker. 2000. "A Proposal for Measuring Business Sustainability." *Greener Management International* 2000 (31): 101-120.

———. 2001. "Indicators of Sustainable Production: Framework and Methodology." *Journal of Cleaner Production* 9 (6): 519-549. doi: 10.1016/s0959-6526(01)00010-5.

Veleva, Vesela, Maureen Hart, Tim Greiner, and Cathy Crumbley. 2003. "Indicators for Measuring Environmental Sustainability: A Case Study of the Pharmaceutical Industry." *Benchmarking: An International Journal* 10 (2): 107-119.

Venkatesh, Viswanath, Michael G. Morris, Gordon B. Davis, and Fred D. Davis. 2003. "User Acceptance of Information Technology: Toward a Unified View." *MIS Quarterly* 27 (3).

Vinodh, S., and Suresh Kumar Chintha. 2011. "Application of Fuzzy QFD for Enabling Sustainability." *International Journal of Sustainable Engineering* 4 (4): 313-322. doi: 10.1080/19397038.2010.536853.

Vives, Antonio. 2006. "Social and Environmental Responsibility in Small and Medium Enterprises in Latin America." *Journal of Corporate Citizenship* 2006 (21): 39-50.

Waage, Sissel, Rajesh Shah, and Sahra Girshick. 2003. "Information Technology and Sustainability: Enabling the Future." *International Journal of Corporate Sustainability* 10 (4): 81-96.

Waddock, Sandra A., Charles Bodwell, and Samuel B. Graves. 2002. "Responsibility: The New Business Imperative." *The Academy of Management Executive* 16 (2): 132-148.

Walsh, S., and D. Diamond. 1995. "Non-Linear Curve Fitting Using Microsoft Excel Solver." *Talanta* 42 (4): 561-572.

Wang, H., M. Xie, and T. N. Goh. 1998. "A Comparative Study of the Prioritization Matrix Method and the Analytic Hierarchy Process Technique in Quality Function Deployment." *Total Quality Management* 9 (6): 421-430. doi: 10.1080/0954412988361.

Wang, Hsiao-Fan, and Wei-Kuo Hong. 2007. "An Integrated Service Strategy by QFD Approach: A Case of a Telecom Company in Taiwan." *International Journal of Management and Decision Making* 8 (2-4/2007): 251-267.

Wang, Yonggui, Hing-P. Lo, and Yer V. Hui. 2003. "The Antecedents of Service Quality and Product Quality and Their Influences on Bank Reputation: Evidence from the Banking Industry in China." *Managing Service Quality* 13 (1): 72-83.

Warkentin, Merrill, Allen C. Johnston, and Jordan Shropshire. 2011. "The Influence of the Informal Social Learning Environment on Information Privacy Policy Compliance Efficacy and Intention." *European Journal of Information Systems* 20 (3): 267-284.

Wasserman, G. S. 1993. "On How to Prioritize Design Requirements During the QFD Planning Process." *IIE Transactions* 25 (3): 59.

Wati, Yulia, and Chulmo Koo. 2011. "An Introduction to the Green IT Balanced Scorecard as a Strategic IT Management System" *System Sciences (HICSS), 2011 44th Hawaii International Conference on*: IEEE.

Watjatrakul, Boonlert. 2005. "Determinants of IS Sourcing Decisions: A Comparative Study of Transaction Cost Theory Versus the Resource-Based View." *The Journal of Strategic Information Systems* 14 (4): 389-415.

Watson, Richard T., Marie-Claude Boudreau, and Adela J. Chen. 2010. "Information Systems and Environmentally Sustainable Development: Energy Informatics and New Directions for the IS Community." *MIS Quarterly* 34 (1): 23-38.

Weill, Peter, and H. Olson Margrethe. 1989. "Managing Investment in Information Technology: Mini Case Examples and Implications." *MIS Quarterly* 13 (1): 3-17.

Weinzimmer, Laurence G., Edward U. Bond III, Mark B. Houston, and Paul C. Nystrom. 2003. "Relating Marketing Expertise on the Top Management Team and Strategic Market Aggressiveness to Financial Performance and Shareholder Value." *Journal of Strategic Marketing* 11 (2): 133-159.

Wernerfelt, B. 1984. "A Resource-Based View of the Firm." *Strategic Management Journal* 5: 171-180.

Weske, Mathias. 2012. *Business Process Management: Concepts, Languages, Architectures*. 2nd edn. Heidelberg, Germany Springer.

Wheeler, David, Barry Colbert, and R. Edward Freeman. 2003. "Focusing on Value: Reconciling Corporate Social Responsibility, Sustainability and a Stakeholder Approach in a Network World." *Journal of General Management* 28 (3): 1-29.

Wilkinson, Sue. 2000. "Women with Breast Cancer Talking Causes: Comparing Content, Biographical and Discursive Analyses." *Feminism & Psychology* 10 (4): 431-460.

Wilson, Diane D. 1993. "Assessing the Impact of Information Technology on Organizational Performance" *Strategic Information Technology Management*: IGI Global.

Woodruff, Robert B. 1997. "Customer Value: The Next Source for Competitive Advantage." *Journal of the Academy of Marketing Science* 25 (2): 139-153.

World Commission on Environment and Development (WCED). 1987. *Our Common Future – World Commission on Environment and Development*. Oxford: Oxford University Press.

Xie, M., T. N. Goh, and H. Wang. 1998. "A Study of the Sensitivity of ''Customer Voice'' in QFD Analysis." *International Journal of Industrial Engineering* 5 (4): 301-307.

Xu, Jun, and Mohammed Quaddus. 2005. "Exploring the Perceptions of Knowledge Management Systems." *Journal of Management Development* 24 (4): 320-334.

Yang, Jiaqin, Mike Whitefield, and Katja Boehme. 2007. "New Issues and Challenges Facing E-Banking in Rural Areas: An Empirical Study." *International Journal of Electronic Finance* 1 (3): 336-354.

Yang, Zhilin, and Minjoon Jun. 2002. "Consumer Perception of E-Service Quality: From Internet Purchaser and Non-Purchaser Perspectives." *Journal of Business Strategies* 19 (1).

Yi, Lan, and Hywel R. Thomas. 2006. "E-Business and Sustainable Development." *International Journal of Environment and Sustainable Development* 5 (3): 262-274.

———. 2007. "A Review of Research on the Environmental Impact of E-Business and ICT." *Environment International* 33 (6): 841-849.

Yin, Robert K. 1994. *Case Study Research: Design and Methods*. 2nd edn. CA: Thousand Oaks, Sage.

Yin, Robert. K. 2003. *Case Study Research: Design and Methods*. 3rd edn. Thousand Oaks: CA: Sage.

Yoo, Youngjin, and Maryam Alavi. 2001. "Media and Group Cohesion: Relative Influences on Social Presence, Task Participation, and Group Consensus." *MIS Quarterly* 25 (3): 371-390.

Yousafzai, Shumaila Y., John G. Pallister, and Gordon R. Foxall. 2003. "A Proposed Model of E-Trust for Electronic Banking." *Technovation* 23 (11): 847-860.

Zairi, Mohamed, and John Peters. 2002. "The Impact of Social Responsibility on Business Performance." *Managerial Auditing Journal* 17 (4): 174-178.

Zeithaml, Valarie A. 1988. "Consumer Perceptions of Price, Quality, and Value: A Means–End Model and Synthesis of Evidence." *The Journal of Marketing* 52 (3): 2-22.

Zeithaml, Valarie A., and Leonard L. Berry. 1993. "The Nature and Determinants of Customer Expectations of Service." *Journal of the Academy of Marketing Science* 21 (1): 1-12.

Zeithaml, Valarie A., Leonard L. Berry, and Ananthanarayanan Parasuraman. 1996. "The Behavioral Consequences of Service Quality." *Journal of Marketing*: 31-46.

Zeithaml, Valarie A., L. L. Berry, and A. Parasuraman. 1991. "Understanding Customer Expectations of Service." *Sloan Management Review* 32 (3): 42.

Zeithaml, Valarie A., Arun Parasuraman, and Arvind Malhotra. 2002. "Service Quality Delivery through Web Sites: A Critical Review of Extant Knowledge." *Journal of the Academy of Marketing Science* 30 (4): 362-375.

Zhang, Y., H. P. Wang, and C. Zhang. 1998. "Product Concept Evaluation Using GQFD-U and AHP." *International Joumal of Environmentally Conscious Design & Manufacturing* 7 (3): 1-15.

Zhou, Zhangyu, Siwei Cheng, and Ben Hua. 2000. "Supply Chain Optimization of Continuous Process Industries with Sustainability Considerations." *Computers & Chemical Engineering* 24 (2-7): 1151-1158.

Zhu, Kevin, and Kenneth L. Kraemer. 2002. "E-Commerce Metrics for Net-Enhanced Organizations: Assessing the Value of E-Commerce to Firm Performance in the Manufacturing Sector." *Information Systems Research* 13 (3): 275-295.

———. 2005. "Post-Adoption Variations in Usage and Value of E-Business by Organizations: Cross-Country Evidence from the Retail Industry." *Information Systems Research* 16 (1): 61-84.

Zikmund, William G., Barry J. Babin, John C. Carr, and Mitch Griffin. 2013. *Business Research Methods*. Ninth edn. Ohio, USA: South-Western.

LIST OF APPENDICES

Appendix A: Questionnaire for qualitative field study

Participant's detail:

a) Name: .....
b) Age: .....
c) Gender: .....
d) Profession: .....
e) Position/ designation: .....
f) Customer/Employee since: .....
g) Types of service and products used/Responsibilities: .....
h) Frequency of service and product used/Department: .....

Interview Questions:

1. Economic value for customer requirements:

Q1. As a customer of this bank, what is your perception or understanding about the economic value for customer provided by the e-business services of this bank?

Q2. What are the economic values that you expect from the e-business services of this bank?

Q3. According to you, of all the economic values deliverable from the e-business services which ones are most important and which ones are least important?

Q4. What do you think are the main barriers in delivering the important economic values to you by the e-business services of this bank?

Q5. How do you think the economic value for customer can be enhanced by the e-business services of this bank?

2. Social value for customer requirements:

Q1. What is your perception or understanding about the social value for customer provided by the e-business services of this bank?

Q2. As a customer of this bank, what are the social values that you expect from the e-business services of this bank?

Q3. According to you, of all the social values deliverable from the e-business services which ones are most important and which ones are least important?

Q4. What do you think are the main barriers in delivering the important social values to you by the e-business services of this bank?

Q5. How do you think the social value for customer can be enhanced by the e-business services of this bank?

3. Environmental value for customer requirements:

Q1. What is your perception or understanding as a customer of this bank about the environmental value for customer provided by the e-business services of this bank?

Q2. What are the environmental values that you expect from the e-business services of this bank?

Q3. According to you, of all the environmental values deliverable from the e-business services which ones are most important and which ones are least important?

Q4. What do you think are the main barriers in delivering the important environmental values to you by the e-business services of this bank?

Q5. How do you think the environmental value for customer can be enhanced by the e-business services of this bank?

4. Economic value for business requirements:

Q1. As one of the key employees of this bank, what is your perception or understanding about the economic value achieved and achievable by the e-business of this bank?

Q2. Based on the strategic goals, what are the economic values that you want to gain from the e-business services of this bank?

Q3. Based on the strategic goals, of all the economic values achievable from the e-business services of this bank which ones are most important and which ones are least important?

Q4. What do you think are the main barriers in achieving the important economic values by the e-business of this bank?

Q5. How do you think the economic value of this business can be enhanced by the e-business services?

5. Social value for business requirements:

Q1. As one of the key employees of this bank, what is your perception or understanding about the social value delivered and deliverable by the e-business of this bank?

Q2. Based on the strategic goals, what are the social values that you want to provide to the society from the e-business services of your bank?

Q3. According to you, of all the social values deliverable from the e-business services of this bank which ones are most important and which ones are least important?

Q4. What do you think are the main barriers in delivering the important social values by the e-business of this bank?

Q5. How do you think the social value delivery can be enhanced by the e-business services of your bank?

6. Environmental value for business requirements:

Q1. As one of the key employees of this organisation, what is your perception or understanding about the environmental value delivered and deliverable by the e-business services of this bank?

Q2. Based on the strategic goals, what are the environmental values that the bank aims to deliver from the e-business services?

Q3. According to you, of all the environmental values deliverable by this bank from the e-business services, which ones are most important and which ones are least important?

Q4. What do you think are the main barriers in delivering the important environmental values by the e-business services of this bank?

Q5. How do you think the environmental value delivery can be enhanced by your e-business service?

7. Economic value for process requirements:

Q1. As a one of the managers of this bank, what is your perception or understanding about the economic value achieved and achievable by the e-business process of this bank?

Q2. Based on the strategic goals, what are the economic values that you want to achieve from the e-business process of this bank?

Q3. Based on the strategic goals, of all the economic values achievable from the e-business process of this bank which ones are most important and which ones are least important?

Q4. What do you think are the main barriers in achieving the important economic values by the e-business process of this bank?

Q5. How do you think the economic value can be enhanced by the e-business process of this bank?

8. Social value for process requirements:

Q1. As one of the key employees of this bank, what is your perception or understanding about the social value delivered and deliverable by the e-business process of this bank?

Q2. Based on the strategic goals, what are the social values that you want to deliver to the society from the e-business process of your bank?

Q3. According to you, of all the social values achievable from the e-business process of this bank, which ones are most important and which ones are least important?

Q4. What do you think are the main barriers in delivering the important social values by the e-business process of this bank?

Q5. How do you think the social value delivery can be enhanced by the e-business process of your bank?

9. Environmental value for process requirements:

Q1. As a key employee of this organisation, what is your perception or understanding about the environmental value delivered and deliverable by the e-business process of this bank?

Q2. Based on the strategic goals, what are the environmental values that this bank want to deliver by the e-business process?

Q3. According to you, of all the environmental values achievable from the e-business process of this bank which ones are most important and which ones are least important?

Q4. What do you think are the main barriers in delivering the important environmental values by the e-business process of this bank?

Q5. How do you think the environmental value delivery can be enhanced by the e-business process of your bank?

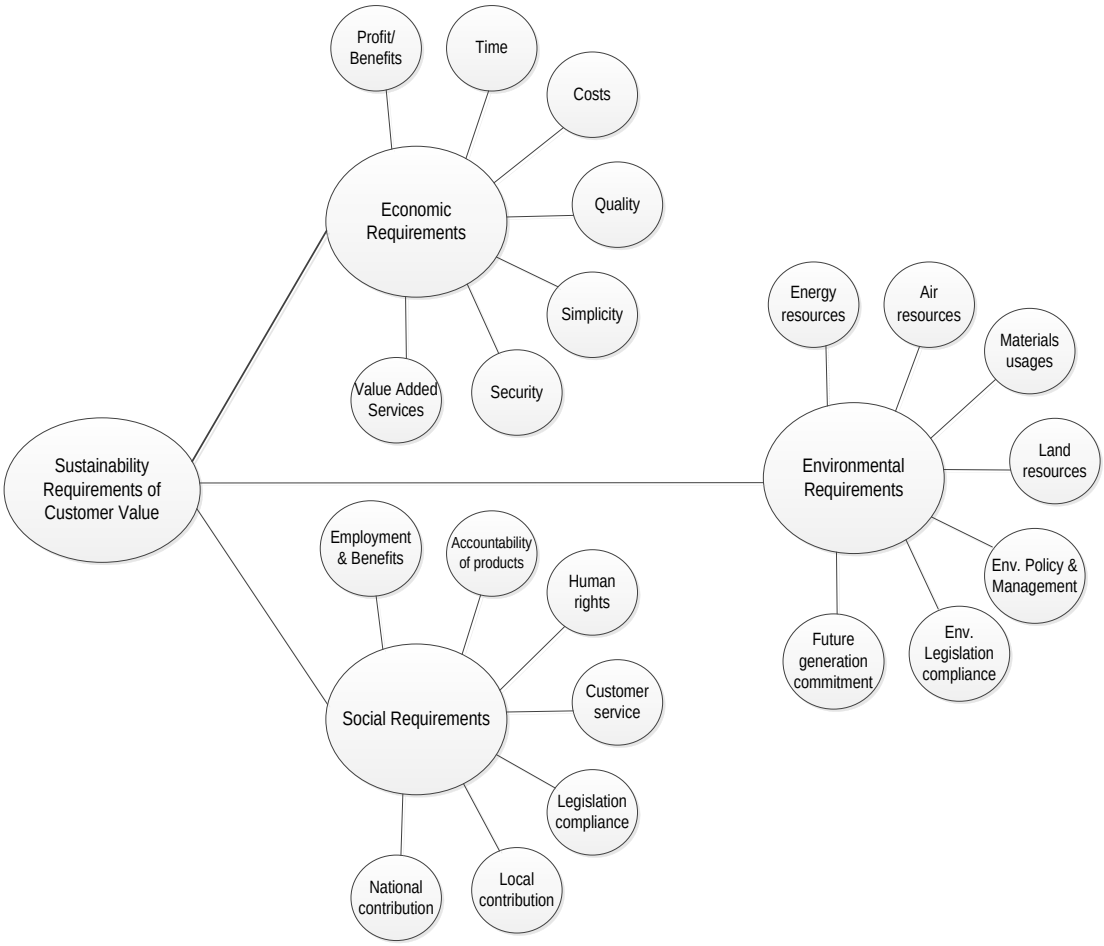


Figure 5.2: Sustainability requirements of customer value

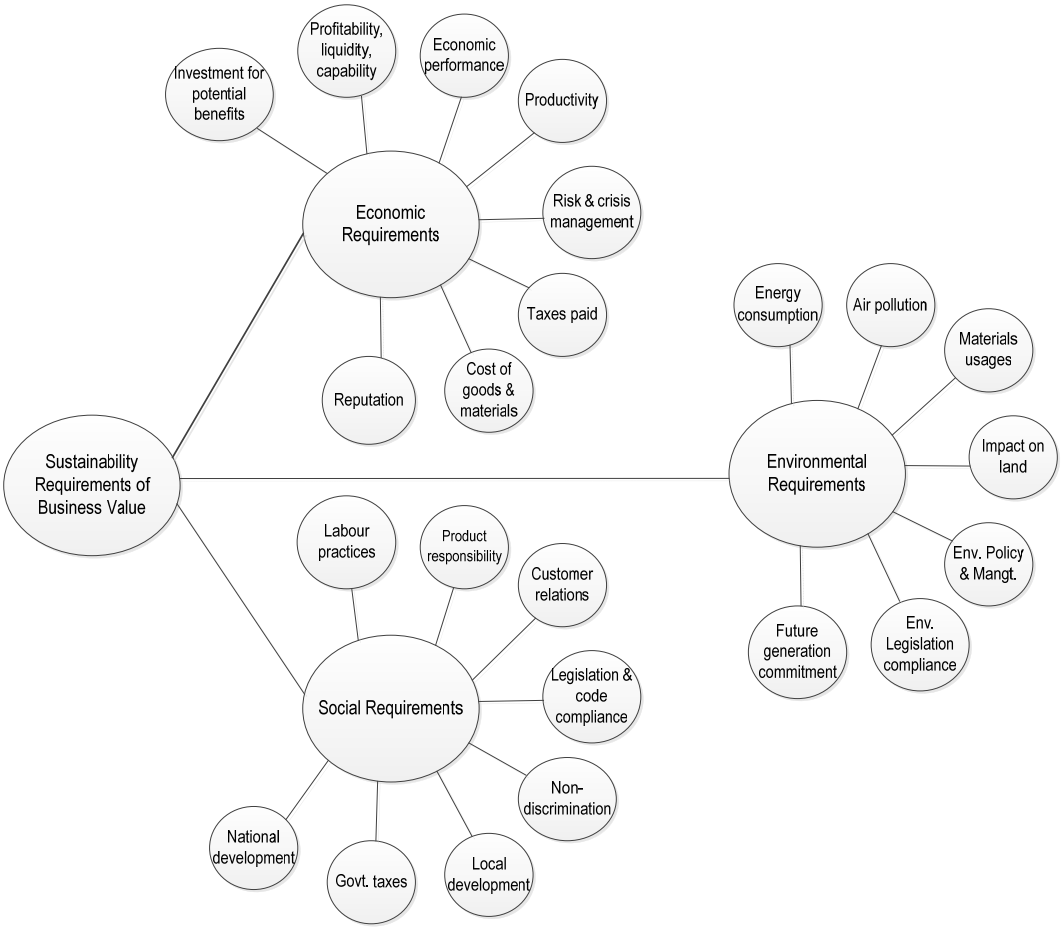


Figure 5.3: Sustainability requirements of business value

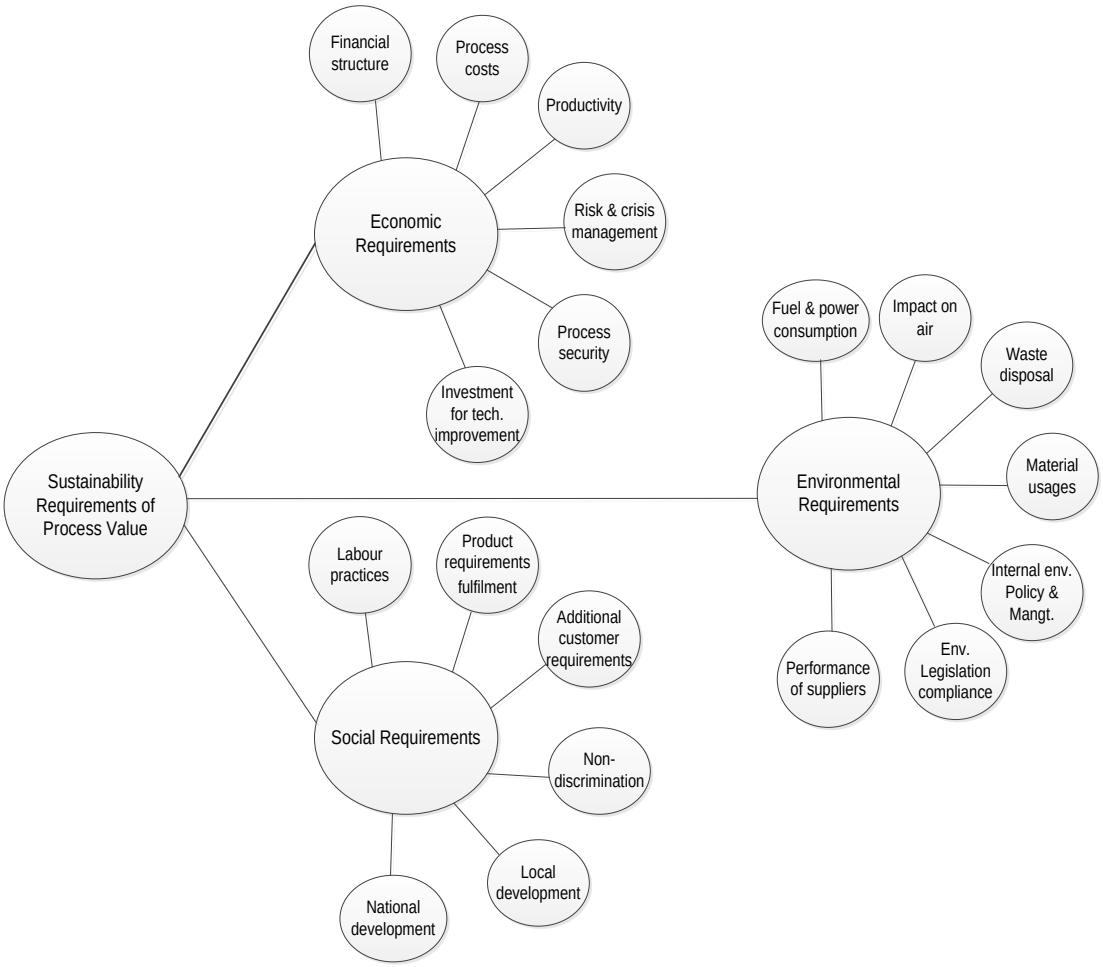


Figure 5.4: Sustainability requirements of process value

Appendix C: Templates for pairwise comparison

1 = Equal importance
2 = Weak or Slight
3 = Moderate importance
4 = Moderate Plus
5 = Strong importance
6 = Strong Plus
7 = Very strong importance
8 = Very very strong importance
9 = Extreme importance

Blended Value:

	Customer Value	Business Value	Process Value
Customer Value			
Business Value			

Customer Value:

	Economic Value of Customer	Social Value of Customer	Environmental Value of Customer
Economic Value of Customer			
Social Value of Customer			

Business Value:

	Economic Value of Business	Social Value of Business	Environmental Value of Business
Economic Value of Business			
Social Value of Business			

Process Value:

	Economic Value of Process	Social Value of Process	Environmental Value of Process
Economic Value of Process			
Social Value of Process			

Economic Value of Customer:

	Total Time to get the Services	Service Costs	Profit/ Benefits from the Services	Quality of the Services	Security of the Services	Simplicity of the Services(complexity)	Potential Value Added Services
Total Time to get the Services							
Service Costs							
Profit/ Benefits from the Services							
Quality of the Services							
Security of the Services							
Simplicity of the Services (complexity)							

Social Value of Customer:

	Employment & Benefits	Customer Service Excellence	Accountability of Products & Services	Legislation & Code of Conduct Compliance	Human Rights	Contributions to Local Community Development	Contributions to Social Development at National Level
Employment & Benefits							
Customer Service Excellence							
Accountability of Products & Services							
Legislation & Code of Conduct Compliance							
Human Rights							
Contributions to Local Community Development							

Environmental Value of Customer:

	Energy Resources	Air Resources	Land Resources	Usage of Materials	Environmental Policy & Management	Environmental Legislation Compliance	Commitment for Future Generations
Energy Resources							
Air Resources							
Land Resources							
Usage of Materials							
Environmental Policy & Management							
Environmental Legislation Compliance							

Economic Value of Business:

	Profitability, Liquidity, & Investment Capability	Economic Performance (market growth, share performance, ROI)	Cost of Goods, Materials, & Services	Taxes Paid to All Taxing Authorities	Productivity for Cost Efficiency	Risk & Crisis Management	Potential Benefits From Improvement	Reputation of the Organisation
Profitability, Liquidity, & Investment Capability								
Economic Performance (market growth, share performance, ROI)								
Cost of Goods, Materials, & Services								
Taxes Paid to All Taxing Authorities								
Productivity for Cost Efficiency								
Risk & Crisis Management								

Potential Benefits From Improvement								

Social Value of Business:

	Labour Practices & Benefits	Product & Service Responsibility	Legislation & Code of Conduct compliance	Customer Relationship Management	Non-discrimination & Freedom of Association	Government Taxes	Local Community Development	Social Development at National Level
Labour Practices & Benefits								
Product & Service Responsibility								
Legislation & Code of Conduct compliance								
Customer Relationship Management								
Non-discrimination & Freedom of Association								
Government Taxes								
Local Community Development								

Environmental Value of Business:

	Fuel & Power Consumption	Air Pollution	Land Resources	Usage of Materials	Internal Environmental Policy & Management	Environmental Legislation Compliance	Commitment for Future Generations
Fuel & Power Consumption							
Air Pollution							
Land Resources							
Usage of Materials							
Internal Environmental Policy							

& Management							
Environmental Legislation Compliance							

Economic Value of Process:

	Financial Structure (Liquidity, ROI, Investment capability)	Process Costs	Productivity of the Processes	Investments for Potential Benefits (from Technological Improvement)	Process Security	Risk and Crisis Management of the Processes
Financial Structure (Liquidity, ROI, Investment capability)						
Process Costs						
Productivity of the Processes						
Investments for Potential Benefits (from Technological Improvement)						
Process Security						

Social Value of Process:

	Labour Practices & Benefits	Product and Service Requirements	Non-discrimination & Freedom of Association	Meeting Additional Customer Requirements	Local Community Development Enhancement	Social Development Enhancement at National Level
Labour Practices & Benefits						
Product and Service Requirements						
Non-discrimination & Freedom of Association						
Meeting Additional Customer Requirements						
Local Community Development						

Enhancement						

Environmental Value of Process:

	Fuel & Power Consumption	Air Pollution	Waste Disposal & Land Pollution	Usage of Materials	Environmental Legislation Compliance	Internal Environmental Policy & Management	Environmental Performance of Suppliers
Fuel & Power Consumption							
Air Pollution							
Waste Disposal & Land Pollution							
Usage of Materials							
Environmental Legislation Compliance							
Internal Environmental Policy & Management							

Appendix D: Weights of the blended value requirements from AHP analysis

Model Name: Prioritised Value Requirements_Averaged

Synthesised: Summary

Synthesis with respect to: Prioritised Value

Overall Inconsistency = .01

Security of the	.04
Quality of the	.04
Process	.03
Simplicity of the Services	.02
Reputation of the	.02
Risk and Crisis Management of the	.02
Profit/Benefits from the	.02
Profitability, Liquidity and Investment	.02
Economic Performance (share performance, market growth,	.02
Legislation and Code of Conduct compliance	.02
Energy	.02
Total Time to get the	.02
Accountability of Products and	.02
Meeting Additional Customer	.02
Potential Value Added	.01
Customer Service	.01
Productivity of the	.01
Cost of Goods, Materials and	.01
Financial Structure (ROI, Liquidity, Invetsment	.01
Customer Relationship	.01
Air	.01
Product and Service	.01
Risk and Crisis	.01
Investments for Potential Benefits (from	.01
Usage of Materials	.01
Environmental Legislation Compliance	.01
Productivity for Cost	.01
Products and Services	.01
Service	.01
Human	.01
Environmental Policy and Management	.01
Environmental Legislation Compliance	.01
Commitment for Future Generations	.01
Legislation and Code of Conduct Compliance	.01
Fuel and Power Consumption	.01
Environmental Legislation Compliance	.01
Contributions to Social Development at National	.01
Process	.01
Investments for Potential Benefits (from Technological	.01
Fuel and Power Consumption	.01
Internal Environmental Policy and Management	.01
Contributions to Local Community	.01
Land Resources	.01
Usage of Materials	.01
Employment and	.01
Usage of Materials	.01

Internal Environmental Policy and	.01
Labor Practices and Benefits	.01
Commitment for Future Generations	.01
Taxes Paid to all Taxing	.00
Non-discrimination and Freedom of	.00
Labour Practices and Benefits	.00
Air Pollution	.00
Waste Disposal and Land	.00
Non-discrimination and Freedom of	.00
Government	.00
Air Pollution	.00
Local Cummunity Development	.00
Social Development Enhancement at National	.00
Local Community	.00
Social Development at National	.00
Land Resources	.00
Environmental Performance of	.00

Dear Survey Respondent,

Thank you for agreeing to complete this questionnaire. Your participation in this research is voluntary. The confidentiality and anonymity of the respondents will be respected and protected. I will ensure and guarantee that none of the respondents that cooperate in the research will be identified or be capable of identification in the writing up of the research for academic publication. Any data presented will be aggregated as I am interested in general trends, not in a particular individual or organisation.

The questionnaire attempts to find out the significant factors that influence the sustainability outcome from the e-business services of the bank. Your assistance in completing this questionnaire would be valuable not only to me but would also make an important contribution to our knowledge about achieving e-business sustainability by the banking industry of Bangladesh. I will value your honest response to the questionnaire and your kind participation is greatly appreciated.

This study has been approved by the Curtin University Human Research Ethics Committee. If needed, verification of approval can be obtained by writing to the Curtin University Human Research Ethics Committee, c/o - Office of Research & Development, Curtin University of Technology, GPO Box U1987, Perth 6845, or telephone +618-92662784. If you would like further information about the study, please feel free to contact me. My contact details are provided below. Alternatively, you can contact my supervisor Professor Mohammed Quaddus on +61 8 92662862 or by e-mail: mohammed.quaddus@gsb.curtin.edu.au

Consent to participate

Your involvement in the research is entirely voluntary. You have the right to withdraw at any stage without it affecting your rights or my responsibilities.

This survey is divided into THREE sections. Please make sure that you have completed ALL the items listed in these sections.

Thank you very much for taking your time and effort to complete this survey.

Yours sincerely,

Mohammed Naim A. Dewan

Ph.D. Candidate

Graduate School of Business
Curtin University, Australia
Tel: +61 8 92661178
Mobile: +61 4 30959076
E-mail: mdewan01@hotmail.com

Blended Value Based Modelling for E-Business Sustainability: The Case of a Commercial Bank in Bangladesh

Section 1: Some information about you and your organisation

Some necessary information about you and your branch will be collected in this section of the questionnaire. The background information will be used for statistical purposes only.

Your name: _____**Gender (M/F):**_____

Your current position: _____ **Name of the branch:** _____

Please tick ☑ the most appropriate answer:

Your age:

☐ 25-30 years ☐ 31 – 35 years ☐ 36 – 40 years ☐ 41 – 45 years
☐ 46 – 50 years ☐ 51 – 55 years ☐ 56 – 60 years ☐ other (please specify) _____

Your highest level of education:

☐ Certificate ☐ Diploma ☐ Bachelor Degree ☐ Master's Degree
☐ Ph.D. ☐ other (please specify) _____

Number of years in the banking industry:

☐ Less than or equal to 5 years ☐ 6 to 10 years ☐ 11 to 15 years ☐ 16 to 20 years
☐ 21 to 25 years ☐ other (please specify) _____

Number of years in this organisation:
 Less than or equal to 5 years 6 to 10 years 11 to 15 years 16 to 20 years
 21 to 25 years other (please specify) _____

Number of employees working in your branch:
Less than or equal to 20 employees 21 – 30 employees 31 – 40 employees
 41 – 50 employees 51 – 60 employees More than 60 employees

Number of years since the branch opened:
 Less than or equal to 5 years 6 to 10 years 11 to 15 years 16 to 20 years
 21 to 25 years other (please specify) _____

Please indicate the level of growth in terms of number of customers:
 Very Poor Poor Somewhat Poor
 Somewhat Satisfactory Satisfactory Very Satisfactory other (please specify) _____

Section 2: Questionnaire about mitigation strategies and their mitigation impacts on blended value requirements

Mitigation Strategies	Blended Value Outcomes	Strongly Disagree	Disagree	mewhat Disagree	omewhat Agree	Agree	Strongly Agree
Investing more on potential value added services will:	-increase the bank's profitability, liquidity, and investment capability	1	2	3	4	5	6
	-increase the bank's economic performance (share performance, market growth, ROI)	1	2	3	4	5	6
	-enhance the financial structure (ROI, Investment capability) of the process	1	2	3	4	5	6
	-increase the bank's potential value added services for the customers	1	2	3	4	5	6
	-increase the potential benefits (market growth, productivity) for the business from overall improvements	1	2	3	4	5	6
	-increase the potential benefits (productivity, capability, security) for the process from - technological improvements	1	2	3	4	5	6
Learning and development of the employee will:	-increase the quality of the services for the customers	1	2	3	4	5	6
	-increase the productivity of the e-banking processes	1	2	3	4	5	6

	-increase the overall productivity of the business for cost efficiency	1	2	3	4	5	6
	-increase the security of the e-banking services for the customers	1	2	3	4	5	6
	-increase the security of the e-business processes	1	2	3	4	5	6
	-reduce the total time for the customers to get e-banking and its related services	1	2	3	4	5	6
Outsourcing high security software and hardware will:	-ensure the security of the services for the customers	1	2	3	4	5	6
	-ensure the security of the e-banking processes	1	2	3	4	5	6
	-improve the quality of the services for the customers	1	2	3	4	5	6
	-increase the productivity of the e-banking processes	1	2	3	4	5	6
	-increase the overall productivity of the business for cost efficiency	1	2	3	4	5	6
Easing the process of service delivery will:	-ensure the quality of the services for the customers	1	2	3	4	5	6
	-ensure the elimination of complexity faced by the customers	1	2	3	4	5	6
	-reduce the total time for the customers to get e-banking and its related services	1	2	3	4	5	6
	-increase the productivity of the e-banking processes	1	2	3	4	5	6
	-increase the overall productivity of the business for cost efficiency	1	2	3	4	5	6
Ensuring efficient availability of service delivery point will:	-ensure the quality of the services for the customers	1	2	3	4	5	6
	-reduce the total time for the customers to get e-banking and its related services	1	2	3	4	5	6
Improving efficiency in supply chain management and use of goods, materials, and services will:	-reduce the cost of goods, material, and services for the bank	1	2	3	4	5	6
	-reduce the process cost	1	2	3	4	5	6
	-reduce the usages of energy resources (power and fuel consumption)	1	2	3	4	5	6
Managing investment efficiently will:	-increase the bank's profitability, liquidity, and investment capability	1	2	3	4	5	6
	-increase the bank's economic performance (share performance, market growth, ROI)	1	2	3	4	5	6
	-reduce the cost of goods, material, and services for the bank	1	2	3	4	5	6
	-reduce the process costs	1	2	3	4	5	6
Ensuring crisis management and early warning signals above industry standard will:	-eliminate the chances of crisis for the e-banking services	1	2	3	4	5	6
	-eliminate the chances of crisis for the e-banking process	1	2	3	4	5	6
	-enhance the quality of the services for the customers	1	2	3	4	5	6
Redesigning of e-banking products will NOT:	-increase the profit and benefits for the customers	1	2	3	4	5	6
	-reduce the e-banking service costs for the customers	1	2	3	4	5	6
Improving efficiency of internal processes will:	-increase the productivity of the e-banking processes	1	2	3	4	5	6
	-increase the overall productivity of the business for cost efficiency	1	2	3	4	5	6
	-reduce the process cost	1	2	3	4	5	6

Establishing CRM unit will:	-improve the quality of the services for the customers	1	2	3	4	5	6
	-increase the fulfilment of additional customer requirements	1	2	3	4	5	6
	-facilitate the customer relationship management for the bank	1	2	3	4	5	6
	-ease the processes to meet the additional customer requirements	1	2	3	4	5	6
	-facilitate the business to maintain products and services responsibilities	1	2	3	4	5	6
	-facilitate the process division to fulfil the products and services requirements	1	2	3	4	5	6
Maintaining privacy of information will:	-enhance the accountability of products and services for the customers	1	2	3	4	5	6
	-facilitate the business to maintain products and services responsibilities	1	2	3	4	5	6
	-facilitate the process division to fulfil the products and services requirements	1	2	3	4	5	6
	-increase the reputation of the bank	1	2	3	4	5	6
Improving vigilance to illegal actions will NOT:	-ensure the legislation and social code of conduct compliance	1	2	3	4	5	6
	-ensure the environmental legislation compliance	1	2	3	4	5	6
	-enhance the environmental policy and management	1	2	3	4	5	6
Increasing CSR activities for national development will:	-increase the reputation of the bank	1	2	3	4	5	6
	-increase the contribution to social development at national level	1	2	3	4	5	6
	-fulfil the environmental commitment for future generations	1	2	3	4	5	6
Ensuring socially responsible action throughout the organisation will:	-protect all the human rights	1	2	3	4	5	6
	-increase the reputation of the bank	1	2	3	4	5	6
	-increase the productivity of the e-banking processes	1	2	3	4	5	6
	-increase the overall productivity of the business for cost efficiency	1	2	3	4	5	6
Establishing green banking cell will:	-minimise the usages of materials	1	2	3	4	5	6
	-minimise the air pollution	1	2	3	4	5	6
	-facilitate the environmental policy and management	1	2	3	4	5	6
	-ensure the environmental legislation compliance	1	2	3	4	5	6
	-minimise the usages of energy resources (power and fuel consumption)	1	2	3	4	5	6
	-increase the reputation of the bank	1	2	3	4	5	6
Increasing environmental CSR activities for future generation will NOT:	-fulfil the environmental commitment for future generations	1	2	3	4	5	6
	-increase the reputation of the bank	1	2	3	4	5	6
Reducing the impact on air by reducing the usages of AC, generator, individual transport will:	-reduce the air pollution by the bank	1	2	3	4	5	6
	-reduce the usages of energy resources (power and fuel consumption)	1	2	3	4	5	6
	-reduce the cost of goods, material, and services for the bank	1	2	3	4	5	6
	-reduce the process cost	1	2	3	4	5	6

Section 3: Capability of the company in relation to MS implementations							
The company:	-has the ability invest enough amount on potential value added services:	1	2	3	4	5	6
	-is able to provide enough learning and development facilities for the employees:	1	2	3	4	5	6
	-has the full capability to outsource the best software and hardware:	1	2	3	4	5	6
	-has the ability to ease the service delivery process easily:	1	2	3	4	5	6
	-has the full capability to ensure efficient availability of service delivery point:	1	2	3	4	5	6
	-has the full capability to improve efficiency in supply chain management and use of goods, materials, and services:	1	2	3	4	5	6
	-is fully capable of managing investment efficiently:	1	2	3	4	5	6
	-has the ability to ensure crisis management and early warning signals above industry standard:	1	2	3	4	5	6
	-has the ability to redesign the e-banking products for the profit and benefits of the customers:	1	2	3	4	5	6
	-has the ability to improve efficiency of internal processes:	1	2	3	4	5	6
	-has the full capability to establish CRM unit:	1	2	3	4	5	6
	-is fully capable of maintaining privacy of information:	1	2	3	4	5	6
	-has the ability to improve vigilance to illegal actions:	1	2	3	4	5	6
	-has the full capability to increase CSR activities for national development:	1	2	3	4	5	6
	-is able to ensure socially responsible action throughout the organisation:	1	2	3	4	5	6
	-has the full capability to establish green banking cell:	1	2	3	4	5	6
	-has the enough capability to increase environmental CSR activities for future generation:	1	2	3	4	5	6
	-is able to reduce the impact on air by reducing the usages of AC, generator, individual transport:	1	2	3	4	5	6