Business Model Innovation for Sustainable Development: Green Technologies and BOP (Bottom of Pyramid) in Emerging Countries: South Africa and India

Doctoral Research Dissertation

In the fulfilment of the requirements for the degree Doctor of Philosophy in Marketing at the Faculty of Commerce, Law and Management, University of the Witwatersrand, Johannesburg, South Africa

Submitted by

Meenakshi Gujral

751810

Under Supervision of

Prof. Richard Chinomona

School of Economic and Business Sciences

Faculty of Commerce, Law and Management

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Abstract

Globally, a vision exists of an economy which produces social, environmental and economic benefits, viz-a-viz three pillars of sustainable development, for all the individuals, communities and society at large. It also focuses on the development of the sustainable use of natural resources, to achieve a greater enviable society, therefore giving rise to the green economy (Bigg 2011). To make businesses sustainable, companies are increasingly focusing on green innovation, sustainable business solutions and re-inventing their business models, and expanding to untapped markets such as the bottom of the pyramid (BOP), consisting of more than four billion potential consumers (Farinelli, Bottini, Akkoyunlu & Aerni, 2011). Most research shows growth opportunities of green products in the bottom of pyramid (Olsen & Boxenbaum, 2009), and has increasingly created deliberations all over the world. Also, companies from both developed and developing countries are becoming increasingly interested in BOP. To successfully target the BOP with 'green' technologies, companies focus their business models on innovation, sustainability and economic profit, instead of gross margins (Prahalad & Hart, 2008). Very limited research evidence is present that links all these concepts together. And therefore, created an interest to examine how integration of green technology bring changes in business model innovation (BMI) for sustainability at BOP markets. The linkage between concepts - BMI, BOP and green technology, to bring sustainable development, has not been sufficiently explored, and especially with focus on emerging economies like South Africa and India. Therefore, the present research has three fold purposes. Firstly, to analyse and understand factors affecting the existing business models of various companies with green technologies targeting BOP markets for sustainable development. Secondly, the research brings an identification and understanding of number of key factors related to BMI, BOP markets and green technologies for sustainable development, and proposes a conceptual framework based on a series of underpinning relationships among these factors. Thirdly, it testifies the conceptualized theoretical framework on green business model innovation for sustainable development for BOP markets, among large companies. The primary objective of research study is to design a right green business model innovation across companies with green technologies for BOP markets. The secondary objective is to identify and compare the differences and similarities of green business model innovation for BOP markets of both South Africa and India. The present research undertakes a sequential exploratory mixed method approach, and is carried out in three phases: Phase 1: Exploration and study of business model innovation of identified industries/sectors with green technologies, targeting BOP segment for

sustainable development, using qualitative research methods to formulate multiple cases. Phase 2: Identification of underpinning factors related to BMI, sustainable development and BOP consumers for green technologies; using qualitative methods and content analysis of results from phase 1, leading to design and development of theoretical framework of green business model innovation for South Africa and India. Phase 3: Testing of conceptualized framework of green business model innovation for sustainable development, using quantitative research methods. The present research tests underpinning factors of emerging green business model innovation for sustainable development, resulting from the qualitative phase, and is used to expand and generalize qualitative findings by using quantitative methods. The findings resulted in linking three theoretical emerging topics in the literature: business model innovation (BMI), green technology for sustainability and BOP. Four cases are developed through 33 face-to-face in-depth interviews with company top executives, using multiple case study approach. Each case comprised of sustainable business model innovation, representing comparison between South Africa and India, across four industries, namely, Energy, Banking, FMCG/Durable sectors and Cloud Computing. Qualitative content analysis and findings resulted in formation of themes and sub-themes and proposed prepositions, depicting the relationship between BMI, BOP, and green technology for sustainability. These prepositions aided in development of conceptual framework and proposed nine hypotheses. The conceptual model is quantitatively surveyed on 206 employees of large companies with focus on BOP markets. The quantitative findings supported all nine hypotheses. Therefore, indicating that integration of green technology is associated with performance of green product/service innovation and green process innovation in a company. Likewise, business model innovation variables; customer interface, infrastructure management and financial aspects, positively impacts sustainability of business model. The contribution of this thesis is in the development of green business model innovation for sustainable development, with focus on BOP markets. This adds to the contextual knowledge and empirical literature on business model innovation, green technologies and BOP markets. Theoretically, it brings better understanding of these concepts, and provides a basis of further research highlighting the importance of innovation while taking account of green economy and BOP. The findings provide marketing practitioners with better understanding of strategies that can be employed to innovate and change their own business models to incorporate green and sustainable initiative for BOP markets.

Keywords: Business model innovation (BMI), Bottom of Pyramid (BOP), Green technology, Sustainable development.

Declaration

I, Meenakshi Gujral, declare that this research report is my own unaided work, except where due recognition has been given. It is submitted in the fulfilment of the requirements for the degree of Doctor of Philosophy in Marketing at the University of Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any other degree or examination in this or any other university.

Meenakshi Gujral

12th June' 2017

Johannesburg

Dedicated to my soulmate, best friend and husband, Tarun Gujral

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List of Abbreviations

BM	Business Model
BMI	Business Model Innovation
BOP	Bottom of Pyramid
CI	Customer Interface
FA	Financial Aspects
SBM	Sustainability of Business Model
GT	Green Technology
GP/S	Green Products/Services
GP	Green Processes
H	Hypothesis
IM	Infrastructure Management

CHAPTER 1: INTRODUCTION

1.1 Introduction

For recent years, a novel concept of the Bottom of Pyramid has increasingly created deliberations all over the world. Also, MNCs from the developed countries are becoming increasingly interested in the bottom of the pyramid (BOP) which is an untapped market consisting of more than four billion potential customers (Prahalad, 2006). Given the growing population and income, companies are starting to reassess BOP consumers as a serious business preposition, and are trying to come up with business models and innovations, based on local needs and risks and thereby balancing between social responsibility and business expansion. BOP market is not only an opportunity for MNCs but also a challenge which may hold substantial learning, alleviation of poverty and innovation for MNCs. All above, is not only resulting in large companies unearthing potential among BOP markets, but also giving birth to number of entrepreneurs and emerging small firms for sustainable development. Due to reasons of 4 A's (affordability, acceptability, availability and awareness), MNCs must develop new approaches to target BOP markets, approaches that are different from the traditional developed country markets of MNCs (Prahalad, 2012). The BOP markets and consumers in countries are heterogeneous in terms of needs and contexts such as regional, environment, cultural variations, behavioural aspects, income level, psychological and demographic differences exist within such BOP markets. Therefore, locally customized BOP strategies are recommended to address specific needs and overcome challenges at a local level.

Green technology and innovation may be key to reducing costs and increasing the efficiency of BOP strategies and thus contributing to the scalability of such initiatives, however expensive cost of trading with green technology and its commercialization cannot be ignored. Several large companies are initiators in providing sustainable green technologies at BOP, including generation of renewable energy, wireless information technology, eco-water purification, biofuels, etc. in recent years, number of large companies like Unilever, Procter & Gamble, Tetrapack, Vodafone and so forth., have provided evidence that MNCs can realize profitable business activities in an economical feasible way (Schuster & Holtbrügge, 2012). Efforts have been made by these businesses in practice to target largely untapped market opportunities in the developing world, by integrating business models with sustainability (Olsen & Boxenbaum,

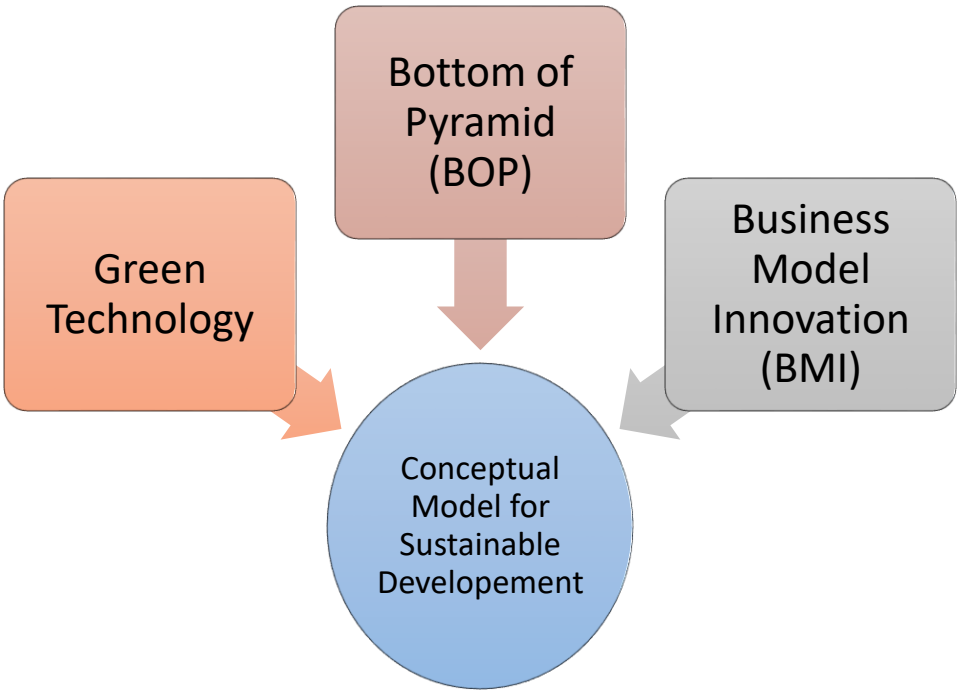
2009). All these initiatives demand to bring new developments and new ways of doing businesses in companies that target bottom of pyramid markets for sustainable development. Hence, when large firms aim to enter low-income markets, through sustainability initiatives, they cannot rely on their existing knowledge (Schuster, & Holtbrügge, 2012) and traditional business models, but must find new and innovative solutions, and in that process re-inventing their existing business model innovation of sustainability, with surge to open markets at bottom of pyramid (Casadesus-Masanell & Ricart, 2010).

Sustainable development strongly links environmental and socio-economic issues (Hopwood, Mellor & O'Brien 2005). Prahalad & Hart (2004), mentions the need for sustainable technologies (including green technologies) in sustainably accessing and serving the BOP.

Technology and innovation is considered as most important regarding sustainability of business model (Boons & Ludeke-Freund, 2013). Particularly, integration of green technology for sustainable development has drawn much attention of practitioners in recent years. Companies are increasingly focusing on innovation of green technologies (Bisgaard, Henriksen, & Bjerre, 2012), to meet sustainable development goals and to reduce environmental risks for future generations. Technologies with more environmentally friendly and cleaner production methods promotes economic growth and thereby leading to green economy (Bobonea & Joia, 2012).

The present research thesis investigates and conceptualize green business model innovation for sustainable development at BOP markets. It particularly links the three concepts – business model innovation, bottom of pyramid and green technology, to achieve sustainable development, and originates a conceptual model depicting the relationship between above concepts. (Refer figure 1.1)

Figure 1.1 Concepts linked in research



This thesis discusses the integration of green technology in the form of green products/services or process, impacting the performance of main pillars of business model innovation, as well as, influences the sustainability of business model.

The present thesis is structured into the following way – chapter-2 discusses the context of research, followed by chapter-3 providing a review of literature. Chapter-4 discusses the research methodology and research design, chapter-5 presents four case-studies developed after qualitative analysis, followed by chapter-6 analysis the qualitative data and presents prepositions and conceptual framework. Chapter-7 analysis the quantitative data and test the proposed conceptual framework, and finally chapter-8 discusses and provides concluding remarks.

1.2 Research gaps and Problem statement

Until recently there has not been much research conducted on investing in BOP, which is the largest and poorest socioeconomic group, for sustainable development. However, there is much

literature that shows the importance of investing in the poor for this reason. Teece (2010) recognises the lack of the business model concept within economics or business study topics. Chesbrough (2010) suggests that companies may have extensive investments and processes for exploring new technologies, however they often lack the ability to innovate their business models to facilitate the new technologies. Teece (2010) and Chesbrough and Rosenbloom (2002) finds a crucial link between business models and technological innovation. Prahalad and Hart (2008) suggest the crucial link between technological innovation and the bottom of the pyramid. However, there is very limited research that links these concepts together.

Very limited research evidence is present in literature on link between concepts of green technologies and business model innovation (Bisgaard, Henriksen, & Bjerre, 2012). Infact, there is no internationally acknowledged definition of green business model innovation, especially addressing integration of green innovation in form of green products, or services and green processes.

Also, when targeting the Bottom of the Pyramid, especially with 'green' technologies, the same business model cannot be used as customer-base shifting to BOP. If companies are willing to change their business models, the BOP can be a highly profitable market, as profits are driven by volume and capital efficiency and although margins are low, unit sales can be extremely high. Therefore, to successfully target the BOP with 'green' technologies, companies must focus their business models on innovation, sustainability and economic profit, instead of gross margins (Prahalad & Hart, 2008).

Moreover, these linkage of above concepts – BMI, BOP and green technology, has not been sufficiently explored with focus on emerging economies like South Africa and India, for sustainable development. Therefore, the problem statement addressed by current research is linkage of theoretically existing concepts, i.e. BMI, BOP and green technology for sustainable development with focus on emerging economies – South Africa and India.

1.3 Purpose and justification of the study

The present research has three-fold purposes. Firstly, to analyse and understand factors affecting the existing business models of various organizations with green technologies targeting BOP markets for sustainable development. Secondly, the research will bring an identification and understanding of number of key factors related to BMI and BOP consumers

for green technologies and proposes a framework based on a series of underpinning relationships among these factors. Thirdly, it testifies the conceptualized theoretical framework on green business model innovation for sustainable development for BOP markets, among large companies.

There is no common source of information on business model innovation, which restricts researchers and practitioners to gain an overview of the scope of business model innovation for sustainability, and particularly with integration of green technology (Bocken, Short, Rana & Evans, 2014). Various terms have been used in past research, ranging from 'clean technology' companies, companies producing resource efficient products, to service-oriented companies providing environmental services, to companies implementing green process-oriented initiatives in their business either in parts or (Bisgaard, Henriksen, & Bjerre, 2012). But, there is very limited research evidence addressing companies both sustainable greening and bottom of pyramid. Also, very limited studies explored how these above greening in the form of product or processes impacts the pillars of business model innovation.

Therefore, the present research significantly contributes academically and for practitioners, in the development of green business model innovation for sustainable development for bottom of pyramid markets.

1.4 Research questions

The key research question is *how do companies incorporate sustainable development through integration of green technologies as products/services/processes?*

Sustainable development involves addressing poverty and environmental sustainability. To achieve this, companies create low-cost and environmental friendly products to target BOP segment, which entails a trade-off, increasing investment on green technology on one side and lowering prices simultaneously on other side.

1.4.1 Specific questions

- Primary question: How do companies targeting BOP segment reinvent their existing business models for sustainable development?
- Secondary question: Is there any similarities or differences between South Africa and India?

1.5 Research objectives

The primary objective of research study is to design a right business innovation model targeting BOP consumers across companies with green technologies. The secondary objective is to identify and compare the differences and similarities of business model innovation for BOP markets of both India and South Africa.

1.5.1 Specific objectives

- To review literature on business models and business model innovations (BMI).
- To understand theoretical foundations of bottom of pyramid (BOP), green technologies and sustainable development.
- To review literature determining implications of these theoretical concepts on businesses of companies.
- To explore the relationship between integration of sustainable green technology and business model innovation (BMI).
- To identify similarities and differences of business model innovation for BOP markets, with special emphasis on South Africa and India.
- To identify key factors related to BMI and BOP markets for green technologies and understand underpinning relationships among these factors.
- To propose possible prepositions, linkages and directions based on underpinning relationship among identified factors.
- To conceptualise and design a new green business model innovation for sustainable development for BOP markets, across companies.

- To test the proposed conceptual framework on green business model innovation for sustainable development among large companies.

1.6 Significance and research contributions - theoretical and practical contribution

The present research study significantly contributes to the development of green business model innovation for sustainable development for bottom of pyramid markets. The following are the theoretical and practical contributions of present research study -

Theoretical Contribution

The present proposed research gives better understanding of BMI, BOP and green economy, as well as on the concept of BMI for a green technology for BOP. A conceptual and theoretical framework developed can be applied in any company focusing on green technology and can be basis for further research. The literature review, along with the conceptual framework and model also add to current literature and allow researchers to build on it and use it as a basis or guideline for further research. The research highlights the importance that companies need to innovate in order to take into account a green economy and bottom of pyramid.

Practical Contribution

The theoretical framework and conceptual model can be applied to other firms, and firms can use them to innovate and change their own business models to incorporate the concepts of green economy and BOP. This research shows that firms need to adapt their models to stay competitive and sustainable in the long run. With today's environmental status, companies can no longer ignore the concept of green economy. Companies need to begin to make their products and processes greener, if not for the benefit of themselves, but for future generations to come. It shows that BOP is not a market to be ignored; there is great potential which companies need to take hold of to increase their profitability.

1.7 Definitions

This section provides brief definitions of each of the concepts and constructs, studied in present research. A comprehensive discussion is provided in chapter 3. For current research, concepts are defined as follows –

Business Model and Business Model Innovation

A business model is the set of which activities a firm performs, how it performs them, and when it performs them as it uses its resources to perform activities, given its industry, to create superior customer value (low-cost or differentiated products) and put itself in a position to appropriate the value (Afuah, 2004). Osterwalder, Pigneur and Tucci (2005), further states, a business model is a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm. Therefore, we must consider which concepts and relationships allow a simplified description and representation of what value is provided to customers, how this is done and with which financial consequences. Osterwalder and Pigneur (2004), identifies nine building blocks of business model – value preposition, target customer, distribution channel, customer relationship, value configuration, core competency, partner network, cost structure and revenue model. When any element of the business model is altered or modified for delivering value in new manner, business model innovation (BMI) occurs (Lindgardt, Reeves, Stalk & Deimler, 2009). Business model innovation (BMI) is therefore, defined as the creation or re-invention of existing business models by putting forward new value propositions, designing novel value-creation systems and developing value-capturing mechanisms (Guo, Zhao, & Tang, 2013).

Green Technology

Green technology means that is environmentally friendly, developed and used in such a way so that it does not disturb our environment and ecosystem, and thereby helps in conserving our natural resources. ‘Green technology’ as a term, is often used interchangeably with ‘Environmental technology’ or ‘Clean technology’. Most developed and developing countries are increasingly turning to green technology to secure the environment from negative impacts,

reduce pollution and improve cleanliness. Overall, green technology aims at contributing environmental sustainability. Green technology can be defined as an umbrella term that refers to use of technology that makes products/services and processes more environmentally friendly and sustainable. According to report from Nordic Innovation, (Bisgaard, Henriksen, & Bjerre, 2012), businesses can be green by producing green products or provide services that green other businesses or consumers (green products or services); or they can be green by greening their own processes or the processes in other parts of their value chain (greening of processes).

Sustainable Development

Sustainability of any company can be measured as an impact to three pillars of sustainable development; namely, social, economic and environmental influence. The concept of green economy involves the use of natural resources, energy and new technologies with more environmentally friendly and cleaner production methods to promote economic growth and new job creation (Bobonea & Joia, 2012). Sustainable development is a "contested concept, with theories shaped by people's and organizations' different worldviews, which in turn influence how issues are formulated and actions proposed. It is usually presented as the intersection between environment, society and economy, which are conceived of as separate although connected entities" (Giddings, Hopwood, & O'brien, 2002)

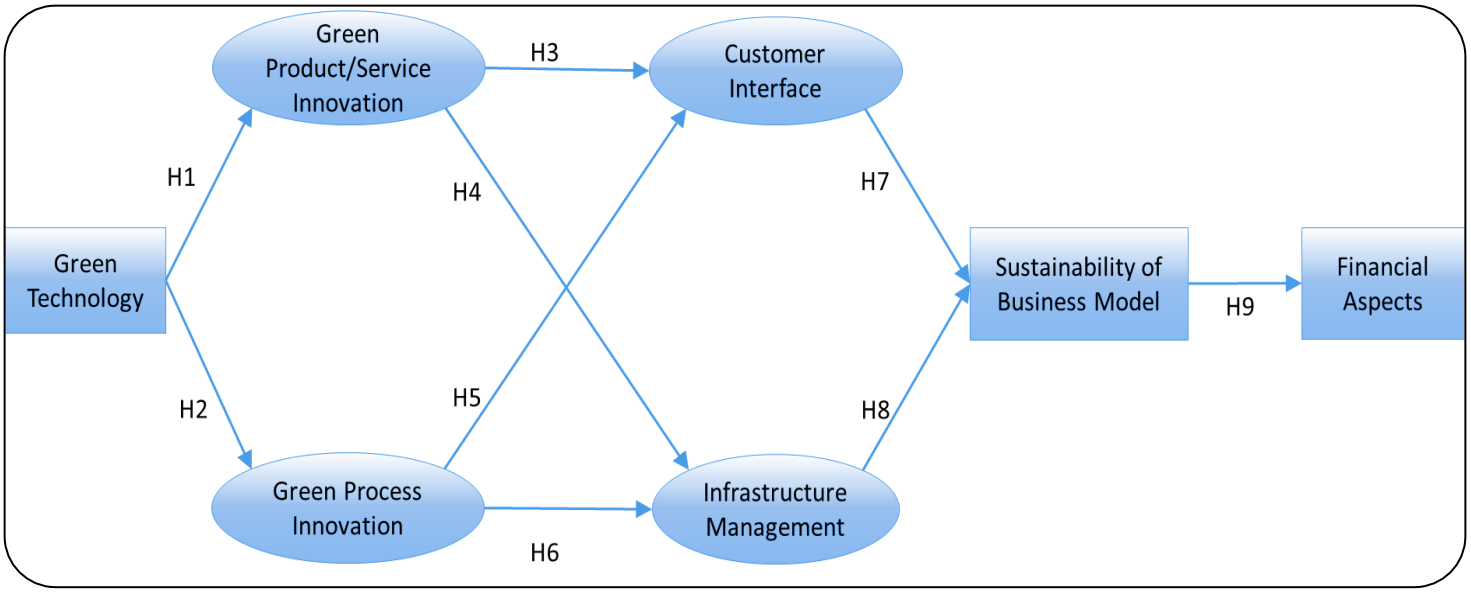
Bottom of Pyramid

BOP is the largest, but poorest socio-economic group. The bottom of pyramid (BOP) represents people who are represented in the bottom (4^{th}) tier of the world income pyramid. The more current usage refers to the people living on less than $2 per day, as first defined in 1998 by C.K. Prahlad and Staurt. L. Hart. Due to reasons of affordability, acceptability, availability and awareness, MNCs must develop new approaches to target BOP markets, approaches that are different from the traditional developed country markets of MNCs. A whole new market needs to be created for BOP in developing markets, rather than just serving an existing market more efficiently (Prahalad, 2012).

1.8 Proposed conceptual framework and hypothesis

The following Figure 1.2: Conceptual framework based on present research results for further quantitative study, illustrates the proposed conceptual framework developed from findings of qualitative research, followed by content analysis and further literature review. This conceptual framework was quantitatively tested to generalize the findings.

Figure 1.2: Conceptual framework based on present research results for further quantitative study



Derived from the conceptual framework, the following hypotheses are proposed:

H1

The integration of green technology (GT) is positively associated with performance of green product/service innovation (GP/SI)

H2

The integration of green technology (GT) is positively associated with performance of green process innovation (GPI)

H3

The performance of green product/service innovation (GP/SI) is positively associated with customer interface (CI)

H4

The performance of green product/service innovation (GP/SI) is positively associated with infrastructure management (IM)

H5

The performance of green process innovation (GPI) is positively associated with customer interface (CI)

H6

The performance of green process innovation (GPI) is positively associated with infrastructure management (IM)

H7

The customer interface (CI) positively impacts sustainability of business model (SBM)

H8

The infrastructure management (IM) positively impacts sustainability of business model (SBM)

H9

The sustainability of business model (SBM) positively impacts financial aspects (FA)

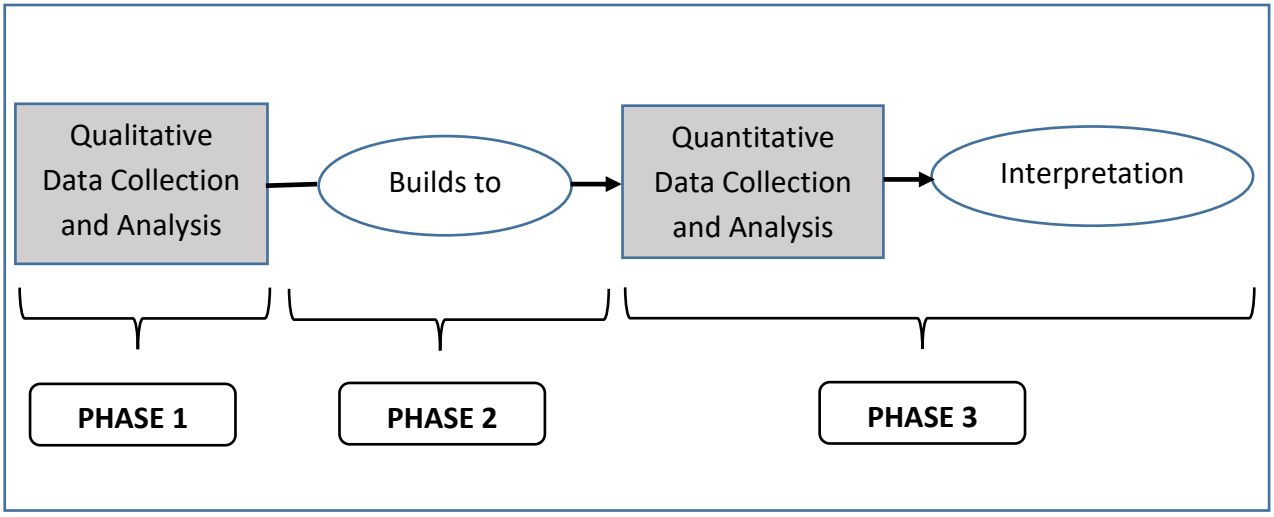
1.9 Research Design and Methodology

The present study explores a new area of relationship between business model innovations, its sustainability, integration of green technologies in companies somewhere targeting bottom of pyramid. Therefore, the study will first require an understanding of industry perspective, to develop a theoretical framework for Green BOP Business Model Innovation. The study used

mixed method approach, i.e. both quantitative and qualitative methods. Industry perspective has been studied using inductive approach, and then using content analysis a theoretical framework is conceptualized. Later, using deductive approach, the conceptualized theory is being tested to generalize the findings.

Therefore, the present study was carried out in three phases, Figure 1.3: Exploratory sequential design, a mixed method approach, using an exploratory sequential mixed method design (Creswell & Clark, 2007). This design is appropriate to use, as present research tests underpinning factors of emerging green business model innovation for sustainable development, resulting from the qualitative phase, and that it can also be used to expand and generalize qualitative findings by using quantitative methods. (Morgan, 1998).

Figure 1.3: Exploratory sequential design, a mixed method approach



Source: Adapted from Creswell & Clark, 2011

Using a three-phase approach, (Creswell, 2009), the researcher first gathers qualitative data Using a three-phase approach, (Creswell, 2009), the researcher first gathers qualitative data and analyses it (Phase 1), and uses the analysis to development of theoretical framework (Phase 2) that is subsequently administered to a sample of population to gather quantitative data (Phase 3). Therefore, the three phases of present research are:

Phase 1: Exploration and study of business model innovation of identified industries/sectors with green technologies, targeting bottom of pyramid segment for sustainable development, using qualitative research methods.

Phase 2: Identification of underpinning factors related to BMI, sustainable development and BOP consumers for green technologies; using qualitative methods and content analysis of results from phase 1, leading to design and development of theoretical framework of green business model innovation for South Africa and India.

Phase 3: Testing of conceptualized framework of green business model innovation for sustainable development, using quantitative research methods.

1.10 Ethical considerations

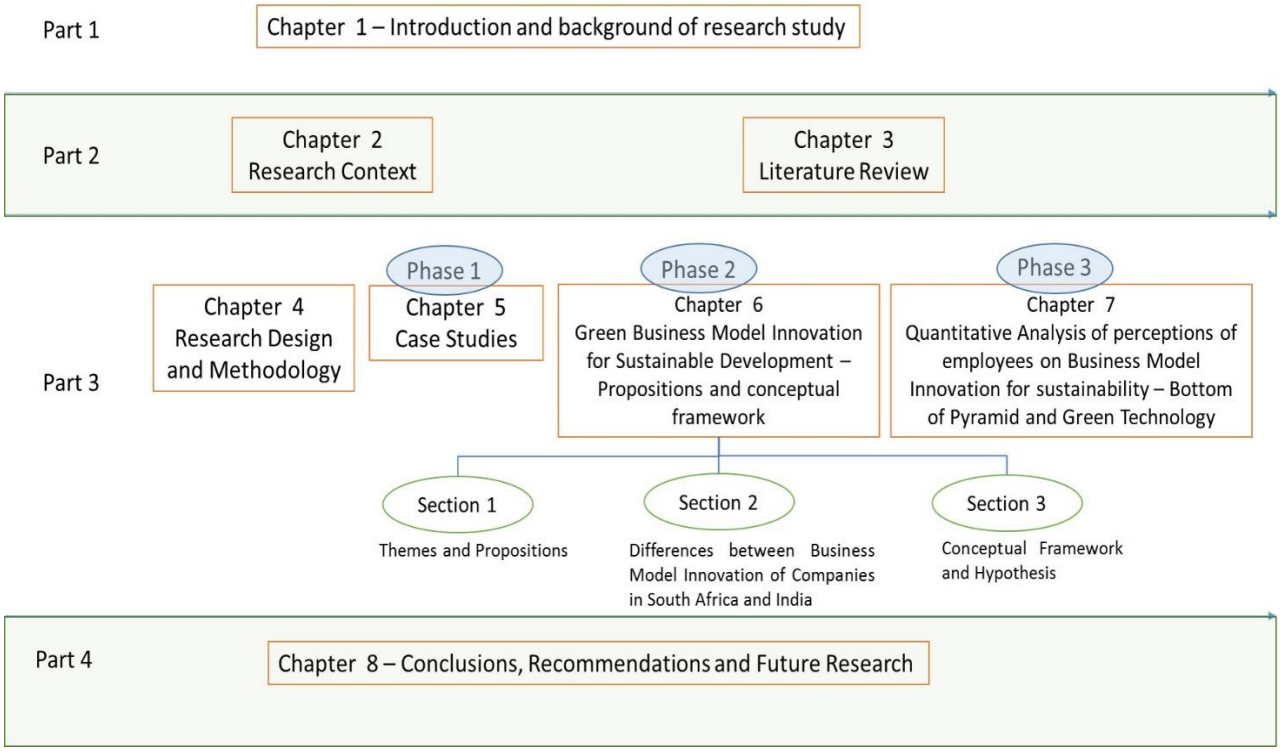
The present research study has taken care of all ethics requirements and researcher followed the University of the Witwatersrand's ethics policy. The ethics clearance was obtained prior to commencement of data collection. All respondents participated voluntarily in present research. They were informed about the research study and were ensured that all information will be kept confidential and anonymous. It was further ensured to use the data collected for academic and research purpose only and will not be given or sold to any third party.

1.11 Structure of the thesis

The present thesis report is structured in the following way: Chapter 2 provides a context of the research with focus on two emerging countries – South Africa and India, chapter 3 provides the literature review relating to theoretical constructs in the study, and this is followed by discussion on research methodology and research design in chapter 4. Chapter 5 represents phase 1 of research study and presents four cases developed through qualitative analysis. Chapter 6 represents phase 2 of research and discusses themes and prepositions and develops conceptual framework based on phase 1 of study. This chapter is divided into 3 sections – section 1 - provides analysis of phase 1 qualitative study, in the form of themes and prepositions, to recognize emerging patterns of data from South Africa and India; section 2 – discusses differences of business model innovation for sustainability at BOP of both South

Africa and India; and section 3 - presents a conceptual framework that integrates green technology, sustainability and concepts of business model innovation. Chapter 7 represents phase 3 of research and presents analysis of quantitative study to testify proposed conceptual framework on employees of large companies. The final chapter 8 provides concluding remarks, implications and recommendations for future research. The below Figure 1.4 presents thesis structure.

Figure 1.4: Thesis Structure



CHAPTER 2: RESEARCH CONTEXT

2.1 Introduction

The present research study focuses on two emerging economies, i.e. South Africa and India. Recent studies reveal, a quarter of the urban population live in slums (UN-Habitat, 2015). 'Ensuring environmental sustainability' is one of the eight millennium development goals (MDG) by UN. The ninth target of MDG is to integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources. Countries like South Africa and India have policies and programmes in place to promote sustainable development, for restoring environmental resources.

South Africa and India are two countries which are very similar yet very different. The conditions and history of the two countries are similar but economic conditions, markets are different. Both South Africa and India are developing countries, though facing poverty challenges, also have focus to certain extend on green technologies.

India was closed economy till 90's. It focussed more on developing her local industries and thereby entry barrier of foreign industries was high. However, post early 90's India opened its economy (Nagaraj, 2000). Since then, post-liberalisation Indian economy has been on high growth part with Year on Year growth around 7% (Malhotra, 2014). India's diverse economy encompasses traditional village farming, modern agriculture, handicrafts, a wide range of modern industries, and a multitude of services. Majority of workforce is focussed on agriculture, owing to historical footprints. Post early 90's, India has moved across the world with its services. They are the major growth driver. India's largely educated English-speaking population, has been the major fuel for establishing information technology services and outsourcing services. Despite world financial crisis in 2007–2008, Indian economy continued to grow consistently owing to strong domestic demand. Post 2011, with less spending by government resulted in low growth. In late 2012, the Indian Government announced additional reforms and deficit reduction measures to reverse India's slowdown, including allowing higher levels of foreign participation in direct investment in the economy. With growing middle class, it's resulting in expanded spending and improved consumption, thereby increased growth.

Despite overall increased growth, India faces challenges of gender inequality, poverty, corruption, violence, inefficient systems, ineffective enforcement of intellectual property rights, delayed justices, inadequate infrastructure, limited non-agricultural employment opportunities, lack of quality basic and higher education.

On other hand, South Africa is emerging market with abundant supply of natural resources. South Africa is backed by strong financial, legal, communications, energy, and transport sectors. Electricity, through major electricity provider “Eskom” in South Africa has been under crisis. Lack of new power plants, aging infrastructure and increasing demand has resulted in "load-shedding" to residents and businesses in major cities. The fall out resulted in reduced industrial production, thereby having direct impact on GDP. The South Africa presents a unique scenario when looking at the bottom of the economic pyramid. South Africa is one of the largest segregations in terms of rich versus poor, which is coupled with major social and sustainable challenges. Around 13 million South Africans are considered to be in the bottom of the economic pyramid (Keraan, 2010).

Challenges such as high unemployment rate of nearly 25% of the work forces, devaluating currency, inflation, corruption, unskilled labour and reach to rural areas have impact on growth of South Africa.

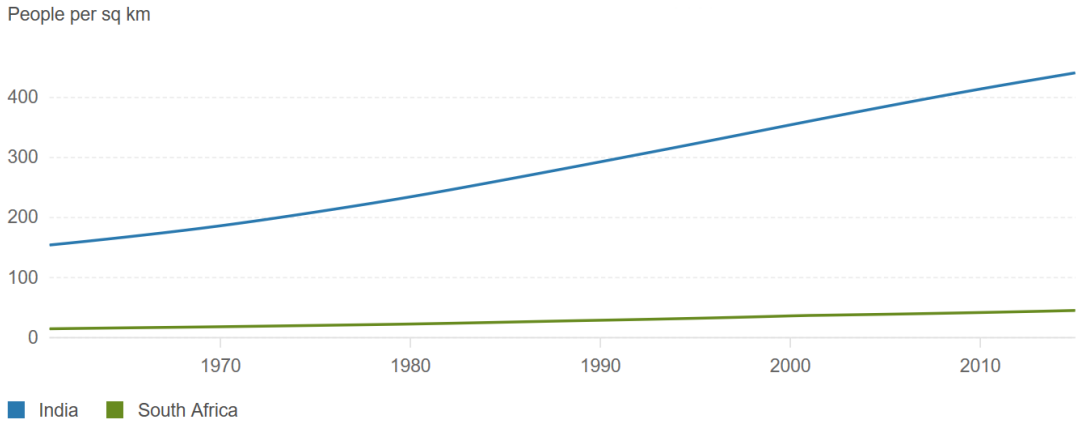
2.2 Demographics – South Africa and India

The following table summarizes the demographic details of South Africa and India.

Table 2.1: Demographic Details of South Africa and India

<table>
<tr><td> 
South Africa</td><td> 
India</td></tr>
<tr><td>54.8M people living making South Africa the 24th most populous country in world.</td><td>1.31B people living making India the second most populous country in the world.</td></tr>
<tr><td>Population Density

45.3 people per sq km</td><td>Population Density

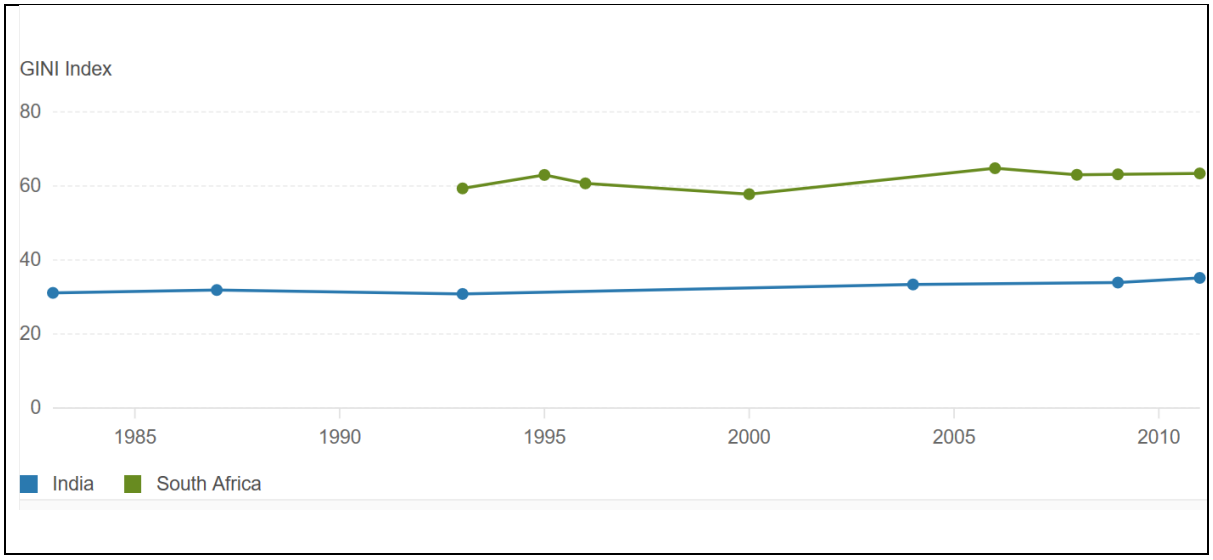
441 people per sq km</td></tr>
<tr><td colspan="2"> 
</td></tr>
<tr><td>Rural Population

35.2%</td><td>Rural Population

67.25%</td></tr>
<tr><td>Adult Literacy Rate 94.6 %</td><td>Adult Literacy Rate 72.23 %</td></tr>
<tr><td>CO_2 Emissions per Capita

8.86 metric tons per capita</td><td>CO_2 Emissions per Capita

1.59 metric tons per capita</td></tr>
</table>



Source: Nationmaster (2016)

2.3 Focus on Sustainability

South Africa

South Africa considers green economy as a viable path to sustainable development. South Africa has made investments in green energy and developed policies to promote green economy. In Rio Summit 2012, South Africa focussed on fact that African countries is better positioned to benefit from green economies. Adopting and transitioning to green economy has provided opportunities and challenges to South Africa. South Africa being a mineral rich country, most of the energy requirements are dependent on fossil fuels such as coal. Establishing a National Framework for Sustainable Development (NFSD) in 2008 to promote sustainability in the country, South Africa has consistently developed several policy frameworks and action plans to support the development of a localised green economy (Morrison-Saunders & Retief, 2012). The policy frameworks by Department of Environmental Affairs (DEA) and elements of an Industrial Policy Action Plan (IPAP), developed by the Department of Trade and Industry (DTI) elaborate on the need to develop a green economy. Establishing renewable energy sector and reduction on thermal power plants as a key element for developing a green economy. It also supports the initiatives of "green jobs" through small and medium enterprises (SMEs). South Africa dedication toward green economy in visible through its National Development Plan (NDP) which was released in 2011 (Zarenda, 2013). The plan detailed the country's strategy for national growth until 2030 and called for a tax on carbon by 2015. Also, South African government developed Green Economy Accord (GEA to partner with private sector and public organisations to create jobs through the development of

a green economy. South African government is promoting green economy by providing institutional frameworks and financial support to green industrial development and thereby promoting green jobs. In Africa, South Africa is matured in transitioning to a low-carbon economy and developing green economy. South Africa lead and experience will be asset on designing policy frameworks.

India

India focus in embracing green economy is for poverty alleviation, lowering economic inequalities and environment wellness. India being a developing country, earlier focus was use of fossil fuels etc. and thus green economy seemed unfair. However, it was soon realized that economic and environment sustainability need to co-exist together. Studies have proven that developing green economy impacts country's economy positively. The coexistence contradicting narratives level to which the concept of a green economy may be interpreted by differing political constituencies to support their arguments. In the case of India, differing positions on the actual benefits of developing a green economy form the crux of the overall discourse.

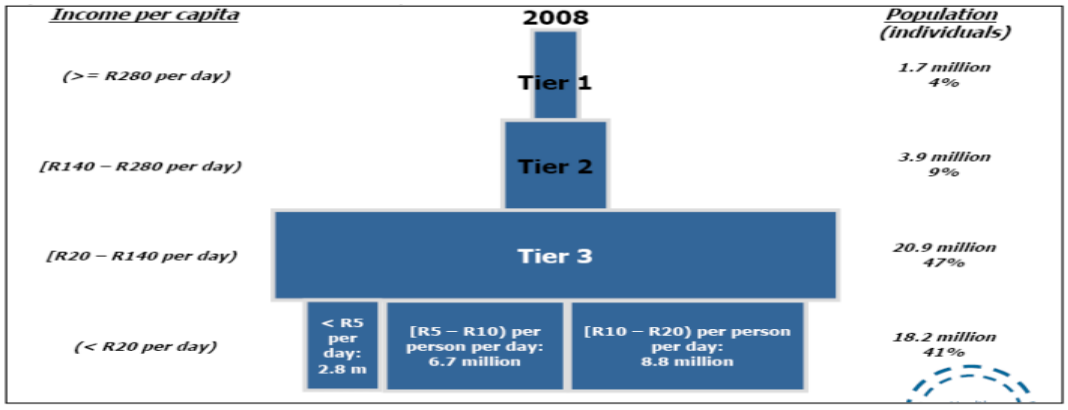
2.4 Bottom of Pyramid (BOP) Market

South Africa

South Africa constitutes a vast and growing market. With a population of around 55,9 million (Stats SA, 2016), South Africa represents a big market for household consumption annually (DIBD, 2010). South Africa is a great example of the first and third world economy in one place. The cities often have very small distance between the rich suburbs and the poor townships. It is estimated that 30 million people live at the base of the pyramid in South Africa on less than $3000 annually in local purchasing power (DIBD, 2010). South Africa's bottom of the pyramid market is also referred to a group of consumers that fall into the LSM (the Living Standards Measure) 1-4 category. LSM is the industry standard when it comes to looking at consumer patterns in South Africa and looks at the following access variables among others: hot running water, fridge, microwave, electric stove, TV and many more (AfricaScope, 2009). SAARF defines LSM 1-4 as usually rural and accounts for over 14% of the South African population (ACNielsen, 2005).

An analysis conducted by Meltzer (2009) shows that, in, 2008 almost three million South Africans lived on less than five rand per day and 18 million lived on less than R20 per day. Mtoba (2006) argues that the reality in the South African context – and in most of Africa – is that a traditional business model would not work. So as is the scenario in India, as in any country, one must take into consideration specific social and economic issues. When the total BOP purchasing power is calculated, it represents a $40 billion market or one third of the entire South African market (DIBD, 2010).

Figure 2.1: South Africa's income, expenditure and LSM trends



Source: Demacon (2010)

The diagram above shows South Africa's income, expenditure and LSM trends. It is evident that 18, 2 million people live on less than R20 a day, with almost 3 million living on less than R5 per day. This market of people is South Africa's bottom of the pyramid market.

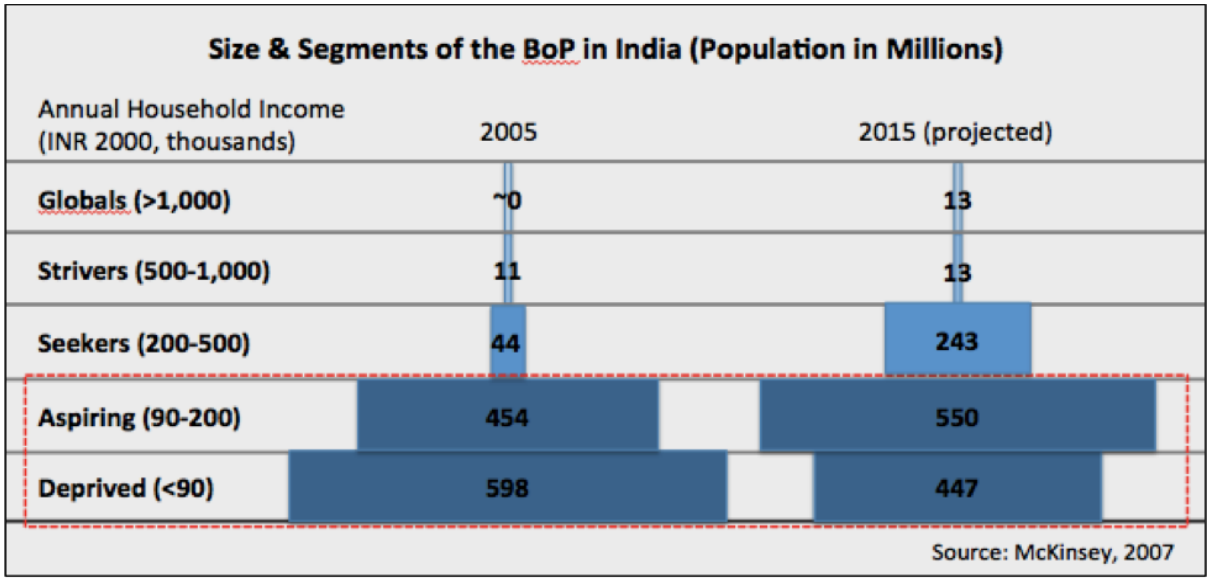
According to Maritiz (2011), bottom of pyramid group has a relative low income and largely underserved. "The bottom of the pyramid is generally understood to refer to the four to five billion people on the planet earning up to US$3 per day," says Pierre Coetzer of Reciprocity, a Cape Town-based consultancy that advises large companies on developing strategies to target this market (Maritiz, 2011, p.1). Coetzer says that the global economic crisis and the increasing importance of emerging markets are pushing South African companies to take a serious look at the low-income segment. He notes that large firms are also becoming more secretive about their bottom of the pyramid strategies, perhaps a sign that they are beginning to take this market

seriously. “We see a very clear trend that companies are no longer asking what the bottom of the pyramid is. If you look at the upper-income segment in South Africa, those markets are mature, they are growing at perhaps 1% to 2% per year, whereas your low-income segments are growing at anything between 9% and 15% per year. You ignore such trends at your peril,” Coetzer explains (Maritiz, 2011, p.1). Companies such as SAB Miller are focussing on BOP segment to increase revenue through volume based strategies.

India

BOP comprise the 1.05 billion people in India (5 out of 6 Indians) who live on an annual household income of less than INR 200,000 as of 2005. This is equivalent to less than INR 16,667 monthly household income. By 2015, size of the BOP is projected to be 997 million, still nearly 80% of the population. (Unitus Seed Fund, 2013)

Figure 2.2: Size & Segments of BOP in India



To address BOP Market in India multiple innovations have taken place. Innovations such as “Tata Swach” range of Water Purifiers from Tata Chemicals - A Tata Group Company. It has provided purified water for the BOP for as low as $10. The innovation provided purified water without the need of electricity. Another innovation was refrigerator from Godrej & Boyce called “ChotuKool”. It provides functionality of refrigerator while running on battery and doesn’t need continuous power supply. Narayana Hrudayalaya, a heart Institute is setting up

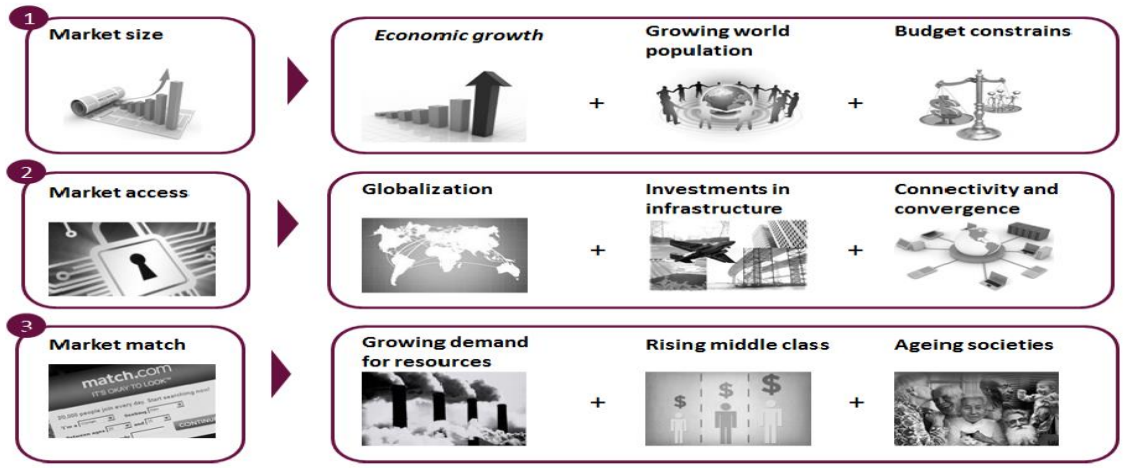
low cost Hospital near Mysore. It will provide medical treatments at a very low cost. The hospital will save by investing less in infrastructure with the help of pre-fabricated material. The Hospital low cost will result in Heart Operation to cost Rs. 50 000 which generally cost Rs.200 000. Vortex is making rural banking a reality with the low-cost ATM. Innovations such as sachets of Shampoo priced at Rs.1/Rs.2. The budget business hotel chain, Ginger Hotel from Indian Hotels (Nextbigwhat, 2016).

Government has been promoting programs such Financial Inclusion, Unique Identification (UIDAI), Internet and mobile connectivity for the BOP. According to DI International Business Development (DIBD) report, Doing BOP Business in South Africa – March 2010, on their trip to South Africa, to explore the potential for doing business in South Africa, found that in order to sell sustainable products to BOP markets, companies can significantly expand their consumer base and at the same time empower poor people to be lifted out of poverty. The BoP markets, rest on low margin per unit and high volume. To successfully manage business conditions at the BOP, the companies must be innovative in their approach and customize their products, production, and prices to the realities in BOP markets.

Despite all above, over the past 5 years, almost two-third of the growth in the world economy can be attributed to the development in emerging markets. Much has been talk in media about high and stable growth rates in the BRICS. Growth rates in the next layer of fast growing markets are equally impressive offering and frontier markets particularly in Asia – including India, and Africa – including South Africa. (Bisgaard, Henriksen, & Bjerre, 2012). From 2009 onwards, the economic growth in emerging markets has outpaced the economic growth in developed countries by a factor of 5. Even though the international financial crises have slightly reduced the growth rates, the BRICS and other developing economies keep expanding at a rapid pace. The key economic drivers indicate that a similar pattern is likely to characterize the economic development in coming years. The economic growth in most Western countries is severely constrained by an ageing population and the impact of debt, while the growth in emerging markets will continue to be stimulated by a growing and vibrant work force, urbanization and technological progress.

According to Nordic Innovation Report, 2014, changing market conditions are resultant of fast paced economic and social progress in emerging markets. Over the past 10 years, the economic activity in emerging markets has doubled, the number of internet users has grown from 1 million subscribers to almost 300 million subscribers, and the number of people residing in urban areas has risen by more than 600 million. According to Nordic Innovation, 2014, a series of megatrends are shaping emerging trends, instigating significant changes in consumer behaviour as well as demand for products and services. Nine megatrends have been identified important shapers of emerging markets, as illustrated below –

Figure 2.3: Retrieved from Emerging market opportunities shaped by nine megatrends



Source: - Nordic Innovation Report, 2014

2.5 Similarities and differences in two emerging countries – South Africa and India

The table below summarises the similarities and differences in two emerging countries, South Africa and India, on various parameters.

Table 2.2: Similarities and Differences between South Africa and India

	South Africa	India
Demographics	Population of about 54 mn	2nd most populous country in world with population > 1.3 bn
	High Literacy Rate	Relatively low literacy rate
	CO2 emission per capita much higher	CO2 emission per capita lower
Sustainable	Government focus and alignment towards Green Economy	Multiple initiatives being taken to ensure Green economy by government
Technology	Multiple technology initiatives such as Solar lanterns etc. for BOP sector	Multiple technology initiatives such as refrigerators, water purifiers etc. for BOP sector
BOP Focus	Corporate beginning to realize the importance of right business model at BOP. Companies trying multiple models at BOP	Corporates matured to certain extend on reach to BOP. Multiple business models over period has proven success in BOP segment
Infrastructure	Basic Infrastructure we developed such as road, sanitation, water etc.	Infrastructure still in developing stage. Still requires developments and uplift of basic facilities.
Challenges	Multiple challenges such as inequalities, reach to Bottom of Pyramid, emission per capita	Multiple challenges such as inequalities, literacy rate, poverty

The above parameters show that the two countries India and South Africa are very similar but at same time very apart. They will have similar challenges faced at bottom of pyramid on reach, basic facilities, inequalities meanwhile there is huge differences in population, infrastructure, and maturity of organizations at BOP. Both countries are conscious towards green economy and sustainability and understand that it is necessary for conclusive growth.

Thus, two developing countries with similar focus towards sustainability meanwhile diversified in terms of business models maturity towards approaching BOP segment constrained by individual challenges, makes comparison study to arrive at business model for BOP segment relevant.

2.6 Summary

This chapter discussed the research context by providing background into the two emerging economies, i.e. South Africa and India, followed by an overview of demographic profile of both countries. More specifically, bottom of pyramid (BOP) markets of South Africa and India was discussed in detail. The focus of both countries on sustainable development was discussed by researcher. Furthermore, the similarities and differences in two emerging countries on various parameters were provided to conclude present chapter.

CHAPTER 3: LITERATURE REVIEW

3.1 Introduction

This chapter of the paper reviews definitions, concepts and theories, to enhance understanding of the components of present research. The review of literature reveals limited evidence of primary research in business model innovation with focus on sustainable development and green technology. Further, very limited research evidence originated on business model innovation for bottom of economic pyramid (BOP) markets. The present section discusses various elements of business model innovation, green economy and green technology, followed by sustainable development and the bottom of the economic pyramid.

3.2 Business Model – definition, concept and theoretical grounding

The following section discusses various definitions of business model provided in literature, followed by discussion on concept of business model. Further, the underlying theories related business model and business model innovation are discussed in detail.

3.2.1 Business Model

Over the years, the term 'business model' has been widely used by academicians, business people, journalists, researchers and consultants. Business model as a concept is still ambiguous, and relatively poorly understood (Linder & Cantrell 2000), used for numerous purposes in multiple context by multiple users. In terms of value chain, (Magretta 2002, p. 87), defines business model consisting of two parts. 'The first part includes all the activities associated with making something, which comprises of designing, purchasing raw materials, manufacturing, etc. the other part includes all the activities associated with selling something, comprising of finding and reaching customers, transacting a sale, distributing the product, or delivering the service. A new business model may turn on designing a new product for an unmet need or on a process innovation. That is, it may be new in either end.' It is discussed in different domains,

such as e-business, strategy, management and information systems. A survey between business-oriented and technology-oriented people, revealed a divergence of understanding of business model definition (Osterwalder, Pigneur & Tucci, 2005). Two approaches were found in defining business model; namely –

a) Value/Customer-Oriented Approach, and
b) Activity/Role-Oriented Approach.

The former approach is more outward looking while the latter is more inward looking.

In simple words, a business model is a concept describing creation of value, its delivery to customers and capturing value. This value can be in any or all forms; social, economic, cultural, commercial, financial, etc. In a company, business model is like a blueprint of how a company does business (Osterwalder, Pigneur & Tucci 2005). It explicitly states how the business functions through activities of buying and selling goods and services, to make profits. From strategy perspective, Gambardella and McGahan (2010) delineate business model as 'Essence of firm's strategy'; and Casadesus-Masanell and Ricart (2010) called business model as 'A reflection of the firm's realized strategy'. In fact, business models are essential part of strategy, as they provide link between product markets, within the industry, and the markets for the factors of production such as labour and capital. The business model indicates how the firm will convert inputs (i.e. raw materials, labour, capital) into outputs (i.e. total value of goods produced) and make a return to its investors. This means that a business model's success is reflected in its ability to create returns that are greater than the opportunity cost of capital and delivers returns that are greater than the opportunity cost of capital, invested by its shareholders. Casadesus-Masanell and Ricart (2010), identifies three characteristics of a good business model as:

- If it is aligned with company goals- the choices made while designing a business model should deliver consequences that enable an organization to achieve its goals
- It is self-reinforcing- the choices that executives make while creating a business model should complement one another
- It is robust- a good business model should be able to sustain its effectiveness over time by fending off four threats; imitation (can competitors replicate it), holdup (can customers,

suppliers, capture the value you create), stack (organizational complacency), and substitution (can new products decrease the value customers perceive)

Originally, the term business model was first used by Konczal (1975) and Dottore (1977) in context of data and process modelling for IT systems. According to Osterwalder, Pigneur and Tucci (2005), business model though appeared for the first time in an academic article in 1957 by Bellman, R. and C. Clark; and in the title and abstract of a paper in 1960 by Jones, G. M.; it rose to prominence only towards the end of the 1990s. The literature review reveals numerous definitions of business models across a whole era. (Refer Table 3.1). On analysing the definitions given by number of authors and researchers, it is found that there are lot of similarities in these works across domains.

Wirtz (2011) identifies three theoretical approaches for the concept of the business model. These are Technology-oriented, strategy-oriented, and organization-oriented approaches. Technology-oriented approach is relevant to the field of sustainable innovation since technologies that contribute to sustainability may have a similar effect (Boons & Lüdeke-Freund, 2013). The second strategy-oriented approach adds the element of market competition to the efficiency of the company. The third organization-oriented approach deals with the business model as a strategic and development tool for business systems with emphasis on organizational efficiency.

Johnson, Christensen and Kagermann (2008), defines business model as consisting of four interlocking elements that, are taken together, create and deliver value. These four elements are – customer value preposition (CVP), profit formula, key resources and key processes.

1. Customer value preposition – the more important the job is to the customer, the lower the level of customer satisfaction with current options for getting the job done, and the better solution/ offering than existing alternatives and thereby greater customer value prepositions.
2. Profit formula – it is the blueprint that defines how the company creates value for itself while providing value to the customer. It consists of revenue model (price and volume),

cost structure (direct costs, indirect costs, economies of scale), margin model (expected volume and cost structure), resource velocity (turn over inventory, fixed assets, and other assets).

3. Key resources – they are the assets such as the people, technology, products, facilities, equipment, channels, and brand required to deliver the value proposition to targeted customer.
4. Key processes – includes recurrent tasks as training, development, manufacturing, budgeting, planning, scales, and service. It also includes company's rules, metrics, and norms.

It is believed that power lies in the complex interdependencies of the above elements (Johnson, Christensen & Kagermann, 2008). Success of the business model is determined by consistency of these elements and the way they complement each other.

Four major interlinked value drivers of business models, were identified by Amit and Zott (2012):

- *Novelty*- captures the degree of business model innovation that is embodied by the activity system
- *Lock-in*- refers to those business model activities that creates switching costs or enhanced incentives for business model participants to stay and transact within the activity system
- *Complementarities*- the value-enhancing effect of the interdependencies among business model activities
- *Efficiency*- cost savings through the interconnections of the activity system

Even if instances of firms and organizations adopting innovative business models have been recognised in business history, it is only recently that the scale and speed at which innovative business models are transforming industries has attracted the attention of scholars and practitioners. Business models play a crucial role in creating key elements, such as distribution channels, supplies and sales channels necessary for the successful execution of business transactions (Massa & Tucci, 2013). Companies often make great efforts to innovate their processes and products to achieve revenue growth and to maintain and improve profit margins.

It is often found that creating innovations to improve processes and products are often expensive and time-consuming, requiring an upfront investment (Amit & Zott, 2012).

Table 3.1: Selected Definitions of Business Model across different Domains

(Complied by researcher, 2016)

No.	Author	Definition
1.	Timmers (1998)	Business model is defined as architecture for the product, service and information flows, including a description of the various business actors and their roles; and a description of the potential benefits for the various business actors; and a description of the sources of revenue.
2.	Wirtz (2000)	Refers to the depiction of a company's internal production and incentive system. A business model shows in a highly simplifies and aggregate form which resources play a role in the company and how the internal process of creating goods and services transforms these resources into marketable information, products and/or services. Therefore, a business model reveals the combination of production factors which should be used to implement the corporate strategy and functions of the actors involved.
3.	Hedman and Kalling (2003)	Business model as consisting of the following casually related components, starting at the product market level: 1) customers, 2) competitors, 3) offering, 4) activities and organization, 5) resources and 6) factor and production input suppliers. The components are all cross-sectional and can be studied at a given point in time. To make this model complete, we also include 7) the managerial and organizational, longitudinal process component, which covers the dynamics of the business model and highlights the cognitive, cultural, learning and political constraints on purely rational changes of the model.

4.	Afuah and Tucci (2003)	Business model is the method by which a firm builds and uses its resources to offer its customers better value than its competitors and to make money doing so. It details how a firm makes money now and how it plans to do so in the long term. The model is what enables a firm to have a sustainable competitive advantage, to perform better than its rivals in the long term. A business model can be conceptualized as a system that is made up of components, linkages between the components, and dynamics. A business model is a framework for making money. It is the set of activities which a firm performs, how it performs them, and when it performs them to offer its customers benefits they want to earn a profit.
5.	Treacy and Wiersema (1997)	The second concept – the operating business model oriented to customer value – describes the interaction of operating processes, management systems, organizational structures and corporate culture, which enables a company to keep its promise of service. These are the systems, infrastructures and the environment that help realizing the customer benefit. The promise of service is the corporate objective, whereas the operative business model oriented to the customer value is the method with which this objective is achieved.
6.	Linder and Cantrell (2000)	An operating business model is the organization's core logic for creating value. The business model of a profit oriented enterprise explains how it makes money. Since organizations compete for customers and resources, a good business model highlights the distinctive activities and approaches that enable the firm to succeed – to attract customers, employees, and investors, and to deliver products and services profitability.
7.	Tikkanen, Lamberg,	Defines business model of a firm as a system manifested in the components and related material and cognitive aspects. Key components of the business model include the company's network

	Parvinen and Kallunki (2005)	of relationships, operations embodied in the company's business processes and resource base, and the finance and accounting concepts of the company.
8.	Hamel (2000)	A business model is a business concept put into practice. An innovative development in this field includes the ability to imagine completely new concepts or completely new ways of differentiating existing business models. Therefore, renewing business concepts is the key to developing new possibilities of value creation.
9.	Magretta (2002)	A good business model explains how enterprises work and answers who is the customer, and what does the customer value? It also answers the fundamental questions every manager asks: how do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?
10.	Afuah (2004)	A business model is the set of which activities a firm performs, how it performs them, and when it performs them as it uses its resources to perform activities, given its industry, to create superior customer value (low-cost or differentiated products) and put itself in a position to appropriate the value.
11.	Amit and Zott (2001)	A business model is depicting the content, structure, and governance of transactions designed to create value through the exploitation of business opportunities.
12.	Osterwalder, Pigneur and Tucci (2005)	A business model is a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm. Therefore, we must consider which concepts and relationships allow a simplified description and representation of what value is provided to customers, how this is done and with which financial consequences.

13.	Zollenkop (2006)	The business model serves as a strategic instrument for a comprehensive, cross-company description, analysis and constitution of the business activity.
14.	Johnson, Christensen and Kagermann (2008)	A business model, from our point of view, consists of four interlocking elements that, taken together, create and deliver value. The most important to get right, by far, is the first. Customer value proposition, profit formula, key resources and key processes are the four elements.
15.	Teece (2010)	The business model focuses on the organizing logic of how to create and appropriate value in a way that achieves distinctive competitive advantage. It details the structures, activities, and processes (including the required resources) that connect the firm's internal functional areas (e.g. marketing, sales, and finance) and external constituencies (e.g., suppliers, partners) in an interdependent system that delivers on the firm's strategy.
16.	Chesbrough and Rosenbloom (2002)	The business model is the heuristic logic that connects technical potential with the realization of economic value.

Shafer, Smith and Linder (2005, p. 202), defines business models as the *"representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network"*. Shafer et al. (2005) identify four major business model components, which are consistent with dimensions in Osterwalder (2004) business model ontology (Sinkovics, Sinkovics & Yamin, 2014). These components are strategic choices, creating value, capturing value and the value network.

3.2.2 Building blocks of business model

According to Osterwalder, Pigneur and Tucci (2005), a business model is a building plan, allowing designing and realizing business structure and systems that constitute the operational and physical form of the company. This triangular relation is between strategy, organization, and systems of the business that is constantly subject to external pressures, like competitive forces, social change, technological change, customer opinion and legal environment. Nine building blocks are identified by the authors.

Table 3.2: Building blocks of business model

Pillar	Business Model Building Block
Product	Value Preposition
	Target Customer
Customer Interface	Distribution Channel
	Relationship
Infrastructure Management	Value Configuration
	Core Competency
	Partner Network
Financial Aspects	Cost Structure
	Revenue Model

Osterwalder and Pigneur (2004), further explains nine blocks of business model as follows –

1. The *Value Proposition* of what is offered to the market, i.e. it gives an overall view of a company's bundle of products and services.

2. The *Target Customer* describes the *segment(s)* of customers a company wants to offer value to, i.e. clients which are addressed by the value proposition.
3. The communication and *Distribution Channels* to reach clients and offer them the value proposition, including various means of the company to get in touch with its customers.
4. The *Relationship* explains the kind of links a company establishes between itself and its different customer segments.
5. The *Value Configuration* needed to make the business model possible with arrangement of various activities and resources.
6. The *Core Competency* outlines the competencies necessary to implement the business model.
7. The *Partner Network* of cooperative agreements with other companies necessary to efficiently offer and commercialize value.
8. The *Cost Structure* resulting from the business model sums up the monetary consequences of the means employed in the business model.
9. The *Revenue Model* generated by the business model describes the way a company makes money through variety of revenue flows/ streams.

These building blocks or pillars are a set of assumptions or hypotheses making into a business model. It is an organised way to lay out business assumptions about key resources, key activities of value chain, besides other important aspects such as customer relationships, channels, customer segments, cost structures and revenue streams.

Further details on ontology or business model canvas is discussed in next section.

3.2.3 Business Model Ontology

Business Model Ontology, also referred as Business Model Canvas by businesses, is a formal approach to Business Models. It facilitates communication and bring understanding and sharing of business logic among employees and stakeholders of a company. Business model ontology reflects systematically on business model, to map each of its elements to real business components.

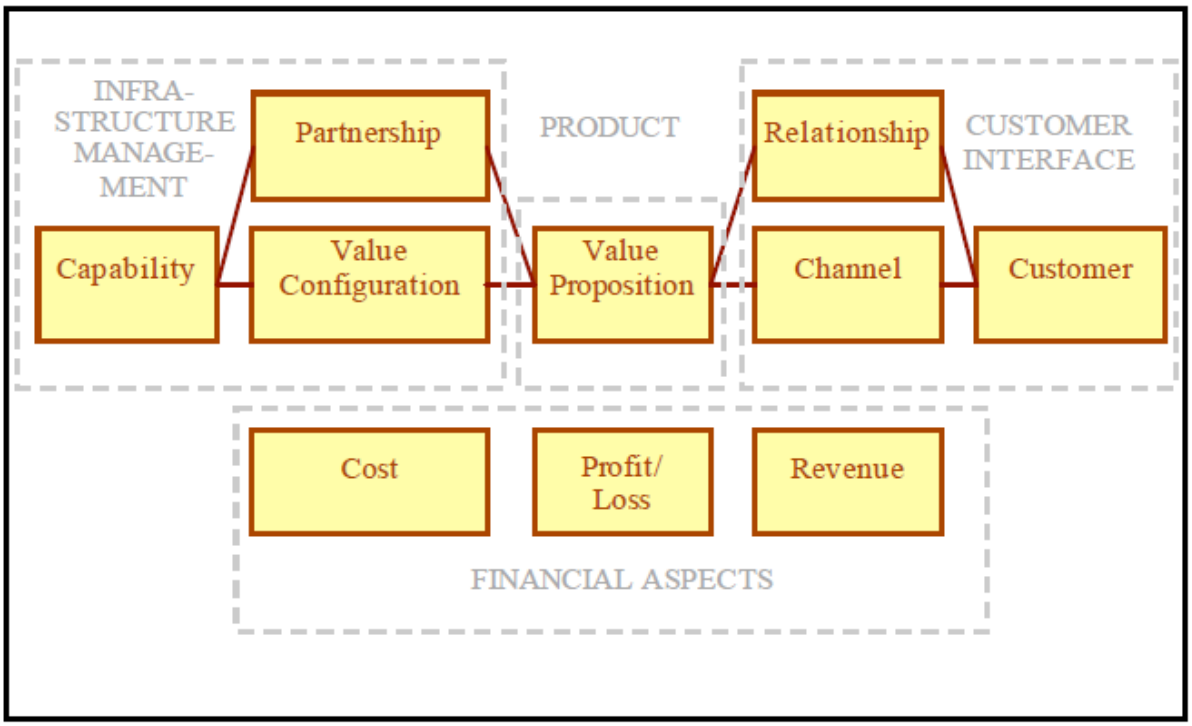
According to Osterwalder and Pigneur (2004), Business Model Ontology is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. Osterwalder and Pigneur (2004), translates four simple business pillars into four main business model blocks to make business model ontology. These four pillars are the '*what*', the '*who*', the '*how*' and the '*how much*' of a company. In other words, these pillars allow to express 'what' a company offers, 'who' it targets with this, 'how' this can be realised and 'how much' can be earned by doing it.

Therefore, Business Model Ontology (refer Figure 3.1: Business Model Ontology) consists of four main pillars, which are further decomposed into elements –

a) Product Innovation
b) Customer Relationship
c) Infrastructure Management
d) Financial Aspects

Product Innovation describes the value preposition of a firm. *Customer Relationship or Interface* describes how a firm gets in touch with its customers and what kind of relationship it wants to establish with them. *Infrastructure Management* describes what activities, resources, and partners are necessary to provide the first two blocks. *Financial Aspects* describes the revenue flows and the pricing mechanisms of a firm, or, in other words, how a company makes money through the other three blocks.

Figure 3.1: Business Model Ontology



Source: Osterwalder and Pigneur, 2004, p. 569

Therefore, business model canvas or ontology helps to conduct structured, tangible and strategic conversations around new businesses or existing ones.

3.3 Business Model (BM) and Business Model Innovation (BMI)

Business model describes the business functions through activities of buying and selling goods and services, to make profits. Business models facilitates 'change' because of their building block approach in framing and communicating the business logic of a company (Peterovic, Kittl & Teksten, 2001). It is often referred to as the content, structure and governance of various business operations to create value though exploitation of opportunities (Guo, Zhao, & Tang, 2013). Business models brings a broader perspective to the idea of innovation and brings many opportunities to create better value for customers and to improve profitability for the firm.

When an element of the business model is altered or modified for delivering value in new manner, business model innovation (BMI) occurs (Lindgardt, Reeves, Stalk & Deimler, 2013). Business model innovation (BMI) is therefore, defined as the creation or re-invention of existing business models by putting forward new value propositions, designing novel value-creation systems and developing value-capturing mechanisms (Guo et al., 2013).

Business model innovation (BMI) is not only about products, but also about producing value-creating outcomes for customers. In other words, business model innovation is the result of when a company increases customer value, while at the same time, creates a new value creation and revenue model that allows the company to capture this value in a new way (Matzler, Bailom, Von den Eichen & Kohler, 2013). Business model innovation is about new ways that an organization creates, delivers and captures value. It refers to the creation of a unique and differentiated business, or the reinvention of an existing business to enhance its value preposition, capture new market opportunities and achieve competitive advantage. Any modification of one or more of the nine dimensions of the business model through implementing and recombining innovative approaches to increase value, can result in the reinvention of a business and therefore a business model innovation.

Matzler et al. (2013) discuss three types of business model innovation:

a) As opposed to adding value to a product or service, a company will increase the customer-added value which results from a new value creation system which allows the company to reduce product prices and costs. Value is created for both the customer and the company.
b) A higher price and new value creation structure allows for greater profits and revenue to be made. Innovation leads to higher value for the consumer which leads to an increase in the consumer's willingness to pay.
c) In the last case, the customer's benefit is reduced for example a basic version of a product. This product is available at a reduced price, and therefore the value for the consumer increases. A new, innovative value chain can lead to reduced costs and therefore greater profits for the company.

Chesbrough (2010) identified six types of business models that companies can employ when considering business model innovation. These six types of models are: undifferentiated business model, slight differentiation in business models, segmented business model, externally aware business model, integration of innovation process, and business model as an adaptive platform.

According to Habtay (2012), there are technology-driven and market-driven disruptive business model innovations:

- A technology-driven disruptive business model innovation is where R&D experimentation comes before opportunities present in the market, and the development of the business model will affect the company's established market.
- A BMI that results from radical changes in existing value prepositions of the consumer (Govindarajan & Gupta, 2001) or changing the company's role in the current value chain (Moore, 2004), or both, which will affect the existing market can be referred to as a market-driven disruptive business model innovation.

Giesen, Berman, Bell and Blitz (2007), also proposes three classified groups of business model innovation in incumbent firms. These groups are –

1. Industry model innovation, consisting of innovating industry value chain by redefining existing business, or creating an entirely new one.
2. Revenue model innovation, consists of innovation in the manner revenues are generated. For example, reconfiguration of the product-service value mix, new pricing models, etc (Massa & Tucci, 2013).
3. Enterprise model innovation, consists of changing innovatively the role a firm play in the value chain, which can involve changes in the extended enterprise and networks with employees, suppliers, customers and others, including capability/asset configurations.

As Chesbrough (2007) says, innovation is no longer exclusively about bringing out new products or technology, but rather needs to include business models too. An innovative business model is important – it will lead to the entire company being more innovative and

therefore will be a competitive advantage over its competitors. BMI leads to better value creation for the consumer and better value capturing for the company (Chesbrough, 2007).

Continuous business model innovation allows a company to outperform its competitors (Mitchell & Coles, 2003). Business model innovations refer to replacements in the business model that provide products/services to consumers that weren't previously available. The process of developing these replacements is referred to as the process of business model innovation (Mitchell & Coles, 2003).

Based on studies by Mitchell and Coles (2003), Schaltegger, Lüdeke-Freund and Hansen (2011), proposes a four-stage development of business model innovation, namely, adjustment, adoption, improvement, and actual redesign. (1) Business model adjustment refers to changes of only one (or minor number of) business model element/s, excluding the value proposition; i.e. modifications of customer relationships, business infrastructure, or the financial pillar alone constitute adjustments. (2) Business model adoption refers to changes that mainly focus on matching competitors' value prepositions. This requires changes to products and/or services, and sometimes also partly in customer relationship pillar and business infrastructure, as they both can be part of value preposition in some businesses (Osterwalder, 2004). (3) Business model improvement occurs when most of the business model elements are changed. Simultaneously changes major number of elements, such as customer relationship, business infrastructure, in such a way that the business network and the financial logic are required to replace an existing model. (4) Business model redesign occurs when an improvement leads to a complete new value proposition. Redesign replaces the underlying business logic and offers new products, services or product-service systems (Hansen, Gomm, Bullinger, & Moslein, 2010).

Girotra and Netessine (2014) suggests ways to think about creating a new business model by altering the current business model in four broad categories:

a) *By changing the mix of products or services* – In order to reduce market risk, companies recalibrate their product or service mix. This usually can be achieved by three options –
    i. Business model focussing narrowly to appeal distinct market segments with clearly differentiated needs.

ii. Searching for commonalities across products, such as shared components, capabilities, customer, market segments, etc.

iii. Creating a hedged portfolio by selecting an assortment of products or markets to reduce overall risks associated with business model.

b) *Postponing decisions* - to decrease the risk associated, or changing the order of decision to delay investment commitments until appropriate information is known, or by splitting the key decisions

c) *Changing the people who make the decisions* – decision-making in value chain can be improved by appointing a better-informed decision maker, or by passing the decision risk to the party that can best manage the consequences, or by selecting the decision maker with the most to gain than others in the value chain.

d) Changing incentives in the value chain – adjusting decision makers' motivation by changing the revenue stream, or by synchronizing the time horizons, or by simply integrating the incentives.

According to Johnson, Christensen and Kagermann (2008), 'A new model is needed, when leveraging a new technology (as in Apple's case), or (as with the Nano, Tata) when the opportunities addresses an entirely new group of customers; and when an established company needs to fend off a successful disruptor (as the Nano's competitors may now need to do).' Business model change is particularly required when creating new growth venturing into unknown market territory. The authors further identify following five strategic circumstances that often require business model change –

1. Marketing disruptive innovation requires large number of potential consumers, including opportunity to democratize products in emerging markets or reach the bottom of pyramid (BOP). For example: Tata's Nano.
2. Opportunity to capitalize on a brand new technology by wrapping in new business model around it (for example: Apple and MP3 players), or the opportunity to leverage a tested technology by bringing it to a whole new market.
3. Opportunity to bring a job-to-be-done focus which does not previously exist. This is common in companies focusing on products or customer segments, leading to refinement of existing products and thereby increasing commoditization. Job focus allows companies to redefine industry profitability. For example: FedEx

4. Need to fend off low-end disruption products at significantly lower costs, leading to threatening of other company's offerings.
5. Need to respond to a shifting basis of competition, bringing acceptable solution in the market, and thereby leading core market segments to commoditize.

Scaling-up is identified as the most critical step for business model innovation. Lindgardt, Reeves, Stalk and Deimler (2013) suggests that an important choice an incumbent company must make is whether to embed a new business model in the core business or establish it separately. The benefits of common assets, customers, and capabilities argue in favour of integration. But a significant disruption to the current model argues for a separate approach. According to Lindgardt, et.al (2013), the most difficult cases are those in which management comes to realize that successful business model has become obsolete and the alternatives are in direct opposition to it.

Johnson, Christensen and Kagermann (2008) warns companies to not pursue business model reinvention unless they are confident that the opportunity is large enough to warrant the effort. The above is advisable also in case of marketing offerings to bottom of pyramid (BOP) consumers. The opportunity should not only be new to the company, but in some way new or game-changing to the whole industry or market. Otherwise, it can lead to substantial waste of time, energy and money. These game-changing moves (Lindgardt, et.al, 2013) may include –

(a) beating back intense competition (for example: Virgin Group, entering the Australian airline market with Virgin Blue, an airline offering low fares with a premium coach);
(b) expanding a business model with current customers (for example: JC Decaux, a street furniture company in Paris, offering a new value preposition to build and maintain the world's largest free citywide network of bicycles and bicycle racks for point-to-point transit of residents and tourists);
(c) extracting brand value by extending the business model (for example: Ikea stores, popular thought world, explored two business model simultaneously in Russia in real estate industry, and thereby leveraging its existing assets and capabilities to experiment with new business models)

A new business model often reinforces and complements the core business. A new model for a new business does not always mean that the current model is threatened or should be changed. To devise a new business model, companies should evaluate challenges in terms of customer value preposition, profit formula, key resources, key process. Companies should evaluate negative influences of their core business on to new business development process. Besides these, companies should seek to create a shared value of awareness of threats and opportunities (Lindgardt, et.al, 2013). Also, companies should assess whether the new business model will disrupt competitors (Johnson, Christensen & Kagermann, 2008).

3.4 Business model innovation for sustainable development

Business model innovation is quite difficult to learn and execute because if its complexity, however if implemented successfully it can create long lasting results along with competitive advantage. Considering current scenario in industries across world, business model innovation age faster than ever before, and thereby becoming obsolete in many cases. Therefore, to keep up with competition, it is imperative to constantly innovate business model. Business model innovation is an important strategy for driving value-creating growth, and a means to seize new opportunities. Bocken, Short, Rana and Evans (2014), states that lack of a common source of information on business model innovations make it difficult for researchers and practitioners to gain an overview of the scope of business model innovation for sustainability. However, Clinton (2013) defines Business model innovation for sustainability as 'the creation of novel forms of exchange at some point along a company's value chain that enable a business to respect environmental limits while fulfilling social wants and needs'. Some of the finding by Clinton (2013) are –

1. It is rare for global market leader to transform its entire business model for sustainability. When innovations happen at multi-national companies, they often occur within an arm of the company focused on a single market. Example: Novartis' Arogya Parivar Health Care Model, which focussed on poor communities in India.
2. It is found that transforming an existing business model for sustainability is far more complex than innovating from scratch.
3. Companies are finding ways to generate business value without using more resources to create more products, thus changing consumption patterns of consumers based on

consumers' habits. All these are resultant of wide spread of concept of 'circular economy' and explosion of 'sharing economy' businesses in recent years.

4. Technological integration invite business model innovation. Use of technologies such as online platforms, cell phones, data kiosks, etc. are enabling businesses to cut out role of middlemen, such as in case of ITC e-Choupal in India; creating new currencies, such as M-Pesa's cell phone minutes in South Africa; and tapping into new value.
5. Innovative financing methods are accelerating and supporting uptake of green energy solutions, such as Mosaic, Simpa Networks, Solar City, etc.
6. Innovation for sustainability can happen anywhere across world, because of the growing freedom of multinationals to innovate for new customer segments including bottom of pyramid (BOP).

According to Massa and Tucci (2013), businesses can create value for sustainability in two ways; firstly, by adopting more sustainable practices and processes that would reduce (or prevent the occurrence negative impacts, such as, reducing energy, water consumption, etc. Secondly, by engineering and marketing new technologies that would provide solution to sustainability problems, such as, renewable energies, green materials, etc. Massa and Tucci (2013), also states that value for sustainability may exist in a firm's practice/s or in a firm's products/s, or both.

Casadesus-Masanell and Ricart (2010) recognizes business model innovation as one of the main building block of sustainable development. They figured out following main reasons for companies surging to business model innovation;

1. The constantly increasing surge to open markets in developing countries, particularly those at middle and bottom of pyramid, is encouraging companies to innovate their business models.
2. The economic slowdown in the developed countries or times of instability, forcing companies to modify their business model to create new ones. Companies carefully examine correct time to re-visit the business model, either to exploit new opportunities in the industry or to react to competitive or technological threats posed to the firm's current business model, including periods of economic downturn. (Giesen, Riddleberger,

Christner, & Bell, 2010). Businesses may undergo business model innovation as they seek alternative ways to gain cost and flexibility advantages. While adopting new pattering models such as new service models or even outsourcing, businesses often able to scale down operations, during economic turmoil, as well as gain access to resources to scale up new opportunities. (Giesen et al., 2010).

3. The rise of technology-based and low-cost rivals is threatening incumbents, reshaping industries, and redistributing profits, thereby transforming the way companies create and capture value through their business models.
4. Break out intense competition, under which product or process innovations are easily imitated, competitors' strategies have converged, and sustained advantage is elusive (Lindgardt, et.al, 2013).

Companies who do not respond promptly to changing environment, are likely to become uncompetitive (Giesen et al., 2010). Businesses may choose to harness disruptive technologies, target new customer segments, alter spending patterns, adjust value preposition, alter pricing model, revenue model or extricate competitors.

Furthermore, Casadesus-Masanell and Ricart (2010), highlights the importance of making right choices by companies particularly taking into consideration the dynamic elements of business models to their full potential, as stated below–

"Few executives realize that they can design business models to generate winner-take-all effects that resemble the network externalities that high-tech companies such as Microsoft, eBay, and Facebook have created. Whereas network effects are an exogenous feature of technologies, winner-take-all effects can be triggered by companies if they make the right choices in developing their business models. Good business models create virtuous cycles that, over time, result in competitive advantage. Smart companies know how to strengthen their virtuous cycles, weaken those of rivals, and even use their virtuous cycles to turn competitors' strengths into weaknesses."

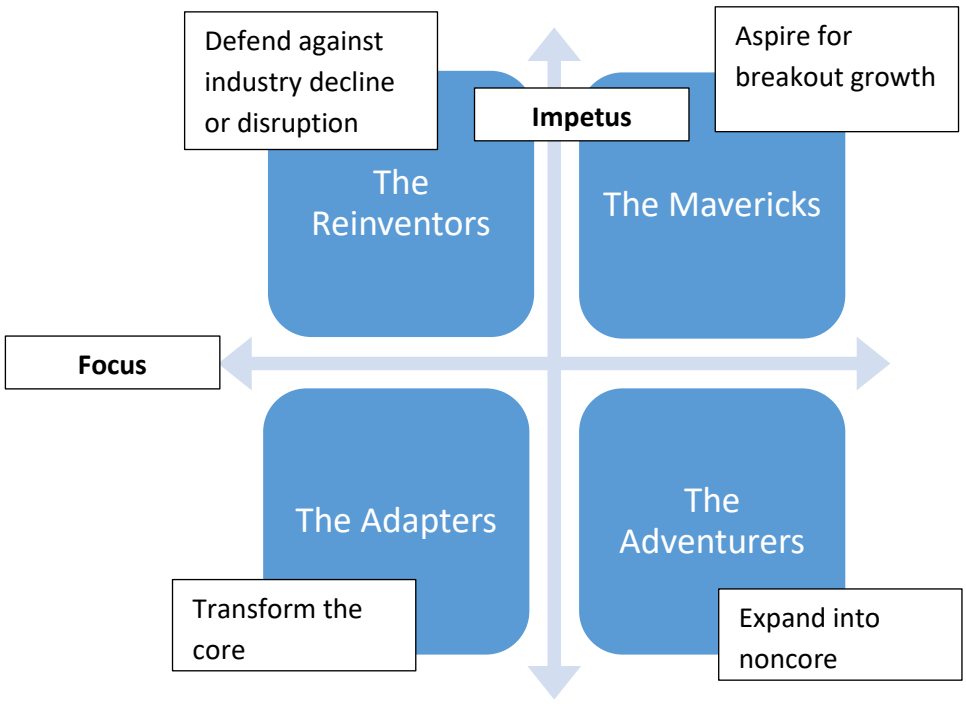
Casadesus-Masanell and Ricart (2010), conceptualizes business model as a set of managerial choices and the consequences of those choices. Companies make three types of choices when creating business models.

1. *Policy choices* which determines the actions of an organization taken across all its operations (such as using non-union workers, locating plants in rural areas, or encouraging employees to fly coach class).
2. *Asset choices* pertaining to the tangible resources a company deploys (such as manufacturing facilities or satellite communication systems).
3. *Governance choices* refers to how a company arranges decision-making rights over the other two (for example, should we own or lease machinery?).

Consequences can be either flexible or rigid. A flexible consequence is one that responds quickly when the underlying choice changes. For example, choosing to increase prices will immediately result in lower volumes. By contrast, a company's culture of frugality—built over time through policies that oblige employees to fly economy class, share hotel rooms, and work out of Spartan offices—is unlikely to disappear immediately even when those choices change, making it a rigid consequence. These distinctions are important because they affect competitiveness. Unlike flexible consequences, rigid ones are difficult to imitate because companies need time to build them (Casadesus-Masanell & Ricart, 2010).

Four approaches to business model innovation has been identified by Lindgardt and Ayers (2014); namely (1) the Reinventor approach, (2) the Adapter approach, (3) the Maverick approach, (4) the Adventure approach. Within each of the suggested four approaches, companies will employ different tactics to successfully rebuild their models and make different choices (Refer Figure 3.2: Four approaches to Business Model Innovation). Two factors define this matrix of four approaches. Firstly, Impetus – Is the company defending against an external threat, such as commoditization, new regulations, or an economic downturn; or is it proactively disrupting the status quo? Secondly, Focus – What is the most attractive area of opportunity – does it reside in the core business or in adjacent business or markets?

Figure 3.2: Four approaches to Business Model Innovation



Source: Adapted from Lindgardt & Ayers, 2014

Sustainability essentially includes three interdependent pillars; namely Economic, Social and Environmental. In business context, Business model innovation for sustainability deploys triple-bottom-line, which includes sustainability pillars – economic, social and environmental, (Elkington, 1997) and considers interests of wide range of business stakeholders. Innovation of business model does not happen in vacuum. It is dependent on surrounding conditions. Business model innovation increases the ability of company to recognize and respond to circumstances that will support new, more sustainable ways of doing business. Business model innovation for sustainability, particularly targeted to BOP consumers, have often failed because of ever-rising pressure to make profits in companies, along with competitiveness and the lack of supportive structures. These BMI for BOP and sustainability yet need to be proven successful among twenty-first century companies across sectors.

Bocken, Short, Rana and Evans (2014) has defined business model by three main elements: value preposition, value creation and delivery, and value capture. Sustainable business models

capture economic, social and environmental value for a wide range of stakeholders (Bocken et al., 2014). Sustainable business models (SBM) incorporate a triple bottom line approach and consider a wide range of stakeholder interests, including environment and society. They are important in driving and implementing corporate innovation for sustainability, can help embed sustainability into business purpose and processes, and serve as a key driver of competitive advantage (Bocken et al., 2014).

Bocken et al. (2014), further defines 'business model innovations for sustainability, as 'Innovations that are create significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organisation and its value-network create, deliver value and capture value (i.e. create economic value) or change their value prepositions'. Lüdeke-Freund (2010), defines sustainable business model as 'a business model that creates competitive advantage through superior customer value and contributes to a sustainable development of the company and society'. Stubbs and Cocklin (2008) highlights that sustainable business models use both a systems and firm-level perspective, build on the triple bottom line approach to define firm's purpose and measure performance, including a wide range of stakeholders, and consider the environment and society as stakeholders. The authors further explain that a sustainable business model aligns interests of all stakeholders' groups, and explicitly considers the environment and society as key stakeholders (Bocken et al., 2014).

Furthermore, Bocken et al. (2014), have developed sustainable business model archetypes across various industries, describing the main type of business model innovation: Technological, Social and Organisational oriented innovations (Boons & Lüdeke-Freund, 2013). These eight archetypes or patterns of sustainability are – maximize material and energy efficiency, create value from waste, substitute with renewables and natural processes, deliver functionality rather than ownership, adopt a stewardship role, encourage sufficiency, repurpose for society/environment, develop scale up solutions. Companies can use one or a selection of business model archetypes for shaping their business model transformation, to create and deliver sustainable value and realizing new untapped opportunities. These patterns demonstrate various options and possibilities for business model innovation for sustainability.

Boons and Lüdeke-Freund (2013), founds above three streams that appear to be most important with regard to sustainable business models: technological, organizational and social innovation. Furthermore, they define each stream as –

1. 'Sustainable business models with a focus on technological innovation are market devices that overcome internal and external barriers of marketing clean technologies; of significance is the business model's ability to create a fit between technology characteristics and (new) commercialization approaches that both can succeed on given and new markets'.
2. 'Business model change on the organizational level is about the implementation of alternative paradigms other than the neoclassical economic worldview that shape the culture, structure and routines of organisations and thus change the way of doing business towards sustainable development; a sustainable business model is the aggregate of these diverse organizational aspects'.
3. 'Sustainable business models enable social entrepreneurs to create social value and maximize social profit: of significance is the business models' ability to act as a market device that helps in creating and further developing markets for innovations with a social purpose'.

Thus, sustainable business models with a focus on technological innovation are market devices that overcome internal and external barriers of marketing clean technologies; of significance is the business model's ability to create a fit between technology characteristics and (new) commercialization approaches that both can succeed on given and new markets (Boons & Lüdeke-Freund, 2013). The market devices can be referred into three combinations of business model and technology innovation: (1) a new business model can employ given technologies; (2) existing business models can take up new technologies; and (3) new business models can be triggered by new technologies and vice versa.

3.5 Green technology – definition; meaning and details

The word ‘Green Technology’ is relatively new, having been used just over past few years. It is often a saying ‘Green is a way to go today’, implying integrating green practices in our daily lives.

In simple words, Green technology means that is environmentally friendly, developed and used in such a way so that it does not disturb our environment and ecosystem, and thereby helps in conserving our natural resources. ‘Green technology’ as a term, is often used interchangeably with ‘Environmental technology’ or ‘Clean technology’. Most developed and developing countries are increasingly turning to green technology to secure the environment from negative impacts, reduce pollution and improve cleanliness. Overall, green technology aims at contributing environmental sustainability.

Green technology can be defined as an umbrella term that refers to use of technology that makes products/services and processes more environmentally friendly and sustainable (Van Berkel, 2000). For example, by reducing CO2 emissions, making products more biodegradable, building zero-emission houses using green technologies such as solar panels, innovative insulation etc. Green technology is a technology whose use is intended to mitigate or reverse the effects of human activity on the environment. Green technology not only reduce adverse effects on the environment but also helps in improving productivity, efficiency, and operational performance of the technology itself.

Energy, Environment, Economy and Social, are often described as four pillars of green technology. Green technology seeks to attain energy independence and promote efficient utilization; helps to conserve and minimize the impact on the environment; enhance the national economic development using technology; and finally improves the quality of life for all (Roseland, 2000).

Since ‘green technology’ is relatively new term used by most industries these days of circular economy, and therefore there is ambiguity in understanding of this term. For this research, ‘Green Technology’ means either integration in product or services or process for sustainability business leading to business model innovation. In recent times, green technology is often explained in context of circular economy. The ‘circular economy’ is a new industrial system that replaces the ‘end-of-life’ concept by restoration and regeneration through intention and design. Sempels and Hoffmann (2013), further explains that “By redesigning products, services or processes, it transforms a waste or previously unvalorised resource into a productive one that may be reused in closed-loop systems”. For example: Xerox has developed machines with this logic, the components of old machines being recovered to be reintroduced in the manufacture of new generations of machines. The implementation of such logic calls for drastic change in many business blocks of the business model (Sempels and Hoffmann, 2013). Literature reveals that great majority of economic models are structured around linear flows of materials. When resources become rare, and therefore expensive, the price of energy increases and so does the degradation of the biosphere. When the generation of waste results in increasingly intolerable environmental and social issues, the model is unacceptable in all its dimensions, even one based on a traditional economic plan. This more so increasingly creates importance of use of green technologies in redesigning offerings (products, services or processes) for transformation of waste to productive resource.

The following are the green technology strategies, commonly adopted by companies to ‘go green’ –

1. Recycling
2. Environmental remediation
3. Alternative fuels,
4. Cradle to cradle
5. Sustainable development and building
6. Green nanotechnology

3.6 Green process and green products/services

The literal meaning of 'greening' of any business is reduction of ecological footprints. The recent focus of research on green concepts; viz-a-viz green economy, green growth, eco-industries, green technologies, all emphasise sustainable development, and sustainable use of resources, to save for future generations. To meet sustainable development goals and to reduce environmental risks to future generations, companies are increasingly focusing on innovation of green technologies. The other main drivers of companies increased focus on green aspects of business, are (Henriksen, Bjerre, Maria Almasi & Damgaard-Grann, 2012) –

a) Current resource scarcities which are expected to rise further,
b) Increasing unstable and unpredictable prices on natural assets,
c) Global challenges of providing viable solutions for environmental and climate change issues.

According to report from Nordic Innovation (2012), businesses can be green by producing green products or provide services that green other businesses or consumers (green products or services); or they can be green by greening their own processes or the processes in other parts of their value chain (greening of processes).

The Nordic report further highlights that it is not always clear-cut, since some businesses may both green by providing a sustainable product or service and at the same time green a process. By integrating green technology in a business, means either emphasis on products for others (products which have a smaller ecological footprint) or the businesses which emphasis services for others (services which help making other businesses green). The overall objective of implementation of green practices, is to reduce impact on the environment, lower production cost, minimize ecological impact on business functions and improve product value (Hung Lau, 2011). These include green purchasing, green material management and manufacturing, green distribution and marketing, as well as reverse logistics. According to green supply chain management study by Hung Lau (2011), green activities especially related to green logistics can be regarded as part of green supply chain management. The green activities involved include product design, supplier selection and material sourcing, inbound transportation,

manufacturing processes, waste reduction, product packaging, distribution and delivery to customers, and end-of-life product returns for recycling and reuse. The study found that adoption of green activities (including green purchasing, green packaging and green transportation) in very large-sized firms are performing better than large and medium-sized firms.

Another aspect of integrating green activities in business, is by bringing innovation related to green products/services or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste-recycling, green product designs, or corporate environmental management (Chen, Lai & Wen, 2006). This is referred as 'Green Innovation'. With increase consumer awareness on environmental issues in recent times, and so more consumers willing to pay more attention to green products/services (Chen & Chang, 2012). Green product or service innovation is important for companies and is a crucial part of business management (Chen & Chang, 2013). Green innovation is used to boost the performance of environmental management to satisfy the requirement of environmental protection (Lai, Wen & Chen, 2003). The study by Lai, Wen and Chen (2003), divided green innovation into 'green product innovation' and 'green process innovation'. The performance of green product innovation is defined as the product or service innovation that is related to environmental innovation, including the innovation in product that are involved in energy saving, pollution-prevention, waste recycling, no toxicity, or green product designs. The performance of green process innovation is defined as the process innovation that is related to energy-saving, pollution-prevention, waste recycling, or no toxicity.

3.7 Green technologies and business model innovation

So far, there has been no well-established internationally acknowledged definition of green business model innovation, addressing integration of green (in form of products or services or processes). Also, there is very limited research evidence on concepts of green business model innovation. (Nordic Reports, 2012). However, there are research studies that debate about how companies green their businesses and how these companies can be classified as 'green

companies'. This section of literature review is based largely on Nordic innovation reports and OECD reports.

Smith and Perks (2010), conducted a perceptual study of the impact of green practice implementation on the business functions. The study emphasized the need to develop systems and structures within firm's business that satisfy the requirements of green business practices while still achieving strategic business goals. Business functions were grouped as follows: manufacturing/operations, marketing/sales, purchasing/supply chain management, distribution/logistics, finance/information technology, and general management/human resources. The study concluded that management and employees of the businesses should consciously strive to use resources more efficiently in the greening of all the business functions. This could give businesses a competitive advantage that could positively impact, particularly the marketing function of business (Smith & Perks, 2010).

Several challenges and barriers have been identified in development and uptake of green technology and innovation. According to OECD reports, these barriers are -

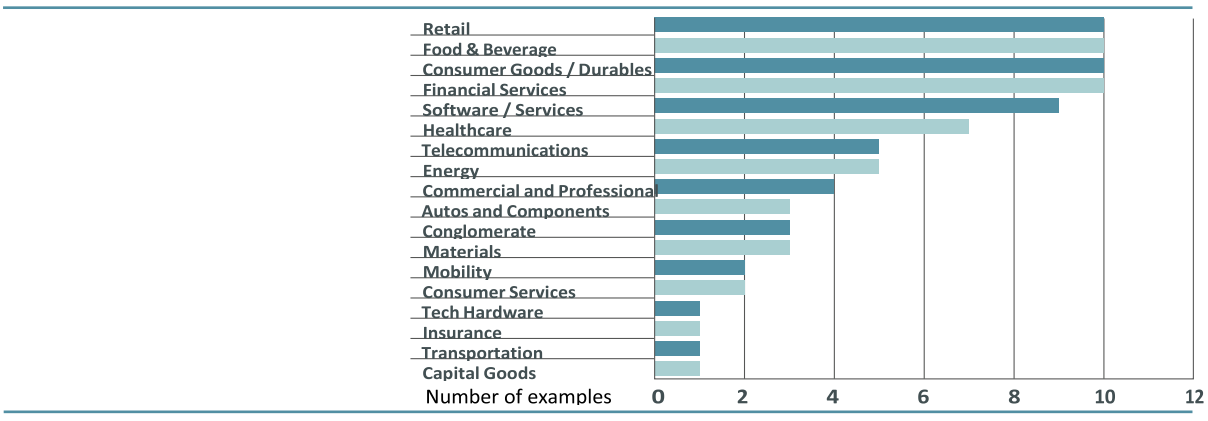
1. Inadequate government intervention particularly to support business for funding green technologies.
2. Inadequate incentives for entrepreneurs and firms to invest in development or the diffusion of green technologies.
3. Public support for R&D spilled over broadly diverse societal benefits, leading to underinvestment of business to R&D at socially optimal level.
4. Market failures, such as credibility problems or learning-by-doing effects, inhibits the development and diffusion of green technology.
5. Weak market understanding of environmental benefits of green technologies, resulting in less diffusion and adoption of such technologies.
6. Systematic failures of technological innovations, and thereby, hindering the flow of knowledge and technology and reducing the overall efficiency of system-wise R&D and innovation efforts (OCED, 1998, 1999).

7. Other barriers particularly related to markets for green innovation, include, uncertainty of success, long timescales for infrastructure replacement and development, lack of options for product differentiation, uncertainty and consumer behavioural failures, etc.
8. Barriers can also relate to firm/company size, including lack of financing, qualified employees, small size of market, etc.

As per OECD reports (2011), commercialization of new green technologies is most challenging even for large firms, whether they are multinationals or national corporations. The main challenge lies with scale, scope and experience, adapting to rapidly changing market environments and high costs of R&D. OCED reports further identifies three biggest obstacles to uptake green innovation, namely; (1) uncertain market demand, (2) uncertain returns on investment, and (3) lack of funds.

Another research on business model innovation for sustainability, (Clinton & Whisnant, 2014), reveals number of examples across industries (refer Figure 3.3: Business model innovation by industry), which together comprise of companies with diverse business models. Most of the business models are dependent on increase utilization of technology to bring innovation. Industries like food & beverage, financial services, healthcare, etc. are witnessing innovation, mainly due to experimentation with delivering affordable services to low-income customers in developing countries.

Figure 3.3: Business model innovation by industry



Source: Clinton & Whisnant, 2014

3.8 Business Model – sustainability and performance metrics

Sustainability is defined as the ability of any process to remain in a continued state of being, by adapting to or withstanding the changes, both negative and positive, within its environment (Mann, Grant & Mann, 2009). Sustainability of any company can be measured as an impact to three pillars of sustainable development; namely, social, economic and environmental influence.

As per Girotra and Netessine (2014), sustainable business models allow profit-oriented companies to earn profits in face of uncertainty and rational utility-maximizing behaviour by key players in model, while having minimal long-lasting impact. The research by Girotra and Netessine (2014), suggests organizations that develop innovative new sustainable technologies must often identify new different business models, distinct from those of the incumbents they substitute, to facilitate the commercialization and consumer acceptance of their newly developed technology. Furthermore, Girotra and Netessine (2014), identifies two types of business model inefficiencies for sustainability, which can arise at different stages of the value chain; namely – *Information inefficiencies*, and *alignment inefficiencies*. Information inefficiencies implies incomplete or incorrect information in making business model decisions. Alignment inefficiencies mean decisions made by key individuals or companies whose objectives are not in line with each other or not in line with entire value chain. Overcoming these two inefficiencies, will lead to formation of new business model that enable the adoption of sustainable practices, including green technological innovation. Literature predicts that the companies that will place amongst the top performers in sustainability in future years, will be those that will be able to turn sustainability into a key business driver (Olsen & Boxenbaum, 2009).

3.9 Green economy and sustainable development

The concept of green economy involves the use of natural resources, energy and new technologies with more environmentally friendly and cleaner production methods to promote economic growth and new job creation (Bobonea & Joia, 2012). As Juan Zhang (2012) says, the external environment will prompt firms and encourage them to implement a green economy. This green economy can also be referred to as a low carbon economy whereby the aim is to reduce coal and oil consumption, decrease greenhouse gases and achieve economic and social development and ecological environmental protection (Zhang, 2012). Fulai (2010) states that the term 'green' can be associated with the environment, forestry, natural, fresh and sustainable. Whereas the term 'economy' is referred to as the economic system.

Currently, there is a risk that the concept of a 'green economy' will be discredited and is seen as a short-term tweak to a firm's current business model to gain a competitive advantage rather than seeing it as a long-term adjustment to save the planet and its valuable resources (Bigg, 2011). 'Green jobs' seem to be driven by short-term economic difficulties and where a quick advantage can be gained. If these jobs fail to do so, the notion is short-lived, and it is made clear that going green was never a major priority in the firm (Bigg, 2011).

Babonea and Joia (2012) highlight the importance that due to our current environmental status with regards to the ozone layer depleting, climate change, our oil reserves running out amongst other factors, that there is an imperative need to make the transition to a more "green" and sustainable economy and environment. To fully make the transition to a green economy, there has to be a cumulative and collaborative involvement from consumers, countries, firms and all other stakeholders to support and invest into this concept (Bobonea & Joia, 2012).

By supporting this economy concept, companies and the like will be able to create significantly more jobs to develop new green technology innovations. The green economy workplace requires a new set of technical skills and knowledge to be taught and learnt by employers and employees (Wapner, 2011). Wapner (2011) also defines a green enhanced business model as

"ensure fair use of ecological resources and sinks at re-generational and bio-assimilation rates". The green economy should bring positive values such as a strong work ethic, innovation and strong societal values to society. It should also see the rise of new leaders with the qualities of being environmentally friendly and socially conscious (Green & McCann, 2011). It is important to note that as emerging countries may not have the aged and developed infrastructure like that of first world countries, that it is easier for them to implement a green economy as they do not have to replace existing infrastructure (which they don't have) but rather are able to start development with the 'new' infrastructure (Bigg, 2011).

Clapp and Dauvergne (2011) emphasise the importance of working towards a green economy as reactive crisis management will not be enough to save the planet in the future. The focus needs to switch now to one concerning the environment before it is too late. Companies need to transform their processes to be more environmentally friendly, as well as convert the products to be more 'green'. Consumers need to play their part and begin to support 'green' products over ordinary products (Zaharia, Tudorescu, & Zaharia, 2011).

As discussed above, a green economy is not simply the firm's responsibility, but rather a global effort towards sustainability. One role required of firms is the task of coordinating the information, negotiation and implementation related to changing environmental behaviour globally (DeSombre, 2011). Domestic activities such as transportation and deforestation are now perceived to have global effects for example on climate change or nutrient cycle. The environment is everybody's concern and therefore if only a handful of firms/states aim to address the issues, there is no realistic way of moving towards a green economy. Institutions need to decrease uncertainty amongst themselves, decrease the global disadvantages of going green (e.g. costs), coordinate global standards and regulations that will force institutes to go 'greener' and be able to manage the adjustments needed when global regulation is not forcefully implemented (DeSombre, 2011).

Adopting the culture of a green economy does not mean taking your current model and adding a bit of 'green' to it, but rather a complete restructuring of a firm's model where 'green' is made a priority (Halle, 2011). The traditional way of doing business needs to be rethought with

a new green perspective to take priority (Najam, Runnalls, & Halle, 2007). Halle (2011) describes a green economy as one that will take us towards sustainable development. He argues that once a green economy is in place, then the focus can be on sustainable development.

Halle (2011) explains that the most signifying difference between sustainable development and a green economy lies in the recognition that an efficiently functioning economy is a prerequisite for addressing the social and environment pillars of sustainability. So, a green economy recognises that, in the end, economic activity will determine whether we attain success in dealing with the problems of social marginalization and environmental destruction (Halle, 2011).

Halle (2011) has described that in a green economy, steps that are taken to reach economic ends also improve environmental and social actions, in the same way actions taken to reach environmental and social ends strengthen and develop the economy. Achieving sustainable development through greening the economy leads to 'green growth'. According to OCED report analysis (Jänicke, 2012), green growth implies policies that either reduce resource use per unit of value added incrementally (relative decoupling) or keep resource use and environmental impacts stable or declining while the overall economy is growing (absolute decoupling). Green growth agenda, however, is wider: its goal is to pursue economic growth and shared prosperity while preventing environmental degradation. Innovation plays a key role in greening growth. As per OCED Green Growth Strategy, innovation together with market-based incentives and appropriate regulation and taxation, can accelerate the transition to greener growth and help decouple environmental degradation from economic growth (OECD, 2011). The OECD Green Growth Strategy therefore called for countries to take a coherent, co-ordinated policy approach to green growth based on a sound innovation policies and a range of policy tools to create, diffuse and apply knowledge. In recent years, the OECD countries have been able to achieve absolute decoupling of GDP growth and emissions of certain acidifying substances, such as sulphur oxide (SOx) and nitrogen oxide (NOx). However, they have only been able to achieve a relative decoupling of GDP growth from GHG emissions, as these have continued to rise. Indeed, in many areas environmental pressures have continued to increase as economies have grown, notably in non-OECD countries (OCED, 2011).

3.10 Bottom of pyramid (BOP)

In economies, the BOP is the largest, but poorest socio-economic group. The bottom of pyramid (BOP) represents people who are represented in the bottom (4^{th}) tier of the world income pyramid. The more current usage refers to the people living on less than $2 per day, as first defined in 1998 by C.K. Prahlad and Staurt. L. Hart. C.K. Prahlad has largely highlighted the concept of BOP in his research papers. Four billion people, a majority of world's population constitute the base of the economic pyramid (BOP). Prahalad has put forward that BOP should be "viewed as a growth opportunity and as a source of innovation" (Landrum, 2007), in terms of products, services, business models and so forth within the private sector. As with a more recent trend "the poor are increasingly recognized as highly resourceful entrepreneurs who possess valuable knowledge, resources and capabilities" (Simanis & Hart, 2006). Prahlad further proposes that business, governments and donor agencies stop-thinking of the poor as victim and instead start seeing them as resilient and creative entrepreneurs as well as value-demanding consumers. As already discussed, MNCs from the developed countries are becoming increasingly interested in the bottom of pyramid (BOP) which is an untapped market consisting of more than four billion potential customers. These four billion people living in both rural and urban settings, represents multiple cultures, ethnicity, literacy, capability and needs. The bottom of pyramid represents new market opportunities for the MNCs as well as the possibility of contributing to the alleviation of poverty. However, undifferentiated approach by companies to these markets will not work. Selling sustainable products to BOP markets, companies can significantly expand their consumer base and at the same time empower poor people to be lifted out of poverty. To convert the bottom of pyramid into micro-consumers, micro-producers, micro-investors and innovators, companies require a new focus on 4As (Prahalad, 2012).

- Creating an *Awareness* of product and service offerings, such that the BOP consumers and producers know what is available in market and on offer how to use it.
- Enabling *Access* such that even consumers in remote locations are able to get access to the products/service.
- Ensuring that the products and services is *Affordable*, thereby demanding companies to re-work on their pricing strategies.
- Focusing on *Availability* to build trust and a loyal base at the bottom of the pyramid, to ensure an uninterrupted supply of product and services. Availability of products and

services also serves as one of the biggest challenges of serving BOP markets. (Anderson & Billou, 2007). Fragmented or non-existent distribution channels are also the reason.

BOP strategies are therefore interesting for MNCs not only for their potential financial returns but also the social impact that they create by providing access to new products, services or even employment opportunities to low income populations. BOP strategies present economic opportunities and bring other benefits to the MNC such as motivation of human resources and increased brand image. The BOP market is not only an opportunity for MNCs but also a challenge which may hold substantial learning and innovation for MNCs. But, there are several business challenges besides opportunities of companies to provide affordable solutions to meet the demand at the BOP. These challenges include limited purchasing power of poor consumers, weak infrastructure, geographical, economic, and cultural distances. The BOP markets, rest on low margin per unit and high volumes. In order to successfully manage business conditions at the BOP, the companies must be innovative in their approach and customise their products, production, and prices to the realities in BOP markets.

Besides above, Prahalad (2012), proposes four key elements to thrive in the low-income market:

- Creating buying power
- Shaping aspirations through product innovation and consumer education
- Improving access through better distribution and communication systems
- Tailoring local solutions, including local BOP strategies

In contrast, Crabtree (2007), Karnani (2007), Landrum (2007) questions the viability of this preposition and proceeds to argue almost the opposite by stating that there exist huge risks for MNCs to change their marketing focus to an unknown, geographically dispersed market which might lead to further exploitation of the already poor if they do indeed succeed.

It has been further argued that there is fortune at the BOP and that the private sector and entrepreneurs should target these vast untapped rural markets in developing countries with low cost services and appropriate business strategies. However, this notion has been opposed by stating that it is a mistake to claim that there is much untapped purchasing power because the poor consume most of what they earn, and consequently, have a low savings rate (Masinge, 2010).

Karnani (2007) further questions, the real size of the BOP market and highlights the cost-quality trade-off when pursuing this market which further emphasizes the risks element to MNCs. However, business opportunities at the bottom of the pyramid challenge conventional ways of doing things (Massa & Tucci, 2013). The bottom of the pyramid proposition can be summarised as follows:

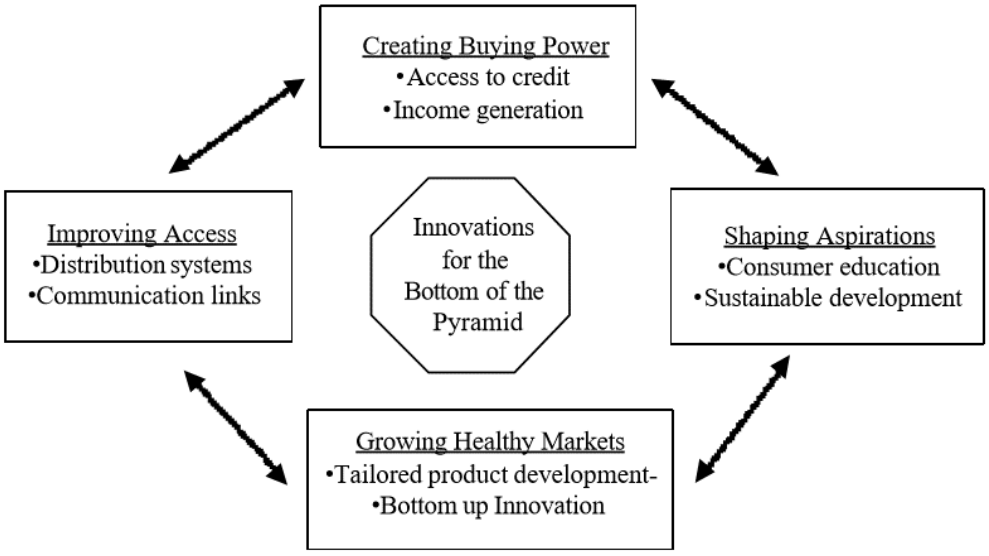
- There is much untapped purchasing power at the BOP, private companies can make significant profits by selling to the poor
- By selling to the poor, private companies can bring prosperity to the poor, and thus can help eradicate poverty
- Large MNCs should play the leading role in this process of selling to the poor

At the BOP, consumer goods are undersupplied, with limited suppliers, leading to higher prices, and because these consumers have a lack of choice for lower quality products (Warnholz, 2007).

Another study on business at the bottom of the pyramid, by Agnihotri (2013), suggests that in terms of improving standards of living, companies can help poor people by treating them as suppliers, producers, and/or employees, not as customers alone. It is easier to raise disposable income than come up with disruptive models and technologies to reduce cost and therefore prices of products and services. The study also concluded that firms can make profits from customers at the bottom of pyramid if they can reduce poverty premiums for such customers and provide affordable utilitarian goods and services. This in turn will help companies to lower their cost structure, improve living standard, and eradicate poverty.

To successfully target BOP consumers, companies need to understand social systems and consumer preferences in the relevant country as a bare minimum. They also need to establish a value chain to efficiently target BOP consumers, do their bit to help combat poverty, make a profit, and finally ensure sustainability. Prahalad and Hart (1999), suggests managers must conceive and create a low cost, high quality distribution system. Firms attempting to develop these markets must be assured that they will be able to create loyalty to their products and services through education and reliable service, without excessive government intervention. Managers of such firms must develop a commercial infrastructure tailored to the needs and challenges of BOP consumers. Creation of such commercial infrastructure is an investment. (Refer Figure 3.4: Commercial Infrastructure for the Bottom of Pyramid), the elements of this infrastructure are creating buying power, shaping aspirations, improving access, and growing healthy markets.

Figure 3.4: Commercial Infrastructure for the Bottom of Pyramid



Source: Prahalad & Hart, 1999

To operate profitability in these setting, companies have to transcend technology and product perspectives of innovation and focus on total delivery of value. Companies need to re-think the very source, the focus and the process of innovation. (Prahalad, 2012). To capture middle and lower part of the income pyramid, which constitutes approximately 80% of the world's consumers, companies will need to innovate. This innovation is not only desired in products or technology, but in the business models that potentially addresses the range of challenges in these markets. Often, the challenges are as follows (Innovation in Emerging Markets, 2010):

1. Poor distribution systems
2. Government restrictions
3. Cultural complexities
4. Population widely dispersed over isolated rural areas
5. Potential consumers with small and unpredicted income streams

That is why countless ventures have failed, due to lack of understanding of local needs for instance, or disputes with local people. Another reason for failing of companies following the BOP preposition is that businesses often overestimate the purchasing power of poor people and set prices of their offerings too high. The BOP consumers are price sensitive, and are vulnerable by virtue of lack of information, proper education, combined with economic, cultural and social deprivations (Karnani, 2007).

Despite risks involved in targeting business at BOP consumers and the fact that it isn't easy to secure a profit in the short term, there is no denying that BOP business represents a new frontier for companies in advance countries, where there is unlikely to much in the way of economic growth in the future. As the process of globalization marches on, BOP business offers the potential to both resolve issues facing developing countries and expand business overseas. Companies, governments, NGOs and other organizations are going to have to innovate to get such business up and running.

Globalization is changing the ways by which companies can create value. For developing countries, it is not an extrapolation of the past experiences of developed countries, nor is it just

about low costs and outsourcing. The real opportunities lie in the proliferation of ways to design a better business. Management expert C.K. Prahlad, laying the framework for the BOP market, argued that 'sustainable product innovations initiated in Tier 4, and promoted through consumer education, will not only positively influence the choice of people at the bottom of the pyramid, but may ultimately reshape the way Americans and others in Tier 1 live'.

Prahlad outlines 12 principles of innovation for the BOP markets:

- Create a new price performance envelope.
- Creativity blend existing technologies with new technologies.
- Ensure that the solutions developed are scalable and transferable across countries.
- Use minimum resources.
- Develop the product based on functionality and not just of form.
- Process innovations to address logistics constraints.
- Deskill the work content.
- Educate customers.
- Ensure that products will work in hostile environments.
- Ensure research on interfaces – this is critical.
- Design methods to make innovation reach the user, and
- Focus on the broad architecture of the system.

BOP market is large and the needs to be addressed are basic yet particular. Due to reasons of affordability, acceptability, availability and awareness, MNCs must develop new approaches to target BOP markets, approaches that are different from the traditional developed country markets of MNCs. A whole new market needs to be created for BOP in developing markets, rather than just serving an existing market more efficiently (Prahalad, 2012).

Pitta, Guesalaga and Marshall (2008) noted that, traditionally, companies have been focused on serving the top of the pyramid, and that their organisation, corporate culture and internal processes require economies of scale, which demand exploiting the richest target markets. In

many cases, successful companies have evolved into efficient machines whose foundation is high structural cost. Thus, targeting the most lucrative segments is vital for continued success.

The BOP is linked to technology innovations and business models, as businesses have to re-evaluate their price-performance relationships for products and services as well as implement radical technology innovations. The business models of companies will have to shift focus to highly distributed, small-scale operations and determine new ways of measuring financial success, i.e. therefore also transforming revenue models. If companies are willing to change their business models, the BOP can be highly profitable market, as profits are driven by volume and capital efficiency and although margins are low, unit sales can be extremely high. Therefore, to successfully target the BOP, companies must focus their business models on innovation and economic profit, instead of gross margins. There are four key elements that are imperative to success in the BOP, namely, creating buyer power (Porter's five forces); shaping aspirations; improving access; and tailoring local solutions (Prahalad & Hart, 2008).

3.11 Summary

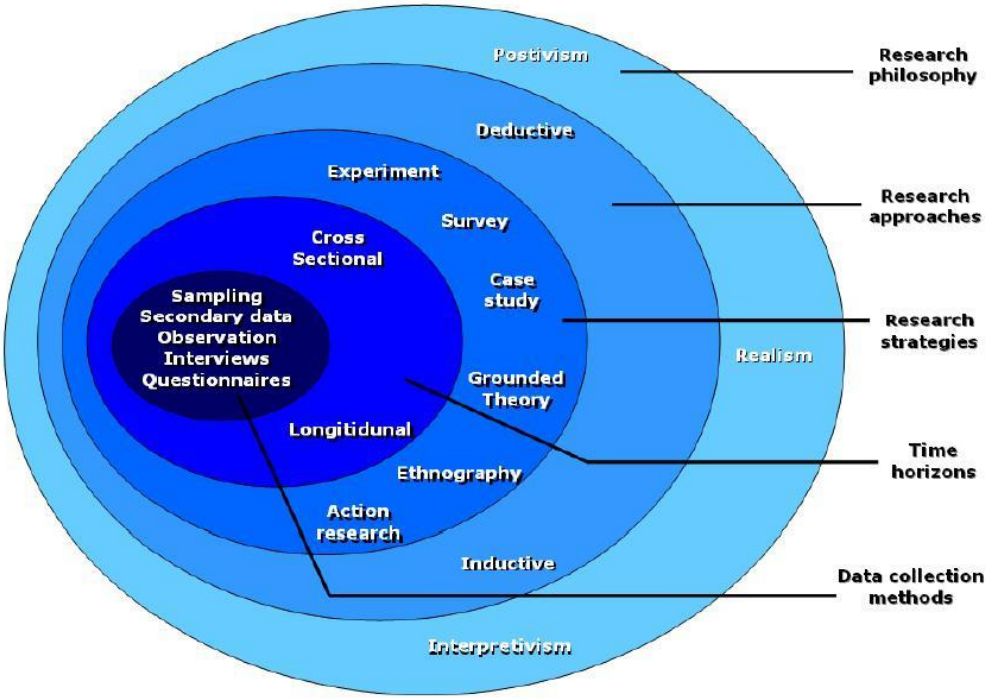
This chapter reviewed the literature and provided the theoretical groundings of underpinning concepts of business model, business model innovation, sustainability and green economy. It discussed in detail the bottom of pyramid, regarding emerging economies. Furthermore, the details of research areas like green technologies, green innovation in relation to sustainable development and Bottom of Pyramid (BOP) was discussed in detail.

CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

The research design and methodology outlines the procedures that are followed by the researcher when conducting the research study. This chapter will follow the research methodology guidelines suggested by Saunders, Lewis and Thornhill (2012, p. 118) as illustrated below:

Figure 4.1: Research methodology framework for the study



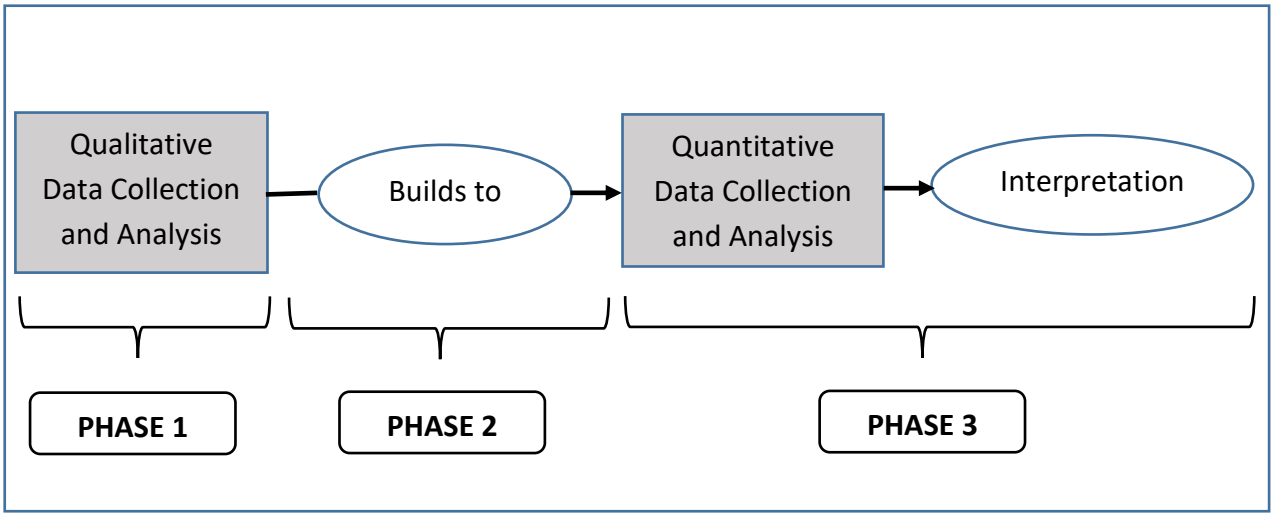
Source: Saunders, Lewis & Thornhill, 2012, p. 119

Business model innovation means a new way of creating value to the customers and capturing value for the company. Therefore, there is strong company dimension of sustainable business model. Although, the concept business model innovation has been widely used in practice and gained considerable attention from businesses across sectors, but there is very limited research on sustainability of business model innovation. Over the last decade, the idea of integration of

green practices has progressively gained popularity among businesses, especially with cumulative efforts of companies to reduce carbon footage. Yet, very few research evidence is existing in context of business model innovation of companies integrating green technologies, especially targeting bottom of pyramid. The present study explores a new area of relationship between business model innovations, its sustainability, integration of green technologies in companies somewhere targeting bottom of pyramid. Therefore, the study will first require an understanding of industry perspective, to develop a theoretical framework for Green BOP Business Model Innovation. The study used mixed method approach, i.e. both quantitative and qualitative methods. Industry perspective has been studied using inductive approach, and then using content analysis a theoretical framework is conceptualized. Later, using deductive approach, the conceptualized theory is being tested to generalize the findings. Table 4.1: Summary of research phases summarizes components of research design across phases of current study.

Therefore, the present study was carried out in three phases (refer Figure 4.2: Exploratory sequential design, a mixed method approach) using an exploratory sequential mixed method design (Creswell and Clark, 2007). This design is appropriate to use, as present research tests underpinning factors of emerging green business model innovation for sustainable development, resulting from the qualitative phase, and that it can also be used to expand and generalize qualitative findings by using quantitative methods. (Morgan, 1998).

Figure 4.2: Exploratory sequential design, a mixed method approach



Source: Adapted from Creswell & Clark, 2011

Using a three-phase approach, (Creswell, 2009), the researcher first gathers qualitative data and analyses it (Phase 1), and uses the analysis to develop a theoretical framework (Phase 2) that is subsequently administered to a sample of population to gather quantitative data (Phase 3). Therefore, the three phases of present research are:

Phase 1: Exploration and study of business model innovation of identified industries/sectors with green technologies, targeting bottom of pyramid segment for sustainable development, using qualitative research methods.

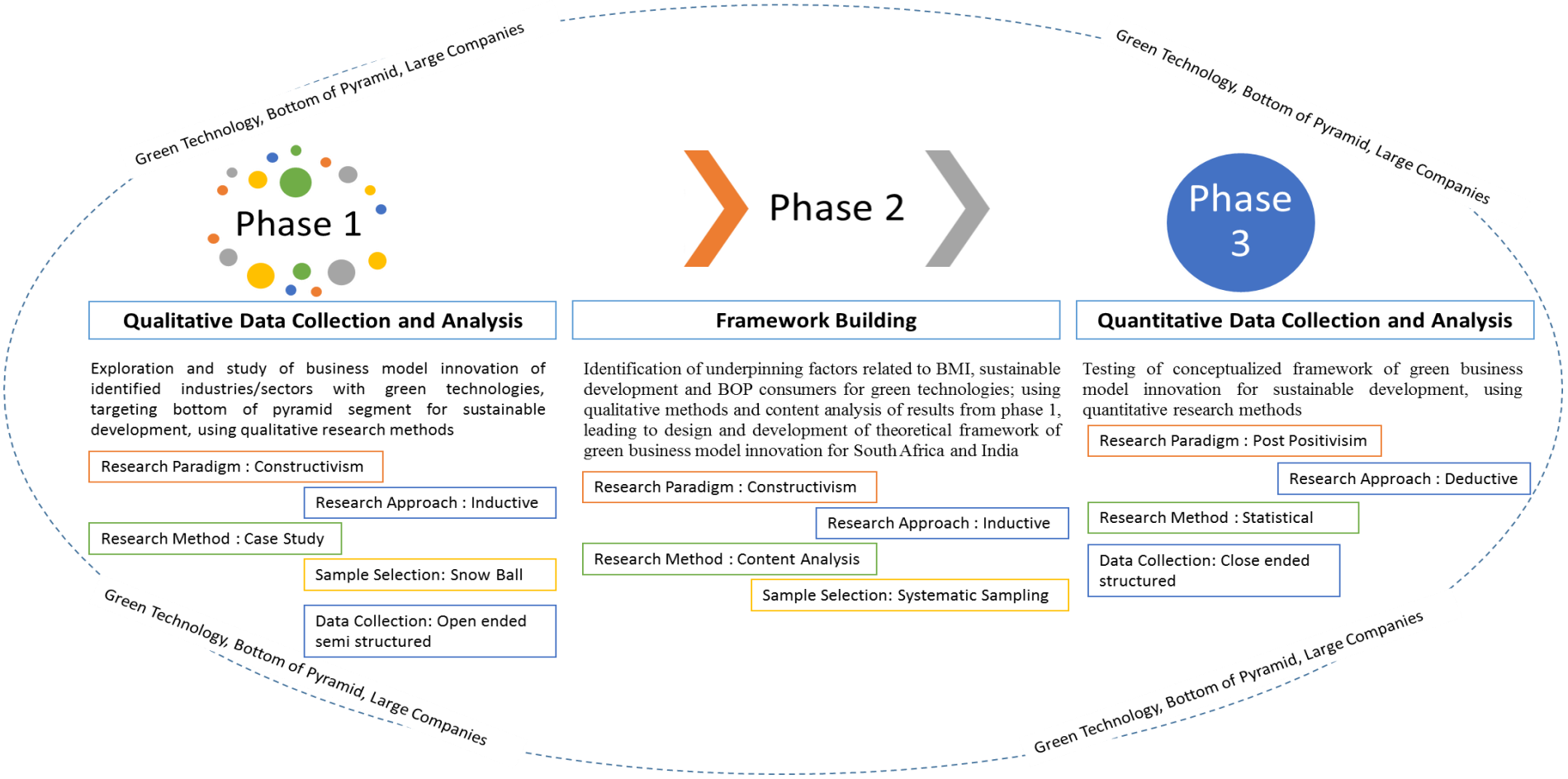
Phase 2: Identification of underpinning factors related to BMI, sustainable development and BOP consumers for green technologies; using qualitative methods and content analysis of results from phase 1, leading to design and development of theoretical framework of green business model innovation for South Africa and India.

Phase 3: Testing of conceptualized framework of green business model innovation for sustainable development, using quantitative research methods.

The following diagram shows the overall research methodology framework, compiled by researcher (2016)

Figure 4.3: Overall research methodology

(Compiled by researcher, 2016)



The table below summarizes the research methodology of current research study.

Table 4.1: Summary of research phases

(compiled by researcher, 2016)

Type of Research Design – Exploratory Sequential Design	PHASE 1	PHASE 2	PHASE 3
Research focus	Exploration of business model innovation of identified industries/sectors with green technologies, targeting bottom of pyramid segment for sustainable development	Design and development of theoretical framework of green business model innovation leading to identification of underpinning factors and driving possible prepositions	Testing of conceptualized /theoretical framework of green business model innovation for sustainable development
Research paradigm	Constructivism	Constructivism	Postpositivism
Research approach	Inductive	Inductive	Deductive
Research method	Qualitative data analysis Case-study approach	Qualitative data analysis further supplemented by Content analysis – going froth and back with qualitative data results and literature review to build theory	Survey (Online) Measurement Model & Structural Model Assessment

Nature of research	Qualitative	Qualitative	Quantitative
Data collection method	In-depth face-to-face interviews, transcripts, secondary desk research from publicly available corporate material including reports		On-line survey on employees of large companies (BOP as one of their customer segment) with integration of green technologies in offerings
Data collection tool	Open-ended semi-structured interview schedule		Close-ended structured questionnaire
Research sample	Top level management stakeholders like CEOs/CFOs, MDs, Senior Managers, Owners, Co-owners		Top and middle level managers and employees
Research locale	South Africa and India	South Africa and India	South Africa
Data analysis software	NVivo 11	NVivo 11	Smart PLS

4.2 Research Strategy

In this section, the research philosophy, research approach and research design is discussed in detail, along with justification of methods adopted for present research.

4.2.1 Research Philosophy

Research philosophy represents a wide spectrum of paradigms, with a rigid positivistic conception of research with quantitative, experimental methodology on one end, and on the other end, an open, explorative, descriptive, interpretive conception using qualitative methods (Mayring, 2014). In simpler words, research philosophy or paradigm refers to the way in which a researcher thinks about the development of knowledge. Paradigm represents a worldview (Guba & Linclon, 1994), are point of views or fundamental models or frames of reference, a researcher use to organize observations and reasoning. Paradigm are set of basic beliefs (or metaphysis) that deals with ultimate or first principles (Guba & Linclon, 1994). Creswell (2009) describes four types of research paradigms or worldview (a basic set of beliefs that guide action); namely postpositivism, constructivism, advocacy/participatory, and pragmatism.

The present research study adopts and follows both constructivism and postpositivism paradigm, as usually implemented with mixed methods research. The mixed method research combines both qualitative and quantitative methods in a single study. Therefore, it involves both deductive and inductive approach, as the researcher mixes both qualitative and quantitative data (Creswell and Clark, 2011).

The researcher in present study shifts from a constructivist worldview in the first and second phase of the research into a postpositivist worldview in the third phase (Creswell & Clark, 2011). The researcher work on constructivist principles during the first two phases of the study, to gain deeper understanding and value multiple perspectives of the research area. In third phase of study, the researcher shifts to underlying assumptions of postpositivism, to identify and measure variables and evolve statistical trends. Therefore, multiple worldviews are used in this research and worldviews shift from one phase to the other phase (Mayring, 2014).

According to Creswell and Clark (2011), Constructivism, is typically associated with qualitative approaches. The understanding or meaning of phenomena, formed through participants and their subjective views, make up this worldview. When participants provide

their understandings, they speak from meanings shaped by social interaction with others and from their own personal histories. In this form of inquiry, research is shaped from the bottom up – from individual perspectives to broad patterns and ultimately to broad understandings viz-a-viz leading to theory generation. Table 4.2: Basic beliefs of alternative inquiry paradigms depicts three fundamental questions, based on ontological, epistemological and methodological assumptions, which serve as a major focus around each paradigm (Guba & Linclon, 1994).

On the other side, postpositivism is often associated with quantitative approaches. Researchers make claims for knowledge based on determinism or cause-and-effect thinking, reductionism, by narrowing and focusing on select variables to interrelate, detailed observations and measures of variables, and ultimately testing of theories that are continually refined (Creswell & Clark, 2011).

Table 4.2: Basic beliefs of alternative inquiry paradigms

Item	Positivism	Postpositivism	Critical Theory	Constructivism
Ontology	Naïve realism – "real" reality but apprehensible	Critical realism – "real" reality but only imperfectly and probabilistically apprehensible	Historical realism – virtual reality shaped by social, political, cultural, economic, ethnic, and gender values; crystalized over time	Relativism – local and specific constructed and co-constructed realities.
Epistemology	Dualistic/objectivistic; findings true	Modified dualistic/ objectivistic; critical tradition/ community; findings probably true	Transactional/ subjectivist; value-mediated findings	Transactions/ subjectivist; created findings

Methodology	Experimental/ manipulative; verification of hypothesis; clarify quantitative methods	Modified experimental/ manipulative; critical multiplism; falsification of hypothesis; may include qualitative methods	Dialogical/ dialectical	Hermeneutical/ dialectical

Source: Guba & Lincoln, 1994

A different paradigm can be followed in different phases of mixed method research. (Mayring, 2014, p. 8). Therefore, from research methodological point of view, in present study, the researcher works from the bottom-up (deductively) in phase 1 and 2, using the respondent's views to build broader themes and generate a theory by interconnecting the themes, thereby following constructivism paradigm. In phase 3 of study, the researcher works from the top-down (inductively), from theory to hypothesis to data to add to or contradict the theory, testifying the theory developed during phase 1 and 2 by using quantitative methods, thereby following postpositivism paradigm.

4.2.2 Quantitative, Qualitative and Mixed method approaches

Quantitative research is most common method for explaining phenomenon (Burrell & Morgan, 1979). It is a means of testing objective theories by examining relationship among variables. These variables, in term, can be measured, typically on instruments, so that numbered data can be analysed using statistical procedures (Gilbert, 2001). Researchers have assumptions about testing theories deductively, building in protection against bias, controlling for alternative explanations, and being able to generalize and replicate the findings (Creswell, 2009). A quantitative survey method is very effective for collecting information from large number of respondents (McDaniel & Gates, 2006).

Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging

questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data (Creswell, 2009).

Mixed methods research is an approach to inquiry that combines or associates both qualitative and quantitative forms. It involves the use of both approaches in tandem so that the overall strength of a study is greater than qualitative or quantitative research (Creswell & Clark, 2011).

4.2.3 Research approach adopted for this study – Mixed Method

As discussed in introduction if this chapter, a multi-dimensional, complex, holistic and dynamic nature of the concepts of business model innovation, sustainable development and green technology demand a multi-method research approach. Therefore, the present study uses mixed methods research to elicit detail information. Mixed method research is the type of research in which a researcher or team of researchers combine elements of qualitative and quantitative research approaches (e.g.: use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purposes of breadth and depth of understanding and corroboration (Creswell & Clark, 2007). In simpler terms, mixed methods include combination of qualitative and quantitative research.

Creswell and Clark (2007, p. 5) believes that the use of quantitative and qualitative approaches, in combination, provides a better understanding of research problems than either approach alone. With this belief and because of nature of present research, the researcher implemented mixed method research approach.

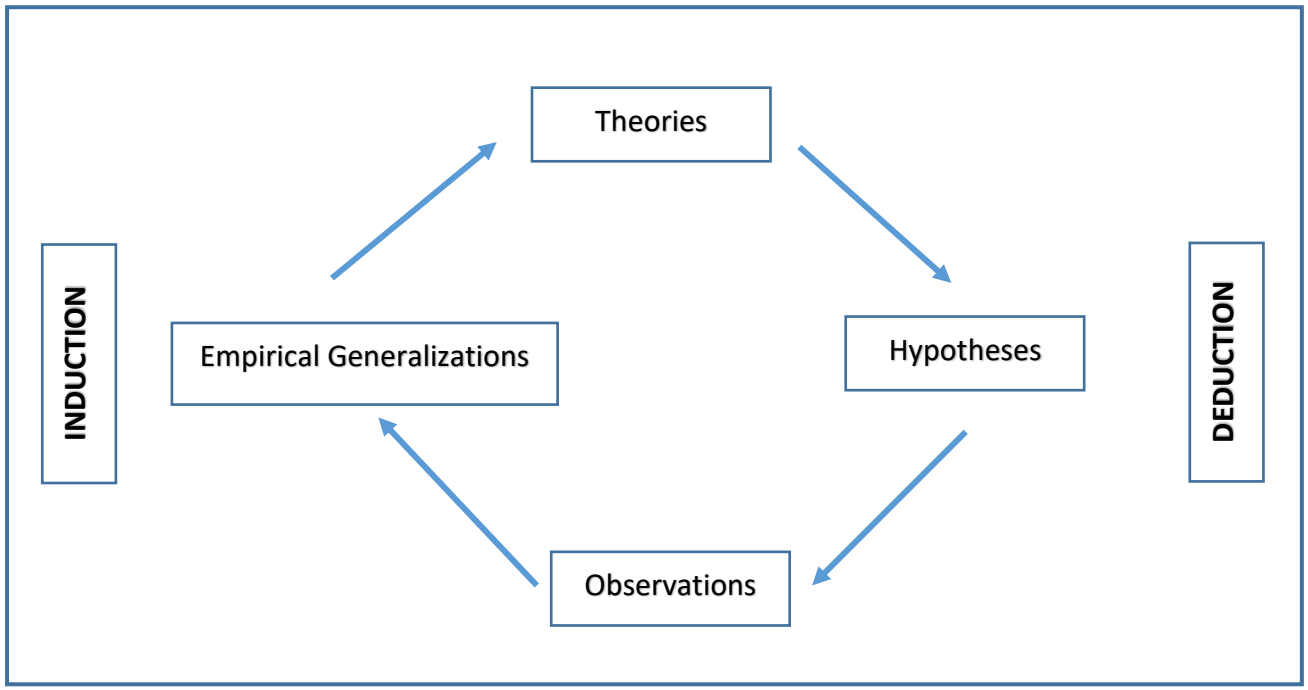
As mixed method research focuses on collecting, analysing, and mixing both quantitative and qualitative data in a single study or series of studies. It allows for the research questions for the second strand (phase 3) of research to emerge from the findings of the first strand (phase 1 and 2) (Tashakkori & Teddlie 2003, p. 687). Therefore, to gain deeper understanding of

underpinning factors (Amaratunga, Baldry, Sarchar & Newton, 2002) of business model innovation, qualitative methods were employed in phase 1 and 2 of present research. And to generalize the qualitative findings, quantitative methods were employed in phase 3 of present research (Morgan, 1998).

4.2.4 Inductive and Deductive Approaches

The inductive approach is referred to as moving from specific to the general, whereas the deductive approach refers to moving from the general to the specific (Collis & Hussey, 2013). The induction reasoning moves from a set of observations to the discovery of a pattern that represents some degree of order among all the given events (Babbie, 2010). Whereas, deductive reasoning particularly moves from a pattern that might be logically or theoretically expected to observations that test whether the expected pattern occurs.

Figure 4.4: Depicting induction and deduction as research approach



Source: Babbie, 2010

Collis and Hussey (2013), further describes a research adopting deductive approach, as a study in which a conceptual and theoretical structure is developed which is then tested by empirical

observation, thereby deducting instances from general inferences. On the other hand, a research adopting inductive approach, is a study in which theory is developed from the observation of empirical reality, thereby inducing general inferences from instances. The present study undertakes both deductive and inductive approach across different phases of research. The first and second phase of present research followed inductive approach induced conceptual framework from specified business sectors. Deductive approach was followed in third phase of research, wherein hypotheses were deduced and tested from results of first two phases conceptual framework and further literature review.

4.3 Research Design

Research design is the plan or proposal to conduct research, involves the intersection of philosophy, strategies of inquiry, and specific methods, that translate the approach into practice.

Given the nature of research study, as justified, in introduction of this chapter, a mixed method research design was followed to conduct research. Mixed methods research resides in the middle of continuum (a study tends to be more qualitative than quantitative or vice versa), because it incorporates elements of both qualitative and quantitative approaches.

Creswell and Clark (2011), defines the core characteristics of mixed methods research as, where researcher –

1. Collects and analyses persuasively and rigorously both qualitative and quantitative data (based on research questions);
2. Mixes (or integrates or links) the two forms of data concurrently by combining them (or merging them), sequentially by having one build on the other, or embedding one within the other;
3. Gives priority to one or to both forms of data (in terms of what the research emphasis);
4. Uses these procedures in a single study or in multiple phases of a program of study;
5. Frames these procedures within philosophical worldviews and theoretical lenses; and

6. Combines the procedures into specific research designs that direct the plan for conducting the study.

The present study is exploratory, using qualitative methods to elicit required detail information for research on business model innovation for sustainable development. Before describing the mixed method, approach adopted for this present study, it is imperative to first understand the different types and terminologies used in literature to understand mixed method approach. The mixed method approach can be divided into three types, based on timings of collection of quantitative and qualitative data sets in research study. Timing describes the order in which the researcher uses results from two sets of data within a study. It can be classified as: concurrent timing, sequential timing and multiphase combination timing (Creswell & Clark, 2011).

In addition to above, Mertens (2005) also describes two forms of data collection: parallel and sequential. Parallel form is defined as concurrent mixed-methods/model designs in which two types of data are collected and analysed. In sequential form, one type of data provides a basis for collection of another type of data.

The present study follows sequential timing and sequential form of data collection. Before understanding different types of mixed method approaches, it is important to understand two concepts for when and how mixing occurs:

1. Mixing strategies; and
2. Point of interface

Point of interface is described by Creswell and Clark (2011), as the stage of integration, a point within the process of research where quantitative and qualitative strands are mixed. The mixing can occur at four possible points during a research study process: (1) interpretation, (2) data analysis, (3) data collection, and (4) design. The researchers employ mixing strategies that directly relate to these points of interface. Creswell and Clark (2011), identifies four types of following mixing strategies:

1. Merging the two data sets;
2. Connecting from the analysis of one set of data to the collection of second set of data;
3. Embedding of one form of data within a larger design or procedure; and
4. Using a framework (theoretical or program) to bind together the data sets.

The present research study integrates quantitative and qualitative data during data collection, and adopts **exploratory sequential design**. This mixed method design allows for the research questions for the second strand (quantitative) of research to emerge from the inferences of the first strand (qualitative) (Tashakkori & Teddlie, 2003). Mixing during data collection occurs when the quantitative and qualitative strands are mixed during the stage of the research process when the researcher collects a second set of data. The researcher mixes by using a strategy of connecting where the results of one strand build to the collection of the other type of data (Creswell & Clark, 2011). Researcher in this study, first collected data qualitative and obtain qualitative results that build in the subsequent collection of quantitative data. The mixing occurred in the way that two strands were connected. This connection was built by using the results of the first strand to shape the collection of data in the second strand by specifying research questions, selecting participants, and developing data collection protocols or instruments.

Creswell and Clark (2011), suggests six major types of mixed methods design; namely:

1. The convergent parallel design
2. The explanatory sequential design
3. The exploratory sequential design
4. The embedded design
5. The transformative design
6. The multiphase design

As already stated above, the present study deploys exploratory sequential design, by collecting and analysing qualitative data followed by quantitative data. The first qualitative strand is exploratory and data collection, analysis and inferences are in one approach. The second

quantitative stand is confirmatory and the new data, its analysis and inferences are in the other approach (Tashakkori & Teddlie, 2003). The resulting final meta-inferences are made as either confirmatory or disconformity of the inferences made at the end of the two strands. Inferences, as used in mixed method research referees to the inferences made from what is studied as opposed to the results of study. Mixed methods lead to multiple inferences that can either complement or confirm each other (Cameron, 2009). This research has more emphasis on qualitative aspect than quantitative aspect.

A brief description of types of mixed method research are as follows:

- Convergent Parallel Design – This design occurs when the researcher uses concurrent timing to parallel implement the quantitative and qualitative strands during the same phase of the research process, prioritizes both methods equally, and keeps the strands independent during analysis and then mixes the results during the overall interpretation.
- Exploratory Sequential Design – This method is also a two phase design. The qualitative data is collected first, followed by collection and analysis of quantitative data. The purpose of this design is to develop an instrument (such as a survey), to develop a classification, or to identify variables.
- Explanatory Sequential Design – This method is a two phase design where the quantitative data is collected first followed by qualitative data collection. The purpose is to use the qualitative results to further explain and interpret the findings from the quantitative phase.
- Embedded (concurrent nested) Design – This design includes one phase of data collection in which priority is given to one approach that guides the project, while the other approach is embedded or nested into the project and provides a supporting role. The embedded approach is often addressing a different question then the primary research question.
- Transformative Design – This type of design also has two phases, but allows the theoretical perspective of the researcher or research question of the study, to guide the study and determine the order of data collection. This perspective guides all methodological choices and the purpose is to evaluate that perspective at different levels of analysis. The results from both methods are integrated together at the end of the study during the interpretation phase. Transformative design may involve sequential or concurrent data collection of both qualitative and quantitative data, and the research shapes within a transformative theoretical framework.

- Multiphase Design – This design combines both sequential and concurrent strands over a period that the researcher implements within a program of study addressing an overall program objective. Program evaluation is often used, where quantitative and qualitative approaches are used over time to support the development, adaption and evaluation of specific programs.

The following table provides details of research characteristics of the exploratory sequential mixed method adopted for present study:

Table 4.3:Characteristics of the Exploratory Sequential Mixed Method Research Design

(Compiled by researcher, 2016)

Typical characteristics	Addressed in current research
Definition	The data collection in phase 1 of present research, was started qualitatively to explore common patterns among business across sectors, for sustainable development and green technology. This was followed by content analysis and further literature review to conceptualize theoretical framework based on common patterns in phase 2 of study. In phase 3 of present research, hypothesis was deduced, and conceptualized framework was tested through quantitative data collection and analysis.
Design purpose	The present research study required to test and measure qualitative exploratory findings, to generalize resultant outcome of research.
Typical paradigm foundation	Constructivist in phase1&2 and postpositivist in phase 3

Level of interaction	Present research was highly interactive with businesses across industry sectors
Priority of the strands	Qualitative emphasis
Timings of the strands	Sequential, wherein qualitative research was done first
Primary point of interface or mixing	At the stage of data collection
Primary mixing strategies	The two strands – qualitative and quantitative, were mixed and connected during data collection. The qualitative data analysis from phase 1&2 of research build into quantitative data collection in phase 3. The phase 1&2 results influenced the decisions made in phase 3, especially while designing research questions, sampling, and data collection.
Common variants	The present study resulted in theory development.

4.4 Sampling Design

The sampling design of current research is discussed under the following headings –

4.4.1 Sample Selection

Based on probability theory, there are two types of sampling techniques or approaches, namely; probability sampling and non-probability sampling methods. Probability sampling refers to a sample that has been selected using random selection for each unit to have an equal chance of being selected in the sample (Bryman & Bell, 2007). However, probability sampling is often

costlier and time consuming (Malhotra & Birks, 2012). Non-probability sampling refers to design in which the elements in the population do not have a known or predetermined chance of being selected as sample subjects (Sekaran & Bougie, 2010).

In phase 1, snowball sampling, a non-probability sampling technique, was used to select sample for gathering information qualitatively in phase 1 of the current research. Snowball refers to the process of accumulation as each located subject suggests other subjects. Since, the qualitative data in present study is exploratory in nature, snowball sampling method was employed as sampling technique to identify sample. Snowball sampling is used for exploratory purposes, when the special population are difficult to locate, and the researcher collects data on the few members of the target population he/she can locate. The researcher then asks these individuals to provide the information/ references from their known circle (Babbie, 2010).

Sample was drawn from large companies as large firms have better well-defined business models and have sufficient financial muscle to invest in research and development of green technologies. These selected large companies were working towards sustainable development, by integrating green technologies as their offerings to consumers, and were also targeting BOP (bottom of pyramid) markets. Furthermore, the respondents/subjects identified, possessing appropriate knowledge, and information on BMI for sustainability, were generally difficult to locate. The researcher elicits such information from senior management employees of large companies, who essentially will have better outlook of the business as whole, and possessing required information on all the verticals and functional areas of the company/business. Thus, the snowball sampling method was employed in qualitative phase-1 of current research. The complete process of data collection that was followed using snowball sampling method is discussed in section 4.5 data collection of this chapter.

In phase-2 of study, systematic sampling, a probability sampling technique was used to obtain opinions of employees of large companies in South Africa. Systematic sampling involves selection of every *n*th subject from a reliable sampling frame, starting with a randomly chosen element between 1 and *n* (Sekaran & Bougie, 2010, Malhotra & Birks, 2012). The final sample is representative of the population with characteristics. Systematic sampling ensures that the

population will be evenly sampled (Hair, Bush & Ortinau, 2009), and is often used for online and e-mail based surveys (Fricker, 2008). In present study, every second subject was selected from a reliable sampling frame of 1402 subjects. The database of this sampling frame was obtained from a consultancy firm, which closely works with largest companies with green sustainable initiatives in South Africa. The database was carefully filtered prior to conducting survey to confirm that the respondents' profile matches those of the top and middle level managers and employees of large companies across sectors. This screening was conducted to ensure that the survey is distributed to interested respondents, thus minimising non-response bias (Armstrong & Overton, 1997).

4.4.2 Population of Interest

The population of interest refers to the entire unit or group of people, events, or things that the researcher desires to investigate (Sekaran & Bougie, 2010), or from which sample is selected (Bryman & Bell, 2007). The population of interest for current study is top management executives including CEOs/CFOs/MDs/VPs and Managers of large companies in South Africa and India. A large company is defined as a business with more than 1000 employees (Jain, 2006). Furthermore, a large company with focus on sustainable development and bottom of pyramid markets with integration of green technologies, were considered for present research. To elicit opinions and generalise phase 1&2 findings, employees from top and middle level management, working in large companies in South Africa, were quantitatively surveyed in phase 3 of study.

4.4.3 Sample size

The sample size refers to the actual number of subjects chosen as a sample to represent the population characteristics (Babbie, 2010). In phase 1 qualitative study, during the period between January 2015 and February 2016, a total of 33 face-to-face interviews were conducted by the researcher, which were 90 to 120 minutes long interviews with top management executives such as CEOs/CFOs, Managing Directors, General Managers, Senior managers, etc. of large companies including consultancy companies, across sectors/ industries, to seek their

opinions on business model innovation. Industry-wide details of interviews are given below in table 4.3 and 4.4. The researcher stopped adding interviewees on reaching theoretical saturation, as there is no ideal number of cases (Eisenhdardt, 1989). Theoretical saturation is further explained and justified in data collection section 4.5 of this chapter.

Table 4.4: Number of Individual Senior Executives Interviews (industry/sector-wide)

Country	Financial services/ Banking sector	Energy sector	Consultant companies	FMCG/ consumer durable sector	Telecom sector	Total
South Africa	8	2	4	3	1	17
India	3	6	4	1	1	15
						33

Table 4.5: Number of large companies (industry/sector-wide)

Country	Financial services /Banking sector	Energy sector	Consultant companies	FMCG/ consumer durable sector	Telecom sector	Total
South Africa	4	2	2	2	0	10
India	2	2	2	1	1	8
						18

In phase 3 quantitative study, a considerably large sample is more likely to yield more reliable data (Lamb, Hair, McDaniel, Boshoff, Terblanche, Elliott & Klopper, 2013), and thereby considerably reducing sampling errors. In quantitative study, a sample size is calculated based on number of factors, such as the size of the population of interest, confidence level, confidence interval, time, cost (Bryman & Bell, 2007), and extent of precision (Sekaran & Bougie, 2010).

Based on these factors, a total of 701 respondents were surveyed by mailing on-line link to participate in survey. This sample was drawn from existing database, consisting of participants who have agreed to be part of a research panel. Out of 701, 206 completed survey questionnaires were considered for analysis, after cleaning of data. Therefore, sample size of phase 3 quantitative study is 206 respondents.

4.4.4 Locale of the Study

The phase 1 and 2 of study was confined to the region of South Africa and India. Metropolitan cities Delhi & NCR, India vis`-a-vis` Johannesburg, South Africa was considered. These were selected as they have a preponderance of large companies with green sustainable initiatives and focus on bottom of pyramid markets.

The phase 3 of the study was confined to South Africa, largely due to cost and time savings. Since researcher is based in South Africa, therefore, it was convenient for researcher to make follow-ups with survey.

4.5 Data collection method

The data collection comprises of setting the boundaries for the study, collecting information through unstructured or semi structured observations, interviews, documents, and visual materials, as well as establishing the proof for recording information (Creswell, 2009).

To collect data in qualitative phase 1 and 2 of current research study, interview method was undertaken. Interviewing is considering as useful data collection method, especially if the research is exploratory in nature (Sekaran & Bougie, 2010). Interviews purposes to elicit participants' point of view and provide in-depth information. Interviewing allows participants to retrieve much information and revive much detail as desired. It allows interviewee to probe and follow up ideas (Creswell, 2009). Interviewing has the advantage of flexibility in terms of adapting, adopting and changing the questions as the researcher proceeds with the interviews. Advantage of obtaining data more efficiently in terms of researcher time, energy and costs. However, the major disadvantage of interview method is possibilities of interviewer bias

(Duffy, Smith, Terhanian & Brener, 2005). This bias can be significantly reducing by taking measures such as audio-recording, sending back the transcripts to interviewees to cross verify their ideas or opinions, etc (Johnson & Turner, 2003).

Another important issue in data collection is, when to stop adding interviewees for building case studies (Eisenhdardt, 1989). The researcher should stop adding interviewees or cases when theoretical saturation is reached (Creswell & Clark, 2007). Glaser and Strauss (1967) sees theoretical saturation as 'simply the point at which incremental learning is minimal because the researchers are observing phenomena seen before.' This simply means ending interviews when its quality is minimal. According to Sandelowski (2000), theoretical saturation occurs when few or no ideas are emerging from your analysis of qualitative data, as there is no ideal number of cases (Eisenhdardt, 1989).

The data was transcribed and analysis of interviews was conducted as researcher went along to identify respondents using snowball technique, and was concluded upon reaching saturation. Identification of key informants was initially started with reaching to known acquaintances through social media, industry and academic conferences and seminars. Prior to data collection, during the period July 2013 to November 2013, the researcher participated and attended number of conferences and seminars to build industry network and relations. This particularly helped in identifying key industry people, who possess relevant information and knowledge of business as whole, establish contacts and collects business cards. Interview appointments were then set-up with these key informants and further follow-up appointments were scheduled, if needed. A complete list of interviews conducted by researcher, along with interviewee position, date and duration of interview, is given in Appendix C of report. Besides face-to-face interviews, the researcher also collected information from secondary sources such as company publically available documents, company profiles and reports, and other desk research documents, were utilised for building cases in phase 1 of research.

To save both time and money, marketers are increasing using online surveys for data collection. (Lamb et al., 2013). The present phase 3 of study, utilises online survey method to conduct research among panel of employees of large companies. There are both advantages and disadvantages associated with online surveys (Sandelowski, 2000). Online surveys allow for reaching large numbers of participants over a shorter time frame, as compare to face-to-face surveys (Duffy et al., 2005). Us of online surveys provide more visual, flexible and interactive

research (Taylor, 2000), and it also removes interviewer bias, as researcher need not be physically present (Duffy et al., 2005). Despite various advantages of online survey method, one of the most challenging disadvantage of using online surveys is found to be the low response rate (Duffy et al., 2005). Nonetheless, online survey method was conducted in quantitative phase 3 of current research, majorly because it reduced the costs and time of research significantly.

Creswell and Clark (2011) recommend suggestions on data collection in exploratory mixed method research design. The researcher collected data in two phases 1 and 3 of current research design, and they are related to each other. In the middle phase 2, the researcher led search and development of appropriate instrument or the modification of an instrument for some variables. As the main aim of phase 3 was to generalize the phase 1 and 2 findings, therefore the individuals who participated in the quantitative phase 3, were not the same individuals who provided the qualitative data in the phase 1 of current study (Creswell & Clark, 2011). However, the measurement instrument developed in phase 2 of the study was pre-tested on individuals including those in phase 1 qualitative study. This was done by researcher, to improve validity and reliability of new instrument (Cameron, 2009).

4.5.1 Data collection tools – Qualitative Study Phase-1 and Phase-2

A semi-structured interview schedule was used as data collection tool to conduct face-to-face interviews of experts from different sectors/industries with green technological innovation for BOP consumers. The interview was conducted with 33 top management large company executives. They represented companies in the domain of –

1. Energy sector
2. Telecoms/mobile communication industry
3. IT services/products
4. FMCG/Durables industry
5. Financial services/Banking sector

The researcher had a list of pre-determined questions to be asked of the respondents personally. The semi-structured interview schedule comprised of six sections. The questions in first two

sections aimed to seek basic information and general viewpoints of interviewee around research area. Next section focused on various aspects of business model innovation for green technology and bottom of pyramid. Questions on business model were designed based on business model innovation ontology (Osterwalder & Pigneur, 2004), to ensure that all aspects of business model are covered by researcher. The fourth section intended to explore the conditions behind business model innovation such as market conditions, barriers, role of competitors, etc. The last two sections comprised of questions related to financial aspects and other aspects of business model innovation, such as, environmental, economic and technological impact, etc. The researcher designed and adopted interview schedule questions, mainly from Nordic Innovation Research Reports (2012). All questions were in line with research questions and were considered relevant to the research problem. The same questions were administered of all respondents in the same manner. However, interviewer modified or reframed the questions while conducting interview, if required, and to achieve better understanding of context of questions. Sometimes, however, based on the requirements of situation, the researcher took lead from the respondent's answer and ask other relevant questions, which may not be on the interview protocol. As respondents express their viewpoints, the researcher notes them down. Each interview was audio recorded using a voice recorder, after obtaining formal consent from the respondent.

The following steps were followed while conducting interviews with industry experts –

1. Prior to conducting final interviews, the researcher has series of practicing session with interview schedule, and audio-recorded, to get how researcher has performed. This helped to make necessary changes and improvised interview schedule.
2. The interviewee was asked to sign participant and consent form before beginning the interview.
3. To begin interview, firstly, the researcher introduced the interviewee to the concept of business model innovation for green technologies and bottom of pyramid, by explaining the business model ontology (Osterwalder & Pigeur, 2010), as it represents the synthesis on ongoing research in the business model domain.
4. To build rapport with interviewee and to bring common momentum and understanding of subject, the first few questions seek viewpoints of interviewee on importance of innovation in business, organisational culture fostering innovation, innovation enhancing quality, etc.

5. During interview, some questions were paraphrased by repeating back to interviewee, wherever required, without changing the context of questions (Mayring, 2014).
6. The interview then focused on the specific components of business model innovation for bottom of pyramid (BOP) with emphasis on green technology and sustainable development.
7. Towards the end, the interview moved to discussion on conditions behind business model innovation, and other aspects such as technological impacts, environmental impact, economic impact, etc.
8. Interview was closed with request for reference to colleagues or friends at executive positions in similar business sector or industry.
9. Most of the interviews were audio-recorded, allowing researcher to focus on what interviewees are saying. It also let researcher cross-check and create back-up. Audi-recording is more accurate than just simply writing down notes during interview (Mayring, 2014).

In 33 interviews, the researcher captured the opinions and viewpoints of business leaders, executives and consultants. The interviews were all transcribed and subsequently compared and analysed using an interpretive software NVivo, a Computer-Assisted Qualitative Data Analysis Software (Sinkovics & Alfoldi, 2012). Data analysis will be discussed in detail in next section 4.5.

4.5.2 Data collection tools – Quantitative Study Phase-3

A structured questionnaire was used to elicit opinions of employees of large companies across sectors. The questionnaire was designed on various aspects of green business model innovation for sustainability. The aspects of business model were selected based on nine pillars of business model innovation identified by Osterwalder & Pigneur (2004). Other identified variables were based on major themes from findings of qualitative phase 1 and 2 of current research study. Furthermore, the researcher also used the themes from the initial qualitative phase to locate published instruments in literature, by conducting content analysis, to best match the different qualitative themes (Creswell & Clark, 2011). For some variables, the researcher modified or developed new measuring instruments based on qualitative findings from phase 1 & 2. The questionnaire comprised of 79 statements, divided into seven sections. These sections tested

the variables that form the conceptual model, namely: (1) green technology; (2) green product/service innovation; (3) green process innovation; (4) sustainability of business model; (5) customer interface; (6) infrastructure management; and (7) financial aspects. The demographic profile of respondents was captured using the questions on (1) gender; (2) industry/sector category; (3) employment size of company; (4) position occupied in company; (5) functional area of respondent in company; and (6) number of years of involvement in green practices and bottom of pyramid.

4.6 Development of measuring instruments

The measurement instruments were designed and modified by researcher, based on content analysis findings from phase 1 and 2, and further literature review. Some existing scales were adapted for the purpose of current study, and in some cases, where there was no existing scale, findings from qualitative studies in literature were used to design measurement scales. The final measuring instrument was pre-tested amongst a small group of sample, including those respondents participated in phase 1 qualitative study. The pilot test was conducted to gain insight into any bias derived from interpretation of findings from phase 1 and 2 of current research.

4.6.1 Measurement scales

The measurement scales in quantitative phase 3 of current study, used 7-point Likert scales. (refer table 4.6) These scales are often used for testing perceptions, opinions, behaviour etc and most frequently used in survey based research (Babbie, 2010). Likert scale improves the level of measurement and determine the relative intensity of different items.

Table 4.6: 7-point Likert scale

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly Agree

4.6.1.1 Independent / Predictor variable

An independent or predictor variable is one that is used to describe a given response variable and influences the dependent variable in either positive or negative way (Sekaran & Bougie, 2010). Infact, an independent variable is presumed to cause or determine a dependent variable (Babbie, 2010). The variance in the dependent variable is accounted for by the independent variable.

a. Green Technology

The integration of green technology in the companies is practiced in three basic forms – green purchasing, green packaging and green transportation. Integration of green technology was measured using Hung Lau (2011) research study. The items were adapted to suit the context of the study, and were changed to a 7-point likert scale. Respondents were asked to rate their level of agreement on a 7-point likert scale (1 – strongly disagree; 2 – disagree; 3 – slightly disagree; 4 – neutral; 5 – slightly agree; 6 – agree; 7 – strongly agree). The following items were used to measure integration of green technology.

Table 4.7: Green Technology Scale

The company purchases environment-friendly raw materials
The company substitute environment harmful raw materials with friendly ones
The company purchases recycled raw materials
The company use suppliers that meet stipulated environmental criteria
The company is in compliance with international environmental regulations in purchasing.
The company uses environment-friendly design & materials in packaging
The company uses cleaner technology in packaging
The company uses recycled packaging materials that are purchased externally
The company takes back waste packaging materials from customers for recycling
The company is into optimisation of efficiency through the use of energy efficient vehicles
The company is into optimisation of distribution process through better routing and scheduling

The company uses integrated delivery to reduce transportation
The company uses environment-friendly technology in transportation
The company manages reverse material flows to reduce transportation
The company's management adopts green technology in product/service innovation
The company's management adopts green technology in process innovation

4.6.1.2 Mediating or intervening variable

The mediating or intervening variable is the one surfaces between the time independent variables start operating to influence the dependent variable and the time their impact is felt on it (Babbie, 2010). Mediating variable helps to conceptualize and explain the influence of the independent variable/s on the dependent variable. The mediating variables in present study are as follows:

a. Green Product/ Service Innovation

The innovation of green product or services in a company was measured using an adapted 7-point likert scale from research studies in literature. These studies were by Chen, Lai and Wen (2006); Lai, Wen and Chen (2003); Chen and Chang (2012). The following items were used to measure innovation of green product or services.

Table 4.8: Green Product/Service Innovation Scale

The company chooses the materials of the product that produce the least amount of pollution for conducting the product development or design.
The company chooses the materials of the product that consume the least amount of energy and resources for conducting the product development or design.
The company uses the fewest amount of materials to comprise the product for conducting the product development or design.
The company would circumspectly deliberate whether the product is easy to recycle, reuse, and decompose for conducting the product development or design.
Overall, company can said to have adopted green product innovation
Overall, company can said to have adopted green service innovation

b. Green Process Innovation

The innovation of green process in a company was measured using an adapted 7-point likert scale, from the research study by Chen, Lai and Wen (2006); Lai, Wen and Chen (2003). The following items were used to measure innovation of green processes.

Table 4.9: Green Process Innovation Scale

The manufacturing process of the company effectively reduces the emission of hazardous substances or waste.
The manufacturing process of the company recycles waste and emission that allow them to be treated and re-used.
The manufacturing process of the company reduces the consumption of water, electricity, coal, or oil.
The manufacturing process of the company reduces the use of raw materials.
Overall, company can said to have adopted green process innovation

c. Customer Interface

The customer interface includes relationships with customer and distribution channels of company. A scale by Smith and Perks (2010) was amended using findings from phase 1 and 2 of current research. A 7-point likert scale was developed and following items were used to measure customer interface of business model.

Table 4.10: Customer Interface Scale

The company uses green initiatives to attract new market opportunities viz-a-viz new customers
The company uses only green packaging for products to attract customers
The company is committed to investing in green research and development initiatives for the benefit of customers
The company uses green marketing to make customers aware of environmentally friendly business for customer education

The company sells only green products
The company ensure brand loyalty by being an environmentally friendly business for the benefit of customers
The company honour commitments by advertising positive environmentalism to involve customers
The company continually remind customers in advertisements of eco-friendly products to enhance brand loyalty among customers
The company develops a reputation for supplying eco-friendly products among customers
The company assess the impact of suppliers on the environment prior to purchasing of products by customers
The company ensure that all businesses in the supply chain meet ISO 14000 standards for benefit of customers
The company purchase only from suppliers selling environmentally friendly products for the benefit of customers
Produce/supply eco-friendly products in spite of higher production costs for the benefit of customers
The company uses space-saving warehousing or storage facilities to reduce environmental impact to enhance brand image among customers
The company has a 'green' warehouse in terms of the construction materials used, heating and cooling facilities to sustain environment for the benefit of customers
The company uses biofuels in transportation fleet and limit the number of distribution trips to reduce the carbon footprint for the benefit of customers
The company uses alternative means of transport to make transport efforts greener for effective penetration to customers
The company uses containers at full capacity to reduce the number of trips to distribute products effectively among customers
The company shares warehouse facilities/transportation networks to avoid traffic congestions and overcrowding in order to bring efficiency in distribution network
Overall, a company can be said to change its customer relationship and thereby bringing changes in distribution channels

d. Infrastructure Management

The infrastructure management includes business model aspects such as partner-network, core-competencies and value configuration. A 7-point likert scale was developed using Smith and Perks (2010) research and findings from phase 1 and 2 of current research. The following items were used to measure infrastructure management in a company.

Table 4.11: Infrastructure Management Scale

The company produce or sell eco-friendly products according to stakeholders' needs to improve network with partners
The company implement green human resource policies to cultivate a green business culture
The company support community action programmes (for example, to make use of reusable containers) to bring value to existing products/services/processes
The company ensure top management support in all green initiatives
The company establish a formal team of people to monitor and promote green issues
The company prioritise the reduction of the impact of facility construction and operation
The company uses resources more efficiently to develop core competencies
The company create by-products, recycle and re-use to eliminate waste to bring value to products/services offerings
The company intensify production processes to reduce environmental impacts while lowering the costs of inputs and waste disposal
The company consciously avoid actions causing changes to the climate, water infrastructure and forestry
The company uses alternative energy sources in production and manufacturing processes
The company uses green technology to remain competitive and increase productivity

4.6.1.3 Dependent or Criterion Variable

The dependent or outcome variable is the variable under investigation and of primary interest to the researcher. It is the main variable that lends itself for investigation as a viable factor (Sekaran & Bougie, 2010).

a. Sustainability of Business Model

To measure sustainability of business model in a company, the scale was designed using qualitative findings from a research study by Bocken et al. (2014). Few examples for each item was also included from the research findings, to provide better clarity to respondents. A 7-point likert scale was developed and following items were used to measure sustainability.

Table 4.12: Sustainability of Business Model Scale

The company maximise material and energy efficiency (egg: low-carbon manufacturing solutions, lean/additive manufacturing, de-materialisation of product/packaging, increased functionality)
The company create value from waste (egg: circular economy, industrial symbiosis, use excess capacity, sharing assets or collaborative consumption, reuse, recycle, re-manufacture)
The company substitute with renewables and natural processes (egg: use of renewable energy sources, solar and wind based energy innovations, blue economy, green chemistry, slow manufacturing)
The company deliver functionality rather than ownership (egg: product-oriented/use-oriented/result-oriented PSS (Product Service System), private finance initiative)
The company adopt a stewardship role (egg: biodiversity protection, promoting consumer care, consumer health and well-being, ethical trade, resource stewardship, radical transparency about environmental and social impacts)
The company encourages sufficiency (egg: consumer education, communication and awareness, demand management, product longevity, frugal business, responsible product distribution/ promotion)

The company repurpose for society/environment (egg: not for profit, social enterprise, social and biodiversity regeneration initiatives, base of pyramid solutions, localisation, home based flexible working)
The company develops scale up solutions (egg: collaborative approaches, incubators and entrepreneur support models, licencing franchising, open innovation, crowd sourcing/funding, patient/slow capital collaborations)

b. Financial Aspects

The financial aspects of business model in a company include cost structure and revenue model. Smith and Perks (2010) scale was amended with findings from phase 1 and 2 of current study, into a 7-point likert scale. The following items were used to measure financial aspects.

Table 4.13: Financial Aspects Scale

The company institutes green accounting policies to reduce the cost of paper used
The company takes part in socially responsible investing (SRI)
The company avoid penalties, fines and legal costs for non-compliance with environmental legislation
The company expands the use of sustainable paper products while reducing the use of paper
The company completes a green business audit to ensure that green business standards are met
Over past 3 years, the company's return on investment and sales is well above industry average
Over past 3 years, the company's profit and growth is well above industry average
Over past 3 years, the company's market share and sales volume growth, is well above industry average
Overall improvement in general level of profitability, after adoption of green practices
Overall improvement in level of production costs, after adoption of green practices
Overall improvement in cost of raw materials or components, after adoption of green practices
Overall improvement in packaging costs, after adoption of green practices

4.7 Pre-testing of measurement instrument

The semi-structured interview schedule in phase 1 and structured questionnaire in phase 3, was pre-tested with small sample of respondents. Respondents also included those participants from qualitative phase 1 and 2 of current research study. As reasoned earlier in this chapter, this was done by researcher, to improve validity and reliability of new instrument (Cameron, 2009). It is recommended to pilot or pre-testing the measurement instruments, especially in case of self-administered questionnaires, to minimise errors (Bryman & Bell, 2007). Firstly, the developed questionnaire was evaluated for face validity by administering it to marketing experts including industry experts. Thereafter, a pilot group of 20 respondents were randomly selected from the existing database of sample respondents and were administered questionnaire. Pre-testing aimed to evaluate content of items, clarity of instructions and language of the questionnaire. Suggestions and comments such as improvement in structure, minor amendments in measuring items language etc, were implemented by the researcher. The results confirmed sufficiency of the research instrument and was in line with research questions and objectives of current research study. The Cronbach's alpha coefficient results obtained from the pilot testing were reliable and are listed in below table 4.14. The Cronbach's alpha for all constructs were exceeding the acceptable threshold of 0.6.

Table 4.14: Pilot testing Cronbach's Alpha Coefficient

Research Construct	No. of items	Cronbach's Alpha Coefficient
Green Technology	16	0.915
Green Product/Service Innovation	6	0.889
Green Process Innovation	5	0.951
Sustainability of Business Model	8	0.899
Customer Interface	20	0.957
Infrastructure Management	12	0.917
Financial Aspects	12	0.894

4.8 Data Analysis

Data analysis involves collecting data based on research questions and developing an analysis from the information provided by participants in research study (Creswell, 2009). The Qualitative data from phase-1 of current research study was analysed using a case-study approach. The textural data in form of interview transcripts, desk research documents, company profiles and reports, were first coded using CAQDA software NVivo 11. Coded data was organized and different themes and categories were explored to bring generalization in form of multiple case studies (Yin, 1994). These categories or themes were further explored in phase-2 of current research, using content analysis approach (Mayring, 2014), along with insights from case studies. Each of the themes were supported by further literature review to generate possible prepositions and conceptualize theoretical framework for green business model innovation for sustainability and BOP. The hypothesis was formulated and measuring instruments were developed, to quantitatively testify theoretical framework in phase-3 of present study. The quantitative data was analysed using software Smart PLS to conduct statistical analysis. The details of data analysis in each phase of present research study is discussed below -

4.8.1 Phase 1 – Case-Study Approach

Business model innovation for sustainability is an exceptional area, wherein limited research is available. (Nordic Innovation Reports, 2012). The dynamic and uncommon nature of business model innovation and with the researcher's interest of exploring dynamics present within single settings (Eisenhardt, 1989); arguably makes case study method as preferred approach to study innovation phenomena. (Chesbrough & Rosenbloom, 2002; Hamel, 2000; Sinkovics et al., 2014). A case study method is an in-depth qualitative investigation of a single phenomenon or case over a period (Yin, 1994). A case study research approach is used to generate comprehensive, multi-faceted understanding of a complex issue in its real-life context (Crowe, Cresswell, Robertson, Huby, Avery & Sheikh, 2011). There are two ways to design a case study research: single case study or multi case studies. While a single case study is sufficient for studying a unique situation, multiple case studies are used to compare two or more similar cases by exploring common or different characteristics, themes and categories for generalization across similar contexts (Yin, 1994). In a multiple case study, a researcher

examines cases to understand similarities and differences between cases (Baxter & Jack, 2008). Thus, for exploring similarities and differences with industries in South Africa and India, multiple case study approach was adopted in current research.

Like any other qualitative study, the data collection and analysis occur concurrently in present phase 1 of study (Baxter & Jack, 2008). The face-to face interviews were tape-recoded and then transcribed as transcripts, using pure verbatim protocol transcription system. (Mayring, 2014). In pure verbatim protocol, the transcription is done word for word including every utterance from audio file. Also, dialect formulations, fillers, articulation are maintained. The resultant transcripts are very near to actual natural interview language (Mayring, 2014). Although researcher conducted face-to face interviews, but to remove any personal biases by research assistant while transcribing, this system of pure verbatim protocol was found most suitable in current research. The transcripts were then further cleaned-up by researcher, to excerpt important information as per research questions. Interview transcripts and other textural data including desk research documents, company profiles and reports, were then coded using software NVivo (Edhlund & McDougall, 2012). Besides facilitating qualitative research process, NVivo also ensures trustworthiness of the process of qualitative research (Bazeley & Jackson, 2013). NVivo helps to analyse the qualitative data by making it more manageable, logical and transparent through systematic comparison and record-keeping (Sinkovics & Alfoldi, 2012).

Previous researches have shown, that there is no standard process for coding or extracting themes (Edhlund & McDougall, 2012). To analyse cases, the coded data was organized and combined into themes and categories. Thus, these themes were based on data collected from both primary and secondary sources. Coherent themes were summarised, to bring meaning to the text. Next, categories or themes were structured to bring some order and linkages were formed with other themes. The result was a structured theme/category based on emerging data, to develop four cases across four industries from South Africa and India, namely Energy, Banking, FMCG/Durable sectors and Cloud Computing. While coding, analysing data and finally formulating cases, research questions were kept in mind by the researcher.

4.8.2 Phase 2 - Content Analysis Approach

Qualitative Content Analysis was executed using the CAQDA (Computer-Assisted Qualitative Data Analysis Software), NVivo (Mayring, 2014). Krippendorff (1980), defines content analysis as "the case of replicable and valid method for making specific inferences from text to other states or properties of its source". Qualitative content analysis defines itself within this framework as an approach of empirical, methodological controlled analysis of data following content within the context of research (Kondracki, Wellman & Amundson, 2002) and describing its meaning in a systematic way (Schreier, 2012). Hsieh & Shannon (2005) describes qualitative content analysis as a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns.

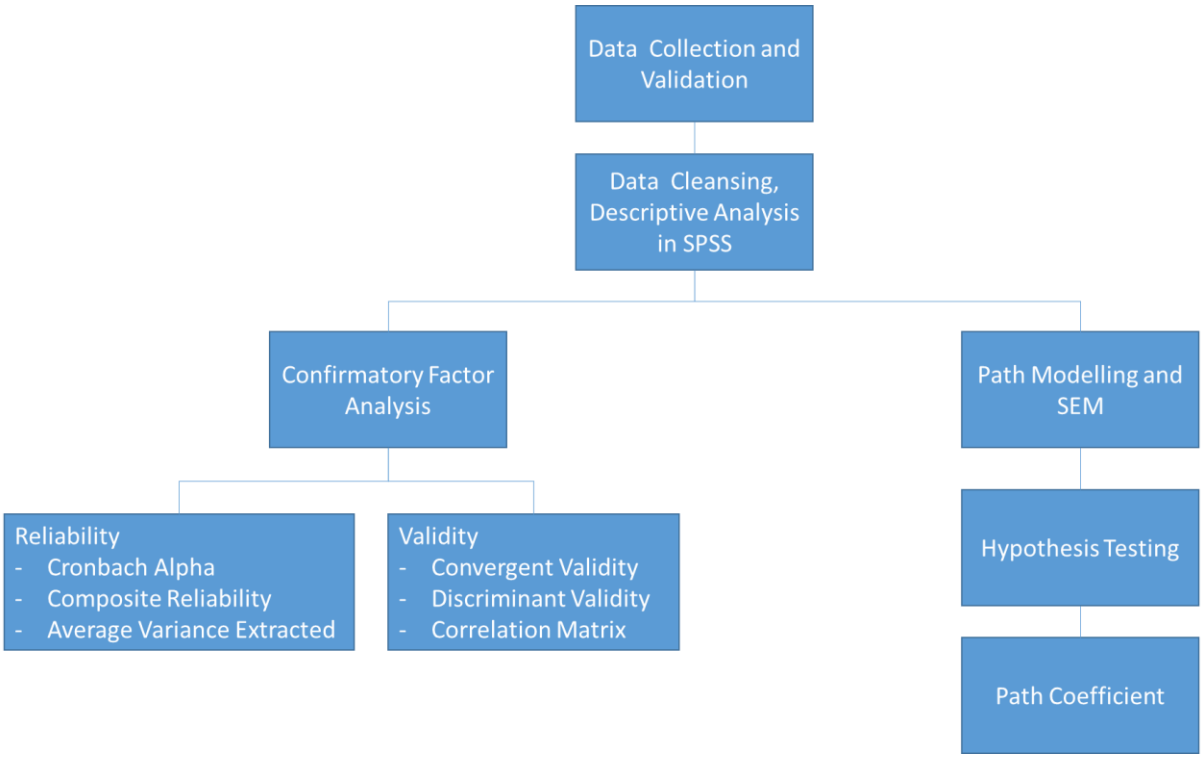
In present study, the procedure followed for qualitative content analysis was first to transcribed all textural material using a word processor, to read the material within NVivo computer programme (Bazeley & Jackson, 2013). The data was then edited and organized for different procedures of analysis. Specific segments of the data material were marked and keywords or categories were attach to each of them (Mayring, 2014). This process is called coding. Therefore, codes identify interesting features of data, and in NVivo, codes are stored within nodes (Bazeley & Jackson, 2013). All segments of the material were marked into categories, as per formerly identified aspects of business model innovation, and other emerging categories such as sustainability, green technology, innovation, etc. Then, all coded material with specific category was gathered, to emerge with 'quotes' for individual categories. Throughout the analysis process, the categories or themes were altered, revised and refined. The software NVivo helped the researcher to organize the data, to effectively conduct interpretation of the data. Besides above, the use of NVivo as CAQDAS enhances reliability, as it gives a researcher an opportunity to re-construct the situation in which the interpretations were formulated (Attride-Stirling, 2001). Once all themes were organised, the researcher started considering interrelation of themes, and narrate the quotes from interview to support the ideas. The researcher conducted further literature review to match identified major themes with proposed variables and scales for development of measuring instrument (Bazeley & Jackson, 2013).

4.8.3 Phase 3 – Statistical Approach

The phase 3 quantitative data were statistically analysed using a software SmartPLS to test hypothesized relationships. SmartPLS is a software with graphical user interface for variance-based structural equation modelling (SEM) using the partial least squares (PLS) method (Hair, Sarstedt, Ringle & Mena, 2012). PLS-SEM modelling approach is particularly used in exploratory research with small sample size and when little is known about the relationships that exist among the variables in theory (Wong, 2013). An overview of statistical analysis applied to phase 3 of current study is discussed under following –

Figure 4.5: Statistical Analysis

(Compiled by researcher, 2016)



4.8.3.1 Descriptive statistics

Descriptive statistics comprises of demographic profile of the sample, such as, gender, industry category, position in company, functional area, etc. SPSS software was used to clean data and conduct descriptive statistics. This is presented using frequency tables and pie-charts in present study.

4.8.3.2 Measurement Model

The following section discusses the various statistical techniques used for testing the reliability and validity of the measurement instrument.

a. Cronbach Alpha Coefficient

Cronbach Alpha Coefficient is used to test the reliability of the measurement instrument. Reliability of measuring instrument means the extent to which the scale produces consistent results when repeated measurements are taken (Malhotra & Birks, 2007). A Cronbach alpha coefficient is used to assess the reliability of the scales in research questionnaire. The scale is reliable when the value of Cronbach coefficient alpha is higher than 0.7 (Hair et al., 2009). However, Cronbach alpha coefficient between 0.5 and 0.6 is also acceptable (Nunnally, 1978).

b. Composite Reliability

Composite Reliability (CR) index is used to measure internal reliability of the measuring instrument. The acceptable composite reliability index should be greater than 0.7 (Hair et al., 2009). It is measured using the following formula –

$$CR\eta = (\Sigma\gamma yi)2 / [(\Sigma\gamma yi)2 + \Sigma\varepsilon i]$$

Where, Composite Reliability = (square of the summation of the factor loadings) /{(square of the summation of the factor loadings) + (summation of error variances)}

c. Average Value Extracted (AVE)

The Average Value Extracted (AVE) depicts the overall amount of variance in the indicators, as accounted for by the latent variable. The Average Variance Extracted (AVE) has to be

greater than 0.4 (Fraering & Minor, 2006) for the construct to be considered reliable. The following formula is used to measure Average Variance Extracted (AVE) –

$$\text{Average Variance Extracted (AVE):}\quad V\eta=\Sigma\lambda yi2/(\Sigma\lambda yi2+\Sigma\varepsilon i)$$

Where, AVE = {(summation of the squared of factor loadings)/{(summation of the squared of factor loadings) + (summation of error variances)}

d. Convergent Validity

Convergent Validity is used to ensure validity of the scales and it indicates high correspondence between scores from two or more different measures of the same construct (Schwab, 2006). It basically checks the correlations between scales in the same direction, with other measures of the same construct, and therefore indicates validity of construct (Schwab, 2006). The item loadings should be greater than 0.5 to indicate acceptable validity (Schwab, 2006).

e. Discriminant Validity

Discriminant Validity depicts uniqueness of the measurement scores of a construct (Schwab, 2006). In other words, discriminant validity occurs when the scores from measures of different constructs do not converge (Schwab, 2006). It shows heterogeneity between constructs (Malhotra & Birks, 2007). A value less than 0.8 should be obtained to achieve high discriminant validity (O'Rourke & Hatcher, 2013).

f. Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) is used to measure validity of the research instrument. It is technique used to confirm the theoretical hypothesis of the relationship between measurement items and their respective factors (Netemeyer, Bearden & Sharma, 2003). To depict strong association, the values obtained should be more than 0.6.

g. Structural Equation Modelling by PLS (Partial Least Squares)

Structural Equation Modelling is a multivariate technique that measures both observed and unobserved or latent variables (Hair et al., 2012). It is a confirmatory approach which can incorporate multiple variables in a model to test most linear relations between variables (Rigdon, 1998).

h. Goodness of Fit

Hair Jr, Sarstedt, Hopkins, and Kuppelwieser (2014) states in his recent book that, “Tenenhaus, Vinzi, Chatelin and Lauro (2005) proposed a PLS goodness-of-fit index (GoF) as 'an operational solution to this problem as it may be meant as an index for validating the PLS model globally (Tenenhaus et al., 2005, p.173)”. Henseler and Sarstedt (2013) recently challenged the usefulness of the GoF both conceptually and empirically. Their research shows that the GoF does not represent a goodness-of-fit criterion for PLS-SEM.

4.9 Reliability and Validity

In qualitative phase 1 & 2 of present study, reliability and validity are very crucial aspects. Use of multiple methods of data collection in research leads to reliability. Triangulation was used for improving the validity and reliability of research and for evaluation of findings. Different sources of information were triangulate to examine evidence from the sources (Creswell, 2009). It led to confirmation and generalisation of research findings, thereby bringing modification of the theory of business model innovation for sustainability. Besides above, the researcher adopted qualitative reliability procedures to bring consistency in current research (Gibbs, 2007). The transcripts were cross-checked and codes were cross-verified for any shift in the meaning while coding data. The coded themes were mailed back to respondents to check for accuracy and increase validity of findings (Creswell, 2009). As explained in section 4.5 of this chapter, in phase 3 of present study, reliability and validity of quantitative data and measurement instrument, was evaluated by statistically examining composite reliability, Cronbach alpha, convergent and discriminant validity.

According to Creswell and Clark (2011), validity, particularly in mixed method research means “employing strategies that address potential issues in data collection, data analysis, and the interpretations that might comprise the merging or connecting of the quantitative and qualitative strands of the study and conclusions drawn from the combination”. Therefore, besides above, following strategies were adopted by researcher to increase validity –

1. Selected larger sample size for quantitative and small sample size for qualitative (Creswell & Clark, 2011).
2. Choose respondents for the quantitative follow-up that participated in the qualitative first phase. The semi-structured interview schedule in phase 1 and structured questionnaire in phase 3, was pre-tested with small sample of respondents. Respondents also included those participants from qualitative phase 1&2 of current research study. As reasoned earlier in this chapter, this was done by researcher, to improve validity and reliability of new instrument (Cameron, 2009).
3. Used major themes as the basis for the quantitative follow-up (Creswell & Clark, 2011).

4.10 Ethical considerations

The present research study has taken care of all ethics requirements and researcher followed the University of the Witwatersrand's ethics policy. The ethics clearance was obtained prior to commencement of data collection (refer Appendix E for ethics clearance certificate). The respondents were experienced top executives in qualitative phase of study; and mainly senior managers and employees in quantitative phase of study. All respondents participated voluntarily in present research. They were informed about the research study and were assured that all information will be kept confidential and anonymous. It was further ensured to use the data collected for academic and research purpose only and will not be given or sold to any third party. The participants were asked to sign consent form prior to collecting data. Informed consent forms are those that participants sign before they engage in research (Creswell, 2009). This form acknowledges that participants' rights will be protected during data collection.

4.11 Summary

This chapter presented in detail the research approach and methodology used to collect and analyse the data. Firstly, the philosophical explanation of the research approach was discussed, followed by discussion of research design adopted for present study. A justification and rationale for chosen research approach was provided. This was followed by sampling design, and development of data collection tools for both qualitative and quantitative phase of present

research. An overview of measurement scales developed and adapted for the study was presented. Lastly, the data analysis of all three phases of current research was discussed, followed by discussion on reliability, validity and description of the ethical considerations. The next chapter will present the data analysis and findings from the three phases of study.

QUALITATIVE PHASE 1

CHAPTER 5: CASE STUDIES

5.1 Introduction

This chapter explores four case studies, based on qualitative study in phase 1 of current research. The four case studies comprise of sustainable business model innovation, representing comparison between South Africa and India, across four industries, namely Energy, Banking, FMCG/Durable sectors and Cloud Computing. These case studies have been developed from in-depth face-to-face interviews with executives of selected large companies, focus group discussions, secondary desk research from publicly available documents and literature review. As per suitability of context of present research, multiple-case approach is adopted, to provide greater confidence and credibility of the research findings from the overall study (Yin, 2014). Also, multiple-case study method is found to be useful when exploring relatively less known phenomena, as it helps to investigate common themes, patterns and differences among different case studies for possible generalisation across similar contexts and categories (Yin, 1994).

The data was categorised and themes were derived using CAQDA software NVivo 11. The identification of categories, patterns and themes were guided by the purpose of research and research questions (Saunders, Lewis & Thornhill, 2009). Thus, the four cases are based on basic components of business model innovation and sustainability aspects, to generate prepositions and conceptualise theoretical framework for phase 2 of present research.
This chapter attempts to explore key research question as how do companies incorporate sustainable development through integration of green technologies as products/services/processes? The discussion under each case, particularly explains working of large companies embracing green business model innovation for BOP across sectors in South Africa and India.

The case on energy sector focuses on ESCOs (Energy Services Companies), with main purpose to generate green and sustainable processes of other businesses. The banking sector case highlights the various green initiatives undertaken by banks including mobile banking, positive impact banking, mobile ATMs, micro-credit, with special focus on bottom of pyramid consumers. The third case on FMCG/Durable sector emphasizes product innovations for

bottom of pyramid consumers, including discussion on various green processes adopted by this sector for sustainable development. Lastly, the case on cloud computing explores its application across industries, to deliver services over the internet or a network, to develop green and sustainable business model innovation. The cloud computing case originates from interviews conducted by researcher in consultancy firms.

The present research withholds the names and affiliations of company executives interviewed for development of case, unless permission is granted from certain company to use the name. The following cases are addressed here as case study 1, 2, 3 and 4.

5.2 Case Study – 1 ESCO (Energy Services Company)

Every organization utilizes energy in some way or the other. Energy can be in form of electricity, water, air pumped etc. Components utilizing energies varies from sector to sector. Example in residential area, office area major component utilizing energy are Lights, Air Conditioners, Computers etc. In manufacturing sector, it can vary from boilers, to water pumps to fans etc. The energy utilized in these components is in form of electricity, water, air, fuel etc. Energy costs money and has direct impact on revenue stream of the company. Thus, energy saved will result in lower ecological footprint, less cost and indirectly help to increase fund to research, better quality, better reach to customer, based on priority of the organization.

Energy Service Companies (ESCOs) thrive on capitalizing this opportunity of reducing energy foot print and have developed business model around the same. Green Innovation has always been an essential component in Energy Service Companies and consultancies. ESCOs focusses on reducing energy costs by ensuring changes, business, process and technical changes in organization to reduce energy footprint, these changes would result in energy cost reduction over a period, thus helping customers to reduce their ecological foot print making them green.

Energy Saving focus in India

India is a very price sensitive market. Historically, many of manufacturing sector cater to needs to local market, thereby are not much exposed to international innovations on energy savings. Though with influx of global companies such as Philips, Sumi Systems etc. and continuous focus on energy saving is sensitizing owners to look at ESCOs. Government has also initiated schemes and set up offices such as BEE (Bureau of Energy Efficiency). BEE is a statutory body under Ministry of Power, with a mission to create policies and develop strategies with a thrust on self-regulation and market principles to achieve energy efficiency. BEE coordinates with government, industries, manufacturers and consumers to facilities measures to be taken for conservation of energy.

BEE does both regulatory and promotional activities. As part of regulatory activities it does following (BEE, 2016):

- It sets performance standards for appliances and designs labelling scheme for the same. The star rating of various appliances like AC, Refrigerators, Fans, Pumps, Water Heaters, etc is part of this mandate that they have.

- They develop energy efficiency code for buildings and Industries.
- They certify Energy Managers and Energy Auditors who can perform energy audits.
- They develop norms for energy consumption.

As part of their promotional activities they do:

- Create promotional programs for energy efficiency, star-rating and other awareness programs.
- Arrange and organize trainings for people who can do energy efficiency projects.
- Develop testing and certification procedures and promote testing facilities.
- Promote innovative financing of energy efficiency projects
- Give financial assistance to institutions for promoting efficient use of energy and its conservation
- Prepare educational curriculum on efficient use of energy and its conservation

With above activities, traditional industries are coming forward to try out concepts and taking forward energy saving projects. It acts as win-win situation for organizations, while resulting in sustainable business model, which results in making these organizations green.

Energy Savings Focus in South Africa

South Africa usage of energy is higher compared to developing countries like India, Brazil, China, Mexico, etc. Also, South Africa has one of the highest carbon emissions. Thus, it makes South Africa a lucrative market for reducing energy and carbon footprint. South Africa Government is equally focussing for cleaner and efficient technology.

The National Energy Efficiency Strategy 2005 (NEES) has set a target of 12% reduction in the overall primary energy consumption by 2015. The eight key goals and reasons for energy efficiency remain as important today and are summarized below: • job creation • alleviate energy poverty • reduce environmental pollution and CO2 emissions • improve industrial competiveness • enhance energy security, and • reduce the necessity for additional power generation capacity (Department of Minerals and Energy, 2005).

The energy profile of South Africa is as below:

Figure 5.1: South Africa Energy Profile

Technology	Residential	Commercial	Industrial	Total MW
Efficient Lighting	939	115	116	*1 170*
Solar Water Heating	3 713			*3 713*
Domestic Cooking Conversion	2 144			*2 144*
Infra red heating	766			*766*
Heat Pumps	960	224	569	*1 753*
Showerheads & Restrictors	240	160		*400*
Load Management		9	200	*209*
HVAC		14	70	*84*
Agricultural Initiatives		144		*144*
Efficient Compressed Air			1 255	*1 255*
Motor Efficiency			408	*408*
Variable Speed Drivers			417	*417*
Fan/Pumps			530	*530*
TOTAL	**8 762**	**666**	**3 565**	**12 933**

Source: IDC (2013)

Definitions

Energy Service Companies (ESCOs) definitions may differ based on context. An ESCO is a professional services company providing energy efficient solutions. The scope includes design and implementation, energy infrastructure outsourcing and risk management. ESCOs, with their strong capabilities, perform technical and financial analyses of energy efficient solutions which impact the feasibility, financial savings and execution of solution.

The two commonly types of ESCOs are

1. Vendor-driven ESCOs: - They use their own technology/products for implementation of energy improvement measures.
2. General ESCOs: - They are product-neutral.

Indian ESCO industry is also dominated by vendor-based ESCOs.

Market Size

Indian ESCO industry is still in evolutionary stage. The overall energy efficiency investment market size under ESCO system of performance contract in India has been estimated at Rs. 14,000 crores with the potential to save about 54 billion units of electricity annually (Shakti, 2014).

Broadly the ESCO industry is divided in Industrial, Commercial, Agricultural and Government customers. The growth drivers for the ESCO industry are rising energy costs, government incentives, lack of reliable energy sources and cost involved to ensure reliability, enterprises to improve their cost-effectiveness. There are still very few General ESCOs focussing on Industrial energy efficiency.

Figure 5.2: ESCO Market Penetration

ESCO market penetration			
	Low – 10%	**Medium – 20%**	**High – 30%**
Potential demand reduction	6 000 MW	6 000 MW	6 000 MW
Load factor (x 50%)	50%	50%	50%
Energy saved (GWh)	26 million	26 million	26 million
Cost per kWh	R1	R1	R1
Market potential over ten years	R2.6 billion	R5.2 billion	R7.8 billion

Source: IDC (2013)

One of the executive further elaborated as –

> *Lot of work can happen by linking multiple types of organisations together. Earlier it was client focused work, now whether it's a consulting agency like us or implementing innovation like an NGO. So, a lot of scope appears to be there in sort of operations in designing large scale programs and implementing these programs which was not there earlier. Earlier is was more like a project mode that one could do, providing consulting services or projects on the ground. Right now, programme can be developed in taping these organisations together or simply working with the government in developing a large scale programme which can be development bilaterally or multilaterally.*

Organizations are expanding their footprints by increasing their scope through innovative means. This in turn is helping them expand their markets size.

Barriers in Indian Market

India focus on sustainable development and mitigate climate change, India has identified energy efficiency (EE) as a key component of the strategy. Energy Service Companies (ESCOs) provide attractive options for companies willing to undertake EE projects. However, ESCOs have not been able to tap into this potential. Despite ESCOs market size increasing year on year due to multiple growth drivers, still challenges exist in ESCO industry. Many of these challenges are country and culture specific.

Low knowledge and experience in efficiency technologies and their implementation affect growth of ESCO market in India. Financial pressure of smaller and medium sized ESCOs rely on Financial Institutes or Investors for investment costs. High risk perception by community for funding ESCO projects has led to a vicious cycle of non-execution of EE projects.

Some of the challenges are highlighted below which result in non-execution of ESCO projects (Shakti, 2014; EESL, 2013):

1. ESCOs involvements means opening industrial processes of the company. Many companies are not comfortable because of the fears about trade secrets.
2. ESCOs projects are about innovation and changes resulting in energy efficiency. Thus, it involves different implementation mechanisms resulting in delays to adopt at client's end. This results in delays and non-execution of projects
3. Lack of energy management infrastructure and qualified staff.
4. Lack of proper communication channel between technical staff and strategic management level.
5. Lack of vision to invest in old process, rather modernize their outdated systems.
6. Lack of information on energy performance contracting
7. Low confidence in ESCOs due to short track record or poor performance and complexities around the financial contracts. Lack of detailed Measurement and verification criteria for energy performance guarantees.
8. Limited historical data or process data in organization for energy use patterns for establishing a baseline.

The technical challenges such as maturity and development of various technologies is also one of the key challenges. Another respondent added -

> *In the technology side, technologies that are relevant for India they were at an early stage of development say a couple of decades back, 10 years back, 20 years back. Right now many of these innovations have not matured. One of the reasons is pressure to reduce costs and spending. Many technical advisory companies used to provide services have come down. A lot of mainstream technologies have already happened for example in the case of solar TV. Earlier a lot of advisory work, consulting work used to happen in designing products, smaller projects: A lot of in-house capabilities were built by revolutionary companies which are now reducing due to reducing market size.*

ESCO being a complex environment, various technologies are at different stage of maturity curve. Product specific offerings such as Solar TV has reach to advanced maturity stage where as service and new age technologies are still at initial maturity stages.

Barriers in South Africa Market

Trust and scepticism was considered by all stakeholders as a significant barrier to growth of the industry.

The main areas of concern were (IDC, 2013):

1. the lack of perceived technical skills within the industry should be addressed before end users, clients and FIs trust the industry
2. no clear definition and standards for ESCOs leading to the perception that many 'fly-by-night' ESCOs exist that are not capable of providing a professional service
3. complex contracting with no standard contracts create uncertainty for end-users in terms of cost, savings potential, risk transfer, etc.
4. lack of accreditation within the ESCO industry, and
5. approaches by competing ESCOs with varying products and solutions have created confusion and an environment of distrust. It should be noted that this could be part of the supply and demand cycle experienced by all industries.

Capabilities

Capabilities and skilled engineers are one of the major strengths for any ESCO. The ESCOs differ from Engineering company as ESCOs work on consulting model and focus on innovative ways to save energy. They are often constrained by Return on Investment, Budgetary constraints, focus, resistance to change etc. To ensure the needful following capabilities are required: -

- Engineers and technicians
- Project managers
- Energy specialists
- Accountants and economists
- Support personnel
- Legal advisors

An ESCO offers performance based projects. The compensation is tied to the amount of energy saved. The ESCO compensation is entirely at risk. Hence right capabilities are essential for sustainable business model.

Customer Impact

ESCOs have direct impact on reducing the cost and ecological foot print of their customers. The business of ESCOs revolve around the saving energy and thus are in turn making their customers green. On discussion with one of executives, he derived an example of Sugar industry. ESCO organization helped Sugar industry to identify the energy consumption patterns and components. Based on information collected ESCO came up with the possible areas of energy savings, amount of investment required, technical and process changes, identify Return on Investment, project execution plan, funding model, shared savings and performance guarantees. Thus, Sugar industry, based on decisions taken, was able to reduce their energy spend while ensuring getting return on investment in 2 years and continued savings thereafter. The overall model is a win-win and sustainable. Business model results in economic sense to ESCO, economic sense to Sugar industry while reducing ecological foot print making it green. ESCOs thus help their customer becoming green and have made the business model viable. The ESCOs get funded by partial savings achieved by their customers through becoming green.

Innovation is thus the key factor in making ESCO business model successful with appropriate cost benefits. A senior manager stated -

> *It about how fast you can install the product and implement services …. So we are bringing some innovation in terms of change engineering. In years to come companies have to think of how to go big as well as the bottom line. At company x we have a lot of innovation. We have projects in the rural areas. We did a lot of financing of projects. If you go to remote areas, we have plants the most remote areas and recently in one of remote locations we had a 44 000 light project. You have to have a product which if fault free because reaching that remote house, accessibility is an issue. Second is that consumer should be able to afford your product and third you should educate him, these are some of the weak links we work with to ensure how you install, how you provide him the service. You know when you do a 5000 light project, for a state, when you work at scale the process becomes more complicated*

Customer engagement through innovative business and financial models will be driving the ESCO business in future. Customer is becoming more demanding day by day. Customer is looking for high quality with low price. Maintaining such high customer expectations while educating customer on complexities will be challenging and will determine success of the company

Cost factors and Benefits

Various cost factors are included in business model of ESCOs. The benefits realised out of Energy savings have to be more than the cost factors to make the model sustainable. The cost factors are (Shakti, 2014, EESL, 2014):

- Cost of work and equipment
- Financing Models
- ESCOs fees for consultancy
- Project management
- ESCO internal organization costs
- ESCO support, monitoring,

The benefits arising out of ESCOs are (Shakti, 2014, EESL, 2014):

- Environmental and economic benefits
- Rehabilitation of infrastructures
- Reduced dependency on Energy Sources
- Save fuel resources

Business Model & Sustainable Development

Multiple business models arise out of ESCOs for their end customers. Many of these customers work for various segments across the society. Such as Agriculture industry use supplies from the Bottom of Pyramid (BOP) segment as well as manufacture products for BOP. With cost effectiveness in such companies help reduce their price for their end products, take initiatives in improving quality and take innovative steps to further streamline their organizations. Thus, reduction in energy has spiral impact on multiple factors governing the company.

ESCOs business models exist for multiple scenarios based on need of end customer. These business model are based on following factors: -

1. Risk Sharing Mechanism
2. Technical Risks
3. Revenue Risks
4. PPP Model
5. Partner Eco System

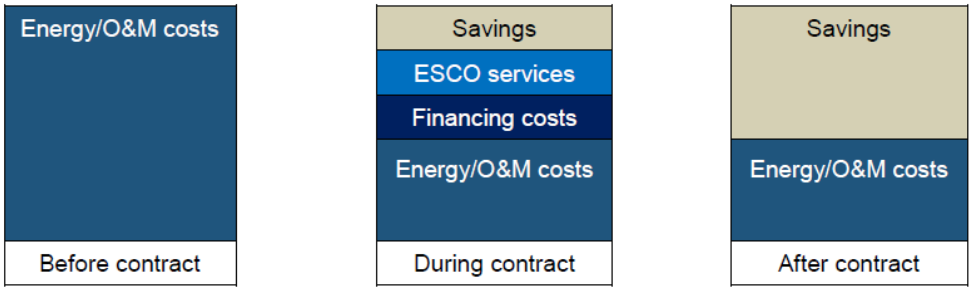
Multiple business models exist for ESCOs with their end customers, however most prominent one are “Guaranteed Saving” and “Shared Savings”. In both models, ESCO provides execution of its services and cost savings. The model difference lies in way the project is financed for ESCOs services. Models are:

Guaranteed Savings

The principle behind guaranteed savings is giving guarantee on performance parameters (example efficiency, energy savings, cost savings, etc.). These performance parameters are measurable. Payments are made as parameters are confirmed.

Such model lowers risk for the ESCO. Project is financed through bank or customer. ESCO ensures that financing is met.

Figure 5.3: Guaranteed Savings Model



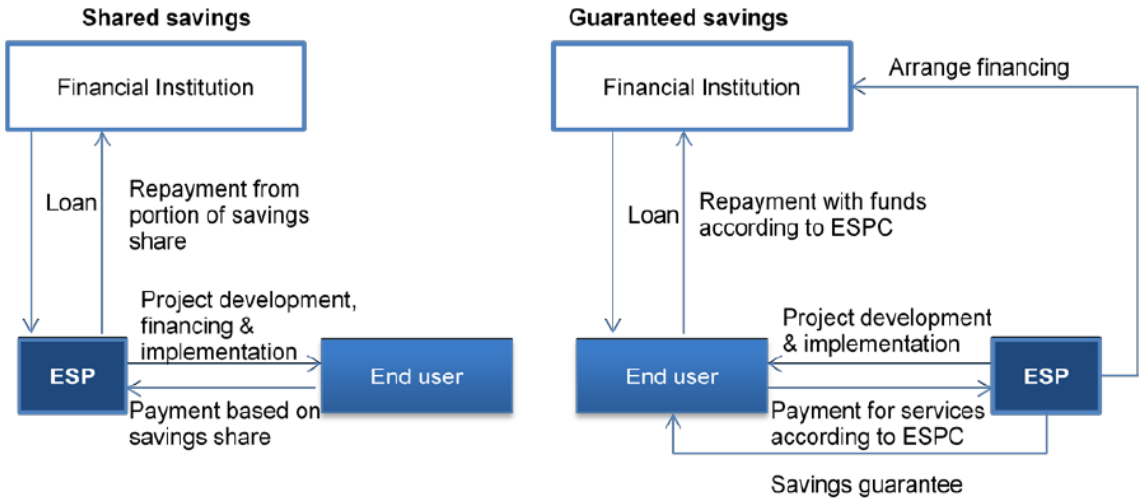
Source: IDC (2013)

Shared Savings

In this business model ESCO is paid from savings. The whole risk lies on ESCO. Though it furthers extends if ESCO provides financing. Such model generally preferred by large ESCOs

In India, the large industries are potential for Guaranteed Savings Model whereas Shared Savings Model is targeted for smaller projects. Due to in house capabilities and expertise, large industries do not entertain shared savings model. Shared Savings Model is perfect for midsize companies who rely on ESCOs for technical reliability and do not have necessary finances for new investment.

Figure 5.4: Shared Savings Model



Source: IDC (2013)

Customer needs does play an important role in way the services are provided and the revenue model changes accordingly. One such example quoted by one of the respondents:

> *Let me give you a good example of how rural electrification happened in India. Government definition of electrification is that you are connected to the grid. You have wires connected to your village but there is no electricity going through. In this situation the government considers the villages electrified but they are not. So there are smaller grids made which can run on biomass, solar energy source, pretty innovative pretty new to be implemented on such small scale and those mini grid people would light up a few bulbs electric fan maybe a television. How did customers react to that? which were the local villagers. A fan wasn't really important to them during the day they are in the field and they sleep outside. They really didn't need a fan. Having a mobile charging point was very important because telecoms service provider was already there more than or television, a telephone charging station was very important. They are called RESCOS (Renewable Energy Services Provider) they started having these centralised mobile charging units and would charge 1 rupee for a 10minute charge. This brought in more revenues. It was important to them so they paid for it. Mobiles were important to them. This supported a business model. They realised that wherever you go you might not find a refrigerator but you will find telecoms towers*

somewhere. So having renewable energy systems or mini grids supported by these towers it became a successful model. The telecoms towers are in the middle of nowhere. There have no power and not charge the villagers so much. These are innovations that just happen but after some learning. Telecoms is good support to the energy sector and we are learning from experience.

Understanding customer needs through in depth analysis of customer behaviours, priorities and needs determine the way services are customized for the successful business model services need to be customized and designed based on the customer needs.

EESL Case Studies

- EESL is one of the ESCO companies in India. They have worked with multiple business models with their end customer. Some of the highlights are (EESL, 2014):
- Nashik Municipal Corporation approved by Board (EESL Investment Rs. 40 crores)– financial closure achieved (loan from Union Bank of India)
- EESL methodology developed following the success of Nashik – disseminated to all
- states and municipalities
- EESL engaged with 9 states covering 24 municipalities in the country. Total investment to be done in the next 2 years ~ 1500 crores (USD 250 m)

5.3 Case Study – 2 – Banking Sector

Banking always have been leading way in adopting technology and ensuring cost effective ways to deliver best services to end customers. Many innovations such as paperless way of banking through the use of finger biometrics etc. help in sustainable, green and efficient banking. With cost effectiveness of solutions, simplicity, accessibility help them target BOP. An executive from banking sector added -

> *Innovations are there as a life of any organisation. We have to continue innovating ourselves, we have to keep ourselves relevant. Over time the basic we have changed. At one time let's say if you were a banker rules have changed. A banker was only about taking deposits and giving advances. Now that narrow definition doesn't work anymore. Bankers do many things now, they are into insurance, mutual funds, financial advisory. Earlier there was only the concept of security now they are guarantees being given by the Government. They are special funds for giving people guarantees. A lot of environmental changes there. Therefore, the banks have to do it. As a result of there are moments were you are the first mover and some moments you are the follower. Anything that comes to the market and is excepted becomes market practice. In banking it is followed very quickly because they know its readily available. So as a result of a lot of that is what is called 1st mover advantage. The advantage will remain with you as long as you did it first. At some point and time someone might re-work what you have done and come up with something better.*

Banking Industry, with increased competition, always must be innovative to be successful and sustained business model. To survive Banking industry must continually evolve.

It is important to take into consideration the Bottom of the Pyramid market as it has been underserved in the past, hence a gap exists for companies to fill (Martinez & Carbonell, 2007). Consumers at the Bottom of the Pyramid are considered as earning a small amount of money; however, they are dedicated towards improving their financial situation (Martinez & Carbonell, 2007). Companies are increasingly opting towards filling the gap and gaining profits from it, and Bottom of the Pyramid consumers lives would simultaneously be improved (Martinez & Carbonell, 2007). The business model may innovation through technology (Chesbrough, 2007). Aspects of the Green Economy will also be discussed in the framework. The adoption

of green products is taking place around the world in different businesses (Zaharia, Tudorescu, & Zaharia, 2011). Firms which incorporate the green approach in the business may attain a positive image (Zaharia, Tudorescu, & Zaharia, 2011). The green approach encourages for people to preserve the environment for the future (Babonea & Joia, 2012).

Across India and South Africa, the importance of green initiatives for goals of sustainable banking, various attempts have been made by public and private sector banks. Banks have taken on the green initiatives in a big way. Banks have gone beyond paperless banking to solar energy sources for ATM's and various other initiatives resulting in green banking.

Green Banking refers to practices and guidelines that make banks sustainable in economic, environment, and social dimensions.

Some of them are in line with BOP sector. One of the respondents mentioned:

> *Fortunately, the BOP sector has been positive less of the prohibitions and more of the convenience. We have about 8800 agents in the field these are at the end, go into the village with a micro ATM which has biometric technology in it this is not an ATM as we see it. Isn't it with an ATM we load money in it and you put your card pass word and all that money comes out but with this there is no money in it and the customer will put their biometric information into the device and it gives them options. If it, they want to deposit the account is credited. If they want to withdraw the account is debited. The agent has the money on them and even though this is done online the agent will physically give the customer the money or he's dependencies the cash. The system updates like an ATM. There are now cash deposit machines. Somebody gets paid in cash, he is very simple maybe a fruit vendor he is getting his money in cash even though he has a bank account. So he gets his money and deposits it into the cash machine. He puts his cash there. We used to think ATMs were only used by highly literate people but recently they are being used by such people.*

Through multiple means of various technological techniques, use of IT and making process efficient, with minimal impact on the environment. Use of technology is assisting banks to be innovative while being green.

Banking Sector green focus in India

As per Indian Banks Association (IBA, 2014) "Green Bank is like a normal bank, which considers all the social and environmental / ecological factors with an aim to protect the environment and conserve natural resources". The focus is to execute banking activities while taking care of ecology, environment, and natural resources including biodiversity. Banking through multiple initiatives such as technical improvements, customer habits change, operations improvements makes bank green. Banking sector is not environment polluting industry, however they play major role in being green by being catalyst in customer behaviour change. Such product promotion and activities due to influence of the bank is showing a positive correlation between environmental performance and financial performance. Several guidelines have been set up for the categorization, assessment and management of environmental and social risk in project financing as below –

Table 5.1: Bank Guidelines

Bank Track	Bank Track is the international network of civil society groups which is tracking the investments and operations of private sector commercial banks and their impact on people and the planet. Members and partners of Bank Track are civil society organizations which have proven track record in campaigning and monitoring on private sector banks. Their main aim is to promote changes in the operations of the bank so that while conducting their business they should consider the ecological well being of the society and be accountable for the activities of their shareholders (BankTrack, 2014).
US Green Building Council (USGBC)	USGBC is changing the way communities and buildings are built, designed and operated. They believe in better buildings that enhance the communities and complement the environment. Their vision is to provide people with healthier, better and brighter places to work, live and play. It is a win-win situation for both environment and economic opportunity. The functions that USGBC perform are • LEED - Leadership in Energy and Environmental Designs most are widely recognized and used a program on Green Building around the world. It is a certification program for homes, buildings and communities that guides the construction, designing, operations and maintenance • Green build International Conference & Expo- Every year USGBC is organizing world's largest conference and expo dedicated to Green Building, which is attended by tens of thousands of professionals all over the world. • Advocacy – USGBC provides community leaders and policy makers with the strategies; tools and resources that they need to inspire action towards a sustainable built environment. • Credentials – They provide a designation to professionals that is 'LEED Green Associate credential' and 'LEED AP credential' which helps them to demonstrate their knowledge in sustainable, construction, design, operations and maintenance of communities and buildings. • Education – They provide Green Building education to professionals from all the sectors of the building industry (USGBC, 2014).
Indian Green Building Council	It is formed in the year 2001 with a vision to build a sustainable environment and to facilitate India to be one of the global leaders in Green Buildings by 2025. The activities of Council enabled a market transformation in Green Building materials, technologies and concepts. LEED-India (Leadership in Energy and Environmental Design) Green building ratings are nationally and internationally accepted benchmark for the operation, construction and design of high performance Green Buildings. It provides architects, consultants, owners, project managers and facility managers the tools they need for designing, operation and construction of the Green Buildings (IGBC, 2014).

CERES	It is a nonprofit organization based in the US. It comprises a powerful network of companies, investors and public interest groups who expand and accelerate the adoption of sustainable business practices and to provide solutions to build a healthy economy. Their purpose is to promote investment policies that are socially, environmentally and financially sound. There are ten CERES principles against which companies can measure their performance on social and environmental issues (CERES, 2014)- • Protection of the biosphere • Sustainable use of natural resources • Reduction and disposal of waste • Wise use of energy • Health and Safety Risk reduction • Marketing safe products and services • Damage compensation • Disclosure • Environmental directors and managers • Assessment and audit
Center for Environmental Research and Education	CERE is a Mumbai based not for profit organization that works to promote environmental sustainability through the action oriented education, advocacy and awareness. They are pioneers in the field of carbon management system and corporate sustainability. They comprise of highly experienced and skilled professionals in all the fields ranging from climate change science to ecological literacy and have completed many development and education projects and national level researches in both rural and urban areas (CERE, 2014).
Center for Environmental Education	CEE in India was established in 1984 as a Centre of Excellence supported by Ministry of Environment and Forests and also it is affiliated with the Nehru Foundation for Development. It is a national institution having its headquarters at Ahmadabad The organization works to increase the awareness about sustainable development among the society and to ensure the due recognition is given to the role of education in the promotion of sustainable development (CEE, 2014).

Source: Nath, Nayak and Goel (2014), pp. 45-62

Despite Green Banking initiatives, India is still in nascent stage. Only one Indian Organization Infrastructure Development Finance Company (IDFC) Ltd, has signed Equators Principles for determining, assessing and managing the environmental risks in the projects undertaken (Equator Principles Association, 2014).

Government plays an important role in promoting Green Banking in India: -

1. **Green jobs**: - Green jobs of creating employment opportunities in non-conventional energy sector. Job is mainly concerned with agricultural, research, manufacturing, and development, administrative,

2. **Green Funds**: - Investment vehicle to invest in companies that are socially conscious in their business dealings or directly involved in reducing ecological footprint. It caters for companies engaged in environmental friendly businesses, such as alternative energy, sustainable living, water and waste management, green transport.

3. **Green Buildings**: - Creating structures and building systems which are environmental responsible and resource-efficient in construction, maintenance, operation, renovation and deconstruction.

4. **IT Infrastructure:** - Utilizing IT to optimize and streamline processes have an overall impact on making the process green. One of the respondents mentioned how IT streamlined their processes and help reach to larger masses.

A senior manager further elaborated as -

> *This is where the challenge of your innovation come in. Look at the BOP, if you find that there is a number of people who are not widely trained who cannot consistently sign in the same manner even though they have learned and they can sign. Tomorrow you go to the banker your check has bounced because the signatures don't match. Now you see with transition someone had left an impression whatever. Now with technology we have moved forward. It has become easier to authenticate. Today it has become more convenient because we have biometrics. Your finger prints can be captured and they can be matched at the bank.*
>
> *When you are actually using it you are helping the bank. When an illiterate person can't put a signature can put in finger in there. There is the digital signature. The next step is the digital signature is exchanging files in digital manner for some time we have been working with the digital signatures. The person handling the file has to have a copy of the digital signature. What is my recovery period? What is my hold? You would have to give them a pay slip for them to actually see what's happening and there's always the argument that who did this, who did? To solve this problem, we had to overhaul the entire process. By a pension every 3 months. By a pension this month, then the next month, so in the pension account we are only depositing the pension.*

Technology is not only assisting to have help bank have differentiated offerings but also helping to reach to larger consumer base at BOP. Combination of refined processes and technology helps increase banks market base and to reach BOP in organized manner.

Banking Sector green focus in South Africa

South Africa banks doesn't have direct environment impact such as mining industries, which are major. However, like India banks do have indirect effect and can help to greater extend

through their customers. Strong South African environmental laws can hold financial institutes responsible for environmental transgressions of their clients.

Under National Environmental Management Act (NEMA), the National Water Act, and the NEMA: Waste Act - lenders could be held liable for environmental damage. Banking Association of South Africa (BASA), banks have approached Minister of Environmental Affairs for exemption from environmental liability. The submission does include code of environmental conduct containing an obligation of financial institutions to ensure compliance at the start of the bank/client relationship.Voluntary Code for Responsible Investing in South Africa (CRISA, or Regulation 28), launched in July 2011 to promote responsible investment, and encourage institutional investors to formally integrate environmental, social and governance issues into their investment decisions. Environmental background checks already happen within South African Banks to ensure environmental compliance through due diligence processes to manage these risks. Environmental sustainability is an important risk management issue.

Table 5.2: Environmental Sustainability with South African Banks

Bank	Turnover	CSI spend	Total CO2 emissions	Average CO2 emissions/ employee	Total electricity consumption	Average energy use kWh/m2
Absa	R45.83-billion (2011)	R96.4-million	359 038t	9.6t/employee	407.1GWh	unknown
Capitec	R7.36-billion (2012)	R1.2-million	27 676t (based on unverified data and assumptions)	3.85t/employee (based on unverified data and assumptions)	26.7-million kW (2012 estimated)	unknown
First Rand	R41.33-billion (2012)	R66-million (R5.57-million environment & conservation efforts only)	280 665t (SA only. 2011)	9.15t/employee	251 724 kWh	209kWh/m2/y (full building envelope)
Nedbank	R33.45-billion (2011)	R61.2-million on environmental initiatives + R89 -million socio-econ development)	217 957,13t	7.74t/employee	164 384 875 kWh	5841kwh/full time employee
Standard Bank	R59-billion (2011)	R114-million	180 403t (63% of SA operations. Verified) 44 005t (Outside SA. Not verified)	6.2t/employee (63% of SA operations)	152 561 816 kWh (SA) 19 960 128 (Africa)	unknown

Source: Leadership (2014, March 4)

Green Initiatives taken by Indian Banks

Various banks in India have taken steps for green banking.

Sharma, Chaudhary and Purohit (2016), highlights important green initiatives undertaken by banks in India. They are visible both in public and private sector. Some of these initiatives taken by Indian banks are: -

1. Public Banks

State Bank of India (SBI)

(1) The bank has tied up with Suzlon Energy Ltd. for generation of wind power. They are using for selected branches by utilizing energy from green technology i.e. windmills in Gujrat, Tamil Nadu and Maharashtra. (2) SBI launched Green Channel Counter (GCC) facility at their branches in 2010. Focus was to change traditional way of paper based banking. (3) Carbon Disclosure Project which undertook various environmentally and socially sustainable initiatives through its branches spread across the length and breadth of the country. (4) Export Import Bank of India (EXIM) along with SBI entered an agreement to provide long term loans to Astonfield Renewable Resources and Grupo T-Solar Global SA for building solar plant in India.

Punjab National Bank (PNB)

(1) Bank is focussing on green initiatives by initiating more than 290 tree plantation drives. (2) Improving the energy efficiency within the bank by conducting Energy Audits as an energy conversation initiative. (3) Bank has signed 'Green Pledge' with Ministry of New and Renewable energy under which they had set up the butterfly park at Guruvayur temple which houses medicinal plants. (4) Ensuring green building and working on initiatives such as energy efficient lights, immediate repair of water leakage, computer shut off, sensors for lights, fans, etc. to continue its effort for green buildings. (5) Modifying their business process such as approvals from Pollution Control Board has been obtained before disbursement of term loans and for the project loans, compliance with environment and social safeguards including rehabilitation and resettlement of project affected people is to be ensured as pre-disbursement condition. (6) The bank was awarded with a second prize for 'Best Wind Energy Power Financer' by wind power India 2011.

Bank of Baroda

They had also taken various green banking initiatives such as (1) Bank prefers environmentally friendly green projects such as windmills, biomass and solar power projects which help in earning the carbon credits. It provides better interest rates. (2) It forces its industrial projects to obtain 'No Objection Certificate' from the Pollution Control Board. (3) Multiple technologies to help reduce the carbon footprint. Initiatives such as compliance with e-business guidelines, use of internet banking, mobile banking to promote paperless banking. Installation of ATM's in most of uncovered areas to reduce the petrol or diesel consumption in travelling and helps in maintaining a clean environment. (4) Desktop virtualization, backup consolidation and server virtualization improve data centre operational efficiency.

Canara Bank

(1) Canara Bank has adopted environmental friendly measures such as mobile banking, internet banking, tele-banking, solar powered biometric operations etc. (2) The bank has gone strong on technology such as implementing e-governance for HRM function and several other administration areas to reduce the paperwork. (3) Giving preference to projects with better lending rates which can help earn carbon credits like biomass, solar energy projects, windmills, etc.

2. Private Sector Banks

ICICI Bank Ltd

Bank has gone for 'Go Green' initiative, which focuses on initiatives such as Green products/offerings, Green engagement and green communication with customers.

- Green Products and Services: The bank is offering green products and services like
  (i) Instabanking: - Anywhere and anytime internet banking, mobile banking, IVR banking, etc. This reduces the carbon footprint of the customers as they do not require the physical statement or travel to the bank branches.
  (ii) 'Vehicle Finance': - They are offering 50% waiver on processing fee of auto loans on the car models which uses alternate sources of energy

(iii) Home Finance – Reduced processing fee for the customers who are purchasing homes in LEED certified buildings.

- Green Engagements: Conducted an environmental awareness program for employees and customers.

- Green Communications: Bank insists their customers for online bill payment, online funds transfer and subscription to e-statements which promote ‘paperless’ and ‘commute free’ modes of banking transactions.

HDFC Bank Ltd

HDFC bank is doing its part by reducing their carbon footprints in waste management, paper use and energy efficiencies. (1) Bank focusses on various HR practices to promote prevention of any wasteful use of natural resources and emission of greenhouse gasses. (2) Utilizing internet banking and use to technology to reduce use of paper. (3) Internal Bank energy efficiency by focussing on energy conservation initiatives such as use of CFL, optimized air conditioning etc. (4) Procuring green products in accordance with Central Pollution Control Board and efficient energy products.

Axis Bank Ltd

AXIS bank implementing several initiatives in green banking (1) In august 2011, bank focussed on recycling by collecting all dry waste generated from their offices and recycling through companies to notepads, notebooks and envelopes. (2) Focussed and obtaining certified ‘Green Building’ (3) Implementing Solar powered ATMs.

Kotak Mahindra Bank

Reduce paper consumption through use of technologies, and implementing rain water harvesting in their offices.

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Green Initiatives taken by South African Banks

Bank X

Leading South African Bank applies the concept of Business Model Innovation for a Green Economy for the Bottom of the Pyramid in the following way:
"Simplicity is the ultimate sophistication" – this is how Bank X describes itself, and its biggest innovation would that of the firm's simplicity. As one of its key pillars, Bank X holds great importance towards simplifying its products and processes to make an overall better experience for the consumer and the firm itself.

Bank X's innovativeness comes from three pillars (Lawson, Moyer, Okubo & Planting, 2006):

1. **Use of technology**: By using fingerprint biometrics, photo identification and card access in their branches, they have been able to implement a system of paperless banking. This has in turn lead to a significant reduction in costs for the bank, therefore being able to share this reduction with its consumers. Fingerprint biometrics and photo identification has led to a simple and effective process for consumers where there is no longer a need to fill in an endless amount of forms. It also reduces human handling error i.e. no lost or misplaced forms. This means that opening a bank account with Bank X is simple and quick. These technologies also increase security measures which helps to reduce fraud. Bank X aims to promote a paperless and cashless environment for its consumers. Consumers' money is also extremely accessible as there is a multitude of available touch points where their money can be accessed such as ATMs, branches, mobile banking, internet banking as well probably the most convenient touch point, your local Pick 'n Pay, PEP or Checkers.

2. **Simplified and focused product range**: Bank X only offers one product, and yet this product is by no means lacking in a certain aspect. With one account, consumers are able to save with one of the best interest rates in the country, transact with the lowest transaction costs as well as apply for credit all with the same account. You often find that regular banks have a dozen product offerings where consumers have to spend a considerable amount of time finding the most suitable account. With Bank X, they have combined all the offerings into one complete and comprehensive account. This once again emphasizes the drive for Simplicity for the consumer.

3. **Low-cost**: This is perhaps the biggest point of innovation and being set apart from the rest of the banks of South Africa. Due to the innovations mentioned above, Bank X has seen the elimination of back offices in branches and no unnecessary paperwork or admin fees which has led to the most affordable banking solution this country has seen. This low-cost model has seen them be able to market to the lower-income consumers as well as the consumers who have never banked before. Bank X offers a small monthly admin fee with small transactions fees. It makes banking affordable.

Bank X's business model has been innovatively designed and adapted to suit the market. By applying Business Model Innovation, they have redesigned banking in South Africa with a completely revolutionary way of banking. Their paperless, one account system has simplified banking for consumers and has led to considerably lower costs for both the firm and its consumers. According to Keraan (2010), over 13 million in South Africa are unbanked, in other words, do not have access to formal financial services. This equates to approximately R54 billion every year. The majority of the unbanked can be considered to Bottom of the Pyramid, in other words the lower-income earning or lower LSM citizens (LSMs 1-4) (Keraan, 2010). Most financial institutions in the current state are not geared to market and profit from the BOP. This is where the competitive advantage of Bank X lies.

Bank X, with its simple and cost effective processes, was able to develop an account that was affordable to the masses, with a minimal opening balance, and significantly reduced administration fees compared to the other banks of South Africa. This enabled the BOP consumers to be able to afford to bank, as fees would not eat away from their hard-earned money. Bank X also made it easy and quick to open up an account with them as stated on their website, their account is the most affordable way of banking in South Africa.

In order to fully market their product to BOP, Bank X had to take 3 factors into consideration, namely:

1. New products and services: Bank X brought a revolutionary new way of banking that consumers had not seen: one simple account to serve all needs that is paperless and has very low bank charges. To serve the BOP, a product needs to have low costs but high utilization volumes. This new product is affordable to BOP because of its low admin costs, zero transaction fees and a minimal opening balance.

2. New business processes: Serving Bottom of the Pyramid requires a new infrastructure of business processes that allows for easy accessibility, real-time transactions and other services. These new processes need to be able to support the implementation of the innovative products to the BOP market. In terms of Bank X, its use of finger biometrics, photographic identification and paperless way of banking all contribute in marketing their all-in-one account to this market.

3. New distribution and service channels: This factor takes into consideration customer accessibility, reachability and cost effectiveness. Two channels that Bank X has made use of to serve BOP are mobile phones and retailers. By making use of mobile banking and being able to access cash using tellers at retailers, Bank X has enabled BOP consumers (especially those who live in rural areas) to have access to their money easily and quickly. This allows for a fully ubiquitous network for the distribution of banking products and services.

Strategies for Green Banking

With influx on IT system and movement towards next age, banks are absorbing new age technology. There is more involvement of Green Technology, and providing Green products are helping in improved customer interactions. Banking operations are being carried from alternate channels such as internet, ATMs and away from banking retail channels. Thus, reduce banking retail means reduced stress on environment factors.

Jha and Bhome (2013) suggest some of following steps for green banking:

(1) Online Banking: - Online banking is something which is adapted by mostly all banks. Online banking helps reduce energy resource print on through reduced number of Retail Brick and Mortar stores. It also helps in reduction of paper resources, less energy spend. Thus helping in making banking green. (2) **Promoting Green Loans**: - Attractive low loan interest rates for green products such as solar equipment, energy savings project. Thus promoting green business. (3) **Reducing Carbon footprints**: - Banks going green internally by use of energy saving techniques such as CFLs, efficient energy systems, optimized cooling systems etc. Thus, the banks directly help in reducing carbon foot print by being more energy efficient.(4) **Solar and Wind Energy**: - Promoting projects using environment friendly technologies and

internally utilizing these technologies in banks. (5) **Engage with key stakeholders**: - Create awareness of environmental issues and their impact on the economy, the environment and the society. (6) **Green Credit Cards**: - Using a green credit card, banks will donate funds to an environment-friendly non-profit organization from every amount spend on credit card. (7) **Carbon Credit**: - Banks getting involved in carbon credit business. (8)**Use of ATMs: -** ATMs help environment by promoting online banking. Various facilities of online banking are available via ATMs thus reducing the need of Brick and Mortar Retail banks. Thus reducing paper, energy foot print.

5.4 Case Study – 3 – FMCG/Durable Sector

BOP markets are characterized by low spending, low budgets and challenges of reaching to end consumer. Because of these reasons, BOP Market has been neglected by multi-national companies. However, BOP segment despite being with low spending and low budgets, it is characterized by volumes. The volumes make it attractive for achieving the right corporate margins. Considering the brand loyalty which is high in this sector along with future vision of the shift of current consumers to lower middle class makes it attractive for the corporates.
The retail / FMCG investments by corporate world in BOP segment will act to lift the poor out of poverty, by reducing costs and increasing efficiency, resulting in saving the poor time and allowing their money to go further. With greater savings, they can invest in their own well-being.

Retails Sector green focus in India BOP Market

Looking at the trends, India is on the growth path and looking strong for next 15 years. The Indian GDP growth is posed at 6 to 9 percent for next decades. India do have one of biggest middle classes in the developing world with 1.21 billion populations. With current growth rate, Indian economy will have largest middle class in the world by 2025. This makes India a very lucrative market for companies. The growth will be majorly inclusive, with growth in all sectors. The growth will be driven by urban India, followed by rural markets and small cities. The inclusive growth will ensure that it will be consumption and domestic demand driven growth.

With growth, the focus toward BOP segment is also increasing. With long term potential of BOP segment to move into middle class segment and with brand loyalty it is making BOP segment an attractive place. Despite multiple challenges, different companies have adopted various methods to service the BOP market.

BOP segment is extremely price conscious but willing to try new products. To tap growing BOP market, companies need to innovate locally relevant and economic products. The willingness of consumers to try new products should be encouraged through innovative packaging and distribution strategies. Companies such as Nestle and Britannia who have introduced smaller chocolate/biscuit packages starting from Re1. Coke created a smaller 200

ml bottle for Rs 5 prompting its rival Pepsi to compete with a similar product. Opening of food malls such as Food World, Subhiksha, Nilgiri's, Fab Mall have been spawned by a growing consciousness towards packaged ready to eat foods due to necessity and affordability.

Innovations must become value-oriented from the consumer's perspective. BOP being price sensitive there is need for 30 to 100 times improvements in price performance. Thus, managing and meeting BOP segment has enforced a new business model on MNCs. Systems for price performance cannot be fine-tuned to cope with the demands of the BOP markets. And most MNCs have now adapted to the needs of the BOP. A senior vice-president from FMCG company expressed -

> *I have seen that any products you have, have to adapt and fit into their lifestyle. It can be so disruptive and take away their traditional ways and we have seen in most cases. For example, in India Philips devised an innovative product smokeless chullah. They go to the villages and see the women cooking it up. They looked at their economy and health issues but they never asked the women to stand up and cook on the slabs/height like an urban woman. It's the same size and smokeless so it doesn't give your health problems that is why it was successfully adapted. It was quickly adapted. I agree with you completely we have this with the bottom of the pyramid. I like what you said they don't understand the consumers. Can you give any example where you think companies don't understand the consumers their values social norms? The way very different from the way urban consumers work.*

According to Mr. Banga, former CEO of HUL, BOP markets can have immediate impact on time taken for products, technologies, and concepts to diffuse in the system. Many of the drivers of change and market growth—deregulation, involvement of the private sector in BOP markets, digitization, ubiquitous connectivity, and the attendant change in the aspirations of people, favourable demographics (a young population), and access to credit—are simultaneously present in BOP markets. The result is the challenge to the "S curve" that is the model for the diffusion of new products and services in the developed world. The changes that played out over 15 years in the developed markets are being collapsed into a short period of just three to five years in many BOP markets. Mr. Banga suggests that the real challenge in BOP markets is that managers have to cope with the "I curve."

Nestle, which has a renewed focus on BOP market. Nestle has introduced smaller packs of their products -Maggi Noodles and Ketchups. This is helping them to increase the penetration of their products and address BOP market. They have innovated and created a taste enhancer with added iron and vitamins, specifically for the BOP audience. This allows them to not only improve the taste of everyday dishes, but also enhance the nutritive value of the food. Another respondent further elaborated -

> *When a consumer doesn't see the money that they won't adopt it. I want to ask what do you think about companies that bring innovative change not the disruptive and radicle ones but small changes. I remember a company that once moved from the tooth paste to the powder, sorry not naming the company ……. The changes were meant for the rural markets. I remember when I was a student they introduced the tooth paste and it failed and then they introduced this powder that can be substituted to the paste for medicinal purposes. What do you think about these companies that change as per requirements of the customers? In South Africa …relate that to margarine some people believe it is healthy some believe it is not healthy. Some believe natural is healthier. I agree with you on that whether you can't convince the market that the product is good, relevant or can deliver on the promise. Whatever the promise it is. For example, does the margarine taste good, is the tooth paste good for your teeth and I can take washing power for instance does the washing powder remove stains? These things have to happen particularly in the bottom of the pyramid because these people do have money to waste. I think if you deliver something is having to be to their expectations. So one: manage their expectations. Through clever media and marketing is important. Two: the consumer knows what they want. They know intrinsically. To convince them to fundamentally change their behaviour you really have to justify why their fundamentally behaviour has to change. It's like telling people, here in South Africa people rub a laundry bar on their clothes and wash it with washing powder. This habit will never change so you have to really convince them that to change this behaviour you have to convince that just using the washing powder alone you will get the same results just as the laundry bar or even better. It should not be the same or small change because consumers will not change. Changing consumer habits there has to be a serious differentiation and if you can't do that you will not be able to change consumer behaviour.*

For business model to be successful at BOP, it must be combination of multiple techniques. Customization of product / services, communication and reach to BOP segment, understanding consumer behaviour and needs, pricing strategy are some of such techniques

Retail Sector green focus in South Africa BOP Market

The South African market for consumer goods predominantly consists of food & beverages, clothing, furniture, and personal care. Representing 55 % of the average BOP household expenditure, the market is by far the largest BOP market in South Africa, but it is also one of the more challenging to enter. South African Companies are looking at ways of entering the BOP market by partnering with the community:

Sanchez and Ricart (2010) argued that the issues that determine the type of innovation required of business models when entering low-income markets have not yet been developed (Sanchez & Ricart, 2010). Academics have attested to the need for developing new strategies and capabilities for serving emerging consumers and a different business model is no doubt required (Hammond & Prahalad, 2004; London, 2008; Pitta et al, 2008). Firms wanting to operate in low-income markets have been under pressure to rethink their existing, often out-dated, business models that were developed to serve consumers from developed worlds, initially focusing on high-volume/low margin models rather than low-volume/high-margin models (Hammond & Prahalad, 2004). Sanchez and Richart (2010) argue that the largest constraint of insulated business models is the reduced willingness of potential customers to pay influencing the firms' choice of reducing costs. In contrast, the interactive business model is focused on increasing the willingness to pay without forgetting cost restraints. The expected result is an innovative business model that is able to grow income choices in the low-income market while making profits (Sanchez & Ricart, 2010).

Marketing also pays an important role in which products are shared in BOP segment. One of the respondents give an example of how marketing strategy make an impact -

> *We had to run a campaign called short left to encourage local tourism. What we should be saying is actually if you live in the surrounding of the Krugger National park you are probably terrified of and elephant because you encounter it in a more dangerous setting rather a fun type environment. They still haven't understood that market. You can't expect someone who lives in Pushpakridge to have the same appreciation for*

wildlife as someone who comes from Soweto for example. We have to have the same approach; we have the same marketing strategy. We think that everyone's experience is the same rather than why don't we change that perception? Why don't we create a positive correlation between the neighbouring community's/ host communities and the wildlife which is around the Krugger National Park, it creates jobs, traffic, tourism. They have a very negative perception of the wildlife. That's the example I could think of. I'm sure there are many other examples.

Massmart

Massmart's pilot initiative, ASANTE, is allowing the giant retailer to enter the BOP market carefully. Using old shipping containers that are converted into mini supermarkets, the retailer can expand its customer base in rural areas and to get a feel of what the market wants. Each container is managed by 3 women and by rotating shifts, they can stay open at hours that suit their clientele. It allows them to earn a salary of between R1 500 –R3 000 PM. Bi-weekly meetings are held between the women and the coach to provide training and assistance on the essential aspects of running the stores, such as:

- Cash flow
- Stock management
- Advertising
- Bookkeeping
- Placing of bulk orders

The advantage of the ASANTE programme is that the container shop benefits from Massmart's massive buying power and these discounts can be passed on to the consumer. Currently the program only runs within a radius of 100km from Durban, but the expectation is that if it works, it will be expanded.

Massmart was able to address following core issues (BOPLab, 2016):

- Provide affordable products for less to the rural communities forming part of the BOP
- Create sustainable new businesses in these areas, creating wealth and thereby reducing the income gap between rural and urban areas.

Woolworths

The Beaufort West hydroponics initiative has allowed Woolworths to make a significant contribution to a town where unemployment is sitting at 80% by creating employment for 50 people, making it the largest employer in the area. Most significantly, it allows Woolworths to get a guaranteed supply of quality fresh produce, in a sustainable manner. It is not a perfect solution as there have been teething problems, including finance and training but Woolworths sees this project as lucrative enough to roll out to different parts of the country (BOPLab, 2016).

The hydroponics initiative has had a clearly positive overall social and economic impact for its direct beneficiaries in the form of employment and an income, while simultaneously ensuring a steady supply of quality produce for Woolworths. With a staff of about 50, BWH is one of the largest single employers in the Beaufort West area. Annual sales increased 25-fold from R24 000 to R600 000 from the year 2003 to 2007. This increase in sales suggests the opportunity for an expansion which could provide as many as another 60 jobs and an injection of R2 million into the town's economy. The project has further acted as a catalyst for two other ventures in the area, producing scented oils and leather, which have created a further 40 jobs. The hydroponics project is another example of how established businesses in South Africa, especially in the retail sector, are increasingly realising how they can leverage the strengths of the poor and source quality products from lower income segments in a sustainable way. There is further potential for scaling up such initiatives and replicating around the country, and Woolworths has been the driving force behind several other projects which will be described in coming factsheets (BOPLab, 2016).

SAB-Miller

By partnering with local communities, SAB has guaranteed supply of maize and sorghum, the main ingredients of beer. The farmers get access to the latest methods of farming and a fixed price for their product. The only downfall is the possibility of over -supply which could threaten the price of the product internationally or it could lead to more farmers wanting to supply SAB and a stock shortage (BOPLab, 2016).

5.5 Case Study – 4 – Cloud Computing

Introduction

The cloud computing is the use of computer hardware and software resources to deliver services over the Internet or a network is already there as we all know, and developing at fast speed.

Traditionally customers used to buy the heavy and expensive IT Equipment and take months to configure and provide them to business for utilizing them. Since the increase in the internet and agility in the business demands to delivery IT and IT related services much faster and scalable. At the same time the business would like to reduce the capital investments and commitments. With change in the investment model, business has more available funds to focus on business and its objectives.

Disruption of IT in Business

Recently there is a huge disruptive innovation happening across the world. Disruptive innovation, a term of art coined by Clayton Christensen, describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors.

One of the main reasons and enables for the disruption is using Information technology to deliver the goods and services. For e.g., Uber by using mobile application to enable the taxi service, shook the world with the disruption of service

Below Poverty Line Market Consumers and being Green

Large corporations usually introduce separate line of products and services for the below poverty line market consumers. They will not introduce their premium range products at all. By making huge differences to the premium products and services or introducing a new product, large corporations plan to capture the market.

It has been observed that the large corporations will not take a risk of introducing the main stream products and services to the below poverty line market consumers as it impacts the profitability.

Today to introduce the new product and/or service line to the even including for the large corporations is a huge task. Because of the business disruptions in their own industry, it is inevitable to introduce their products and services to the market with a greater speed and agility.

Thus, large scale companies are adapting cloud services to take it up for small / medium scale companies to provide them the same experience as premium products, while being green. Companies need not buy servers, buildings and floor space to build datacentres, no electricity, cooling costs, no purchase of software licenses, etc. when they adopt cloud technology. Thus, cloud technology help reduce upfront investment, thereby reducing cost. This enables companies to deliver the products to various consumers including those on BOP segment without being expensive and at the same time being green.

In case of any introduction of product/service to Below Poverty Line for big organizations, the large corporations need not hesitate on IT investments as they become more operational expenditure when compared to traditional capital expenditure. Due to the very nature of change in the investment model, based on the growth of the business line related to BPL the large corporations can increase the IT investments in cloud. A senior manager from IT consultancy firm stressed -

> *We are in Solar products business. In order to provide our orders, we continually need to maintain inventory, orders, supply chain. We also have customers and vendors. Customers are necessarily required to keep track of, possible orders coming. We use Microsoft CRM system to manage those. Also, many of our sales agents are in field. Thus, we needed a system where there is less capital investment and is available on internet for field services. Similarly, on supply chain side, we needed system to interact with our vendors to initiate supply of raw materials based on demand. We used Microsoft Online cloud platform to assist and be ready in short period.*

Cloud Computing direct / indirect impact on Green and BOP segment

Cloud computing assists thereby benefiting in following ways:

1. Small Investment

Incorporation of Cloud Computing by corporates, and releasing it as service to small / medium enterprises help reduce the upfront investment required by small / medium companies. Reduce overall cost does impact the price to end consume.

2. Green and Sustainable

   Hardware deployed by companies result in electricity usage, cooling requirements, e-waste production etc. With cloud computing the hardware is consolidated for various companies at one location. This helps in optimized electricity usage, optimized cooling and reuse of e-waste. The overall chain is made green with adaptation of cloud computing.

3. Management

   The operation challenges and expenses come on top of every infrastructure deployed in company. Cloud computing takes away these expenses and consolidates in optimized way. Thus, the management of the infrastructure is much easy, without impacting end consumer.

4. Time to Market

   Cloud computing helps reduce effort and time required to set up computing infrastructure, necessary for optimized organization performance and product development. Cloud com [putting assists in faster Go to Market.

5. Enhancing Knowledge

   Cloud computing makes it easy for organizations to help share their knowledge with other interested organizations. Thus, companies don't have to build from scratch and can develop on existing knowledge base. Usage to help develop more efficient / green technologies, utilizing the consumer knowledge base of BOP etc. can help increase the reach and develop models to BOP consumer. Example microfinancing with use of cloud based solutions and handheld POS to BOP segments is one of the available solutions utilized by Banks in India without investing much on Retail Branches. An executive further elaborated -

Our company is start-up company. We have huge cost pressure and cash flow. If we don't make money in moth serious money pressure build up. In that situation how can we afford premium software products. The software is necessity if we need to compete with big companies, and provide high quality services. With help of cloud we are able

to do achieve. We don't have to invest in huge license cost, we can add and remove users as they arrive. It has given us platform to leverage, optimize our services, be agile and maintain high quality keeping our costs down. It further helped us to move faster to market and reduce carbon foot print of our company with reduced energy profile.

Cloud Computing Examples

Internal - CellC Cloud Adaption

How adaption of Cloud computing helped for internal customers

Challenge

According to Cell C CEO, Lars P. Reichelt, "the objective was to promote an easier way of communicating through the intranet, whilst increasing productivity. The capabilities of Google Sites were investigated to see if it could provide us with the tools to build and sustain a new corporate intranet which was previously on Microsoft © SharePoint. After a successful Google Sites evaluation, we decided to deploy across all employees with the assistance of a local Google Enterprise partner, Grove Group. The trial allowed Cell C to achieve their goal of building and sustaining the new corporate site".

Solution

Reichelt continues, "the switch to cloud computing where software and IT services are delivered through a browser is a shift from the traditional on premise collaboration products used by Cell C. The decision to move to Google Sites comes after a successful managed trial that allowed Cell C to build a new, multifunctional corporate intranet. Cell C uses Google Sites to enhance internal collaboration and modernise working practices."

The google apps are cloud based solutions which assisted in reducing operational expenses and sustainable (Globalapps, 2011)

Small Business - FNB Business and for small business Instant Accounting

First National Bank, a division of FirstRand Group for small and medium organisations, the bank provided integrated cloud solution for an instant Accounting software.

It is huge value addition to small customers, the integrated instant accounting solution

Instant Accounting is a unique, online accounting solution which uses your FNB electronic bank statement to generate financial statements and reports, including income statements, balance sheets, cash flow statements, generate invoices and more.

The Instant Accounting is cloud based solution available to various business units without spending heavy on accounting software (FNB, 2016)

Townships in SA – Government and large corporations' initiatives

Initiating some of township development using public cloud solution. For the South African government, the focus is on G2G (government-to-government), G2BC (Government to Business & Citizen) and G2C (government-to-citizen) activities. Improved service delivery is facilitated by building e-Government awareness, being a model user in e-Government centres of excellence, working towards one government information and communication channel (one portal, one call centre, etc.) (GCR, 2015).

5.6 Summary

This chapter developed four case studies comprising of sustainable business model innovation, representing comparison between South Africa and India, across four industries, namely – Energy, Banking, FMCG/Durable and Cloud Computing. Case-studies provides in-depth comparison of companies in South Africa and India. These case studies are developed based on secondary desk research and common themes and sub-themes, which are originated from qualitative analysis of data.

QUALITATIVE PHASE 2

CHAPTER 6: GREEN BUSINESS MODEL INNOVATION FOR SUSTAINABLE DEVELOPMENT – PREPOSITIONS AND CONCEPTUAL FRAMEWORK

6.1 Introduction

The main purpose of this chapter is to conceptualize theoretical framework of green business model innovation for sustainable development, which addresses primary research question of current study, i.e. how businesses targeting BOP consumers reinvent their business models for sustainable development.

This chapter is structured into three major sections. The first section provides analysis of phase 1 qualitative study, in the form of themes and prepositions, to recognize emerging patterns of data from South Africa and India. The computer aided software NVivo 11 is used for systematic classification process of coding and identification of themes and patterns. This section also highlights the similarities between South Africa and India.

The second section addresses the secondary research question of current study. It discusses particularly the differences of green business model innovation for sustainability at bottom of pyramid markets of both South African and Indian companies.

The third section presents a conceptual framework that integrates green technology, sustainability and concepts of business model innovation. Qualitative content analysis is used as research method to augment themes obtained in phase 1 with further literature review, to formulate hypothesis and propose conceptual theoretical framework.

6.2 SECTION 1: Themes and Prepositions

This section provides analysis of qualitative findings. The qualitative data was analysed using the software NVivo 11 (Mayring, 2014). The first set of themes originated from coded data in form of nodes is presented in Appendix D. These themes were further categorized, interrelated and refined into final themes and sub-themes, using an iterative approach by moving backwards and forth between and across the data sets. The researcher found that most of the themes were

similar for both South Africa and India. However, some differences from South Africa and India were identified by researcher, which are discussed in second section of this chapter. Table 6.1 provides classification of themes and sub-themes from qualitative analysis.

Table 6.1: Themes and sub-themes originated after refinement of first sets of themes, by using NVivo 11 software

Major themes	Sub-themes
Innovation at Bottom of pyramid (BOP)	a. Innovation driven by needs and aspirations of BOP consumers b. Commercialization of innovation c. Innovative distribution channels d. Role of multiple stakeholders
Company culture	a. Providing a sense of freedom to employees b. Encouraging employees to bring innovative ideas and new ways of doing their jobs c. Providing a sense of ownership d. Limited financial rewards or incentivising e. Support from senior managers or executives, thereby building a sense of confidence f. Learning from peers g. Making employees less afraid of new challenges with new technological innovations h. Creating open culture within organisation i. Regular feedback mechanism from employees j. Recruiting employees carefully
Features of business model leading to business model innovation	a. Product improvement b. Matching increasing customer's needs and aspirations c. Providing competitive edge d. Generating innovative idea from identified felt needs of customers
Customer interaction	a. Involvement of customer in business processes

	b. Identifying opinion leaders or influencers, especially at BOP markets c. Customer education d. Customer interaction and feedback mechanism e. Demographic and psychographics of customers f. Localization of products and services bringing innovation and value to offerings g. Customer communication h. Distribution networks
Finance	a. Green financing b. 'Green Washing' c. Financial barriers d. New forms of revenue schemes e. Cost structure f. Financial resources
Innovation	a. Provides competitive advantage b. Required for constant improvement of product c. Changes nature of business model d. Innovation is driven by needs of people and competition e. Requires considerable investments f. Technology – key success driver for innovation
Learning & Training	a. Cross-learning - Fostering development of learning centres in organisation, Allowing a certain amount of chaos, freedom from fear b. Online training
Operations	a. Green technology implications b. Importance of change management

	c. Operational pressures as limitation of business in implementation of innovation
Market offerings – products or services	a. Need based products and services b. Competitive offerings in BOP markets c. Hitting on consumers' consciousness d. Price sensitive business offerings
Infrastructure management	a. Development of core competencies b. Involvement of partners c. Integration of technology to develop efficient infrastructure
Social environment	a. Changing concept of innovation and influencing positively social environment of consumers b. Disintegrate and re-integrate as facilitator or incubator
Sustainability	a. Equal attention to all three pillars of sustainability – environmental, social and economic b. Policies fostering sustainable practices – 'Going Green' c. Financial support from government agencies d. Innovation brings sustainable development e. Accounting carbon footprint f. Bringing changes in business model g. Combating with competitors
Technology	a. Technology and innovation b. Educating and learning new technologies c. Importance of green technologies d. Reasons for failure of technologies

The final major themes and sub-themes are discussed under the following headings –

6.2.1 Features of business model leading to business model innovation

Business model is the way in which a company generates revenue and makes profit from company operations. The concept of business model facilitates the analysis of the way which a firm derives economic value from a newly developed technology (Rasmussen, 2007). However, business model adopted, is critical to the success of commercialization of new technology (Chesbrough & Rosenbloom, 2002). And to successfully adopt new business model, it is imperative to consider various aspects of business model. According to the company executives' interview, a business model should be able to accommodate the following features –

a. Product improvement

Continuous product improvement is enviable for a business, which wants to stay competitive in market. Companies work on business models based on requirements of the end users of their product or service offerings. An executive from energy sector, explains –

> *With increase in expectations of customers, companies' business model importantly, slowly and gradually you will notice ……. and with competition bringing in new types of services, more developed services than yours, more developed products than yours, more technologically developed products than yours. It necessitates that you keep on improving your product but that improvement cannot be done by straight forward or simple methods which usually apply that is when you start thinking outside the box.*

Product improvement further compels to think out of the box, to bring innovative ideas and solutions to growing customer's needs. And hence, it will bring innovation in a company. In other words, many times new ideas and solution originate from customer needs. When these needs are recognized by customers, it becomes easy for company to implement innovation. This is highlighted by one of the banking sector executive, by providing an example of taxi services like Uber and Ola –

cabs services ….like Uber, Ola ……the idea originating from customer needs…needs being recognised from the customer …….provides a common platform to connect taxi/cab drivers with consumers. …..I can give you the idea of what I have seen these cabs. They also need some good services in the hired vehicle sector. These people also worked with the drivers, gave them some training and you find that the popularity of the business has increased and many times now if you ask for a cab many times the cabs are not available. Somebody actually identified the need of the customer that now in India with economic growth that segment has become sizable. Those who will have extra money but would want timely services, courteous services. That is how these people came into business see these business is now successful.

Continuous product improvement helps to retain consumers and increase engagement with consumers, thereby increase consumer interaction. However, in process of improving offerings viz-a-viz improvising on business model, can often lead to challenges, especially while re-inventing business model for BOP sector. According to respondents, these challenges can be – right orientation of consumers, difficulty in understanding context of product offerings, lack of empathy from businesses towards BOP customers. Other challenges may include, acceptability by BOP customers and lack of adequate demand. While answering question on overcoming challenges, one of executive from a consultancy firm, suggested *sensitization* as viable solution. Sensitization means making companies realize social, cultural and behavioural aspects of BOP customers and considering these aspects, while innovating their business model. He further explained –

The customers in BOP segment are very different from what you already have and so is there behaviour, cultural and social context. One of the primary ingredient of the change is Sensitization to the whole ecosystem.

b. Matching increasing customer's needs and aspirations

With increasing needs and aspirations of customers, it is essential that firms innovate their offerings with same pace. This was illustrated by a respondent using an example of time portals, a database of each city around the world. The concept of such innovative business practice

originated with changing needs and aspirations of customers, who enjoy quality travel. In his words -

> *…….take an example of just Time Portal: in this age/time people move from one place to the other, they require a lot of information of that city. Someone came with an idea of having a databank of each city. They will not charge you for the service but then now slowly and gradually generating revenue through the vendors who register with them. Identify the need of the people, generate an innovative idea I would say and come up with a solution that helps people*

c. Providing competitive edge

Business model innovation also helps companies maintain competitive edge in market. Besides, speed of innovation, the quality and quantity of adoption of new technology is equally imperative. As per respondents in current study, development *speed and pace* of new technologies, leading to new innovations, is the golden rule of winning competition in present times. They are the most important drivers to business model innovation. The resultant, companies striving for improved research and development investments, and increase collaborations with specialized firms. An executive from FMCG sector, shared an example from service industry in South Africa. Most banks function aggressively in South Africa, and therefore to maintain competitive advantage, Bank X has found a unique way to doing business by giving ownership to BOP customers. The executive further added –

> *If you go to the township economy in South Africa and I think of Bank X ….. I think they are doing some good innovation in that space. I think we need to see how we can make this township economy grow. So an Idea would be - micro manufacture for the townships where they can get employed and becomes shareholders …….but from our side we can't outsource everything because we are concerned about the quality of the product. Some of the other things we do is that we can outsource management and if people truly own it, brand or brands there are working on it becomes a co-operation where it grows you see that's what I have in my head……. of what I think will fundamentally change the FMCG sector.*

d. Generating innovative idea from identified felt needs of customers

As already explained, new ideas and innovations often stems from local needs of customers. On one side, identifying needs of customers help companies innovate their offerings. According to respondents in study, such need based innovative offerings and solutions, especially involving green technologies, comes up with challenges too.

> *…I think because of two reasons. 1: such solutions are generally more capital intensive, costly as compared to traditional solutions. …..Financial barriers are barriers that people to work on. Second is in the case of such communities the positive impacts of the green technology is mainly enjoyed by the consumer segment who generally do not have a say in the acquisition of that technology because the control over the finances at the household level and the peoples' strengths are with the other consumer segment*

Besides two main challenges, the above response also highlights the importance of decision-maker at the household level. Decision maker in a family, may or may not be the end user of technology. And therefore, may or may not completely understand the need of same. A respondent from energy consultancy, further explained using an example from India –

> *…….for example the impact of kerosene lamps at the house hold level is felt primarily by the woman and the children do not a say in the purchasing of the lamp because the purchasing is handled by the man because it's expensive and ……the decision making not in their hands plus there other challenges for example another product at house hold level: presence of service network those challenges are there but these I think are the primary challenges why I think adoption becomes difficult.*

On the other side, according to respondents, companies should make deliberate efforts to make customers realize their needs. Many times, this practice results companies facilitating in converting unfelt needs of customers to felt needs; and this is especially applicable in case of BOP customers. Various forms of information flow to customers to help them realize their

needs, such as advertising, product campaigns, promotion schemes, including use of traditional media like television, radio, puppet shows, etc.

6.2.2 Innovation at Bottom of Pyramid (BOP)

The bottom of pyramid market constitutes four billion people, living on less than $2 per day. These four billion people are not 'monolith', but represent multiple cultures, ethnicity, literacy, capabilities and needs (Prahalad, 2012). The bottom of pyramid consumers lives in both rural and urban settings, but differ in their needs and aspirations. And therefore, the businesses need to develop differentiated approach to these markets.

a. Innovation driven by needs and aspirations of BOP consumers

One of the CEO interviewed explains that the innovation at BOP sector stems out of needs and aspirations of consumers at BOP, and therefore placing biggest challenge on businesses. He further adds –

> *Take an example like India. Money is not evenly spread throughout society. We have very rich and very poor. Now the need, belief, behaviour, all these things keep changing. Generally, the people who are involved in product development, people who are involved in decision making at the company and the people who are involved in the advertising of the company, have some in-built perception of the BOP sector…… but unless the person spends some time with the people of the BOP sector the person will not have a good feel of their actually beliefs, needs and real behaviour. So to my mind this is the biggest hurdle which can be overcome by continuous product improvement as central activity to do business at the bottom of the pyramid*

The research concludes that the innovation has to be driven by needs and aspirations of the consumers at the bottom of pyramid, in order commercialize these innovations by businesses.

b. Commercialization of innovation

According to a senior manager from India, supplying to large number of BOP consumers impose another challenge on companies, while commercializing innovative product or service offerings at BOP markets. He questioned –

> *So if you look at these rural areas with 150 million BOP people needs and wants ….. they just entered consumption, ….how will you perceive it? How will it be cater to, … so that's a fundamental question. …..So if a business is going to design innovation if I say BOP …. I'm actually defining what my BOP likes*

Therefore, companies need to re-look at their supply chain management and distribution channels across BOP markets, to effectively and efficiently maintain availability of their products/services offerings. Another senior manager emphasized on strengthening of sales and dealer network of businesses, to commercialize products and services to BOP sector. However, this will certainly require plenty of resources to scale up their offerings, which are designed and innovated around BOP consumer requirements. He further suggested –

> *Targeting market at BOP will be a new strategy. ……Impacts to be analysed through surveys before switching to a new strategy. ….which will lead to newer ways of delivering your products/services*

c. Innovative distribution channels

Various examples and suggestions were quoted by interviewers, pertaining to innovative distribution channels, maintaining effective supply chain by businesses to achieve purpose of selling to BOP consumers. One of the CEO from South Africa suggested 'decentralization' as a viable solution for businesses to create affordable accessibility to BOP markets. He explained decentralization, using an example from housing and construction industry –

> *Looking at my experience I can say there are many sectors for example the housing and construction industry. Companies have the access to buy these building materials in rural areas. They have adapted it by decentralising. Instead of having a big builders'*

warehouse they can have a smaller builder's 'warehouse express's therefore having a far smaller reach. ……I think banking is another sector you can see ……..through Mpesa it is another industry that uses mobile communications as payment gateway. I think we see the financial services and the construction industries as an example of industries that have really adapted to make sure that the primary segment - the BOP is addressed appropriately. …… Banks focus on Bottom-of-pyramid customers by offering services such as Account Opening, Purchase transactions, Cash Withdrawals, small remittances, etc. through Business Correspondent which are equipped with Mobile app based handheld devised ……."

Thus, research depicts that decentralization is an effective way to overcome the main challenge of reach to BOP consumers by businesses.

d. Role of multiple stakeholders

All innovations generally in the BOP is a collaborative effort and very much in the true essence to involve other stakeholders and partners. Roles and responsibilities for each of the stakeholder based on the strength it brings to the table. According to respondents in current research, Business Model Innovation at BOP is a *'deep pocket' and 'patient success game'. There are no short cuts or early bird prizes.* Therefore, it adds a significant cost for long drawn future business potential.

BOP has multiple stakeholders on the same things – Right from a programmatic support from a donor agency to government subsidies and finally to a commercially cost effective product. The choice is what make it tick. With the increased volume of BOP consumers and wafer thin margins, the company has to keep innovating newer and cost effective techniques, as mentioned by executives during interview. This is proven to be more effective in introducing an innovation to the BOP customers. In words of an executive from energy sector –

These old traditional companies that also don't understand the market. Brand house is a good example. The Soweto beach festival. A small black company came up with the idea.

A company based from people from Soweto. They said why don't you create a Soweto beach party and you can market your products to that market in a very innovative way. I think the problem lies in the way in which we understand that market, instead of trying to market our products in the way we traditionally marketed our products rather we need to change in the way we market our products by adopting to the market. Companies that have been successful are those that have adapted. You can take telecommunication company X for example they changed their slogan to yellow. Using 'coloquism' which is based on slang – township lingo to get their message across. So I think companies that have adapted to that market rather than expecting the market to adapt to them have been more successful.

6.2.3 Company Culture

Company's culture refers to beliefs, shared values, practices and behaviour of the employees and management of company. It includes hiring practices, handling business transactions, how people work, decision-making, resolve differences of opinions, navigate change, etc. culture develops over a period and defines traits of people working in a company. Culture to any business is one of the crucial and important aspect. It is conducive culture which fosters innovation and encourage bringing new ideas from employees. It is one of the main internal driver of organization and has to be fostered throughout organisation at all levels, in form of organizational culture. A culture often percolates from senior management to employees at lowest level in organization. One such incidence of organizational culture illustrated by a CEO of an ESCO energy consultancy -

We were working in a paper company which was almost bankrupt and those days there was something in India called BIFR it was like chapter 11 which is the corporate restructuring when the company is failing in that situation…. So we were invited for some improvement on energy efficiency, cost reduction and the MD was trying to save the company through cost reduction ….if they can come out of this problem. So we did quite a few jobs and the company was almost crumbling and one of the projects we did also got failed. ….I got a call in the middle of the night from the GM that unfortunately this has failed and it can create major problems and I said ok. Then in the morning I

talked to the MD of the company and he was calm and composed because I was expecting a blast off. He was calm and composed and he said can you think of a solution? When he said can you think of a solution in a calm and composed way I said give me a day's time .....now when I was telephoning him I was telling him from an environmental fear. When he said can you come up with a solution in a composed manner immediately my fear disappeared from the brain. Then we worked together on the solution and we still work for this company and this is the 14th year of the association with that company. I could never think that a bankrupt company with a project failure coming out would do business again and that managing director probably we got the trust helping out thought that we could do something and probably thought that if he again fires me …then in any case they are sunk. I didn't have the courage to ask him, now this is when we do talk sometimes. I didn't think from that perspective I was only trying to serve my skin from the board……

When executives were asked to elaborate on how they encourage innovation in their business, especially creating a culture of innovation, most of them suggested following ways –

a. Providing a sense of freedom to employees

Most executives interviewed favoured on providing a sense of freedom to employees. Given that space and liberty, often makes room for *'out of box thinking'* by employees. One of the executive expressed as -

When your people are given some kind freedom,….they are not afraid to make mistakes, you have to develop an environment for this. Those people especially involved in product development sometimes they are successful sometimes they make failures. If you come very heavily on them they might be discouraged. So you find that people will start to restrict their thinking. ……Innovation in my mind should not be applied for the sake of innovation, it should not be taken as a fashion.

Respondents also added that providing a sense of freedom is need based, and not necessarily implemented in all verticals of company. It also depends upon the type of industry.

b. Encouraging employees to bring innovative ideas and new ways of doing their jobs

Another way to foster innovation in company's culture, is to constantly encouraging employees to bring innovative ideas and new ways of doing their jobs. According to respondents, this culture should be incorporated at all levels in organization. An executive further emphasized as –

> *Where you have need for it you must make sure you have a good environment so that the people have better thinking. Not only those that are related with product development. .....Even if the boy who serves you the tea also talks to you voluntarily about the company operations that's also a sign that there is good environment. It shows that the people are thinking about the company .....and you will find that innovation/ out of the box thinking will always be on offer….*

c. Providing a sense of ownership

A good conducive environment at work also facilitates a sense of ownership among employees. It brings in more feel of the business and employees relate better with growth and development of company. The positive implications of such steps by company, also get reflected in the work style of employees. Another respondent quoted an example -

> …..he *too took a challenge. I think at the time he working without sleeping for days. There was a compliant from HR and security that he doesn't go home and they close his office door ……goes on the stair case seating on his laptop. He's not crazy all these happened. He got so motivated that he could work without sleep for days ….*

d. Limited financial rewards or incentivising

Giving incentives or financial rewards can encourage employees to think of new and innovative ideas and solutions. Many companies have used financial rewards as prime source of motivating employees, especially IT companies. However, few key executives warn of using

too much financial incentives to motivate employees. Financial benefits should be used in limit and responsibly. This is very well explained by a senior manager –

> *if any innovation is a success that's the biggest change that they are trying to bring out, so financial rewards may not be that attractive. If that innovation brings about a change that guy feels an internal happiness in him. It's very important and when it reflects that in the key area …. maybe it's not in the key area, he knows that at the end of the day it is going to help him in the key areas slot. But he might see that in another group it is not being used, so he needs my support. If he tries and if it's a technology thing then it is what we term here dare to try. So sometimes he works on that project for 6 months, 8 months or a year and maybe after a year it does not work he then knows that maybe his career will go into a slump for the next three years. So if it happens no body in the group will try to make any innovation.*

An effective alternative to financial rewards, can be KPIs (key performance indictors). Research results revealed companies particularly in FMCG sector, make 'thinking out of box to bring viable innovative solutions' as part of KPIs of employees. A senior manager from one such FMCG company quoted -

> *Interesting you ask that actually we don't have any formal incentives for innovation but we do look at our KPIs. What is the service like? What we put in their targets is that we asked the employees to write one thing that their contribution has added to the organisation and they should be able to measure it and has fundamentally added to the organisation. As a supply chain I think it's important that we are seen as adding value to the business and not functional thing that is used to measure KPIs because there are 3 pages of KPIs. So that's what we have attached to it. Is there a formal reward or incentive attached to it? Not really but we have made it part of the targets and achievement of those targets goes towards career advancement and some kind of*

e. Support from senior managers or executives, thereby building a sense of confidence

Mentorship and support from senior line managers and executives, have proven to be effective source of building confidence among employees. According to respondents in present research, this creates inner confidence among employees and give rise to healthy challenges at workplace. One of the senior manager further adds –

> *As a manager, you have to build their inner confidence that there is somebody and also tell them that look if you fail don't worry it's me….I'm always there for you. I took him to the managing director and I said this young man did this analysis. So one instance that we try here is to encourage anybody that you can do anything……..*

Another executive iterated as -

> *Mentorship and support so that the innovation does not stay just on paper on in the head just an idea but it is actually implemented when it is about a product, developing the product, taking it into the market, so one has to run with the idea until it is actually implemented on the ground so that support from the top management if an innovative employee receives. I think that would also be the biggest incentive……*

Often, employees loose interest if there is lack of appreciation from line managers. This also weakens the trust among managers, which is also a crucial aspect of company's culture.

> *……….that employees generally lose interest if there is no appreciation of those ideas from the seniors and if they see that the seniors are not really taking them seriously and I don't know if you can recall the things that you have observed so far in the co that you been associated with even if the teams come up with ideas with ideas that are very vibrant viable you can put some more research to it and you can commercialise them ……..*

f. Learning from peers

Developing a culture which fosters a learning environment within a company, can prove to be very effective strategy to innovate business solutions. Most respondents agreed on taking opportunities to learn from new and fresh perspectives from employees or co-workers. Infact one of the comment made by a respondent, completely reflects above discussion –

> *…….the moment you go as a consultant you think you have come to solve their problem and you get yourself on to a superior pedestal and become superior so any way of looking at it is that when I see the sugar group changing I'm getting so much of inputs which then give me certain tools to put into my organisation and that itself it was triggered by this, that there's so much learning that we are getting and that's the biggest tool for us to provide better services to our clients. ……*
>
> *Secondly I think organisation should listen to the young generation and people emerging from the markets to innovate. We here believe in leader mentorship. There is no reason why a junior member should not mentor the CEO. Organisations need to listen to the younger generation of this country. There is no reason why a junior member should not seat on the board or the executive of the company. I can give you a good example. ABSA in fact most banks have a ticketing system. You enter a bank and you are given a number based on the kind of query that you have. Actually the most junior the most junior person in that organisation said instead of doing this why don't we give customers a number. They can SMS their query and as soon they leave the office the relevant number is generated to them automatically and tells the customer that you can exactly to this bank in Rosebank (Johannesburg) and you don't have to wait in a queue and as soon as you get to the branch you can collect your card. By Listening to the most junior person you can open the organisation. They look at the same problem differently as compared to an IT person or management. It is different for me talking to my senior management and going into the bush for 2 weeks and brain storm….*

The above quote reflects the experience of a senior executive from banking sector. According to him, the learning attitude of employees make difference and develops a regular culture of company to innovate.

g. Making employees less afraid of new challenges with new technological innovations

This is particularly encouraged to employees at managerial positions. As per executives in interview, managers should not be afraid to accept challenge and come *'out of comfort zone'* to experiment with their innovative ideas. An executive further narrated an example to explain above –

> *If in fact sometimes both from my junior and senior colleagues I know have put them into real trouble by accepting a project about with we don't know anything. An example is 2 years back. I saw a bank which had been loaned before by a company which was doing very well was one of their very good customers until that company decided to make a very good investment using a Chinese technology which was not proven in India and then they decided to setup four projects and none was operating. I see a bank came from somewhere and can probably help. I went to the bank and told them this. I told them the truth our knowledge in this are in not so exhaustive because first of all this technology is new in India and it is from China. However, the fundamentals of this technology we know. We immediately found out what was going on and so when I came and discussed with the team they were all scared and they didn't tell me but one of the youngsters here did a brilliant job of analysis. I learned from that analysis and off course he would be able to communicate with that analysis and off course he would be able to communicate with the ISS bank, brilliant analysis to me this was one of the best examples get into a new technology innovation the process by which it could be made to work and it worked. So this is what I'm saying……..*

h. Creating open culture within organisation

Establishing an open culture with company, encourages employees to keep finding newer approaches to their present work profile. As per a senior manager from durable sector, an open culture should be applied at all levels of organization. He further adds -

> *……I actually think that when an organisation opens up from the security guards to the cleaner when it allows to open itself up and make every person feel that they are making a contribution to the organisation then there can be innovation……*

Another respondent from present study suggested to conduct a feasibility research of ideas generated by employees from open culture.

i. Regular feedback mechanism from employees

In current scenario, most organizations create a conducive environment that encourages innovation and effective functionalization within the organization. However, it is imperative to understand perceptions of employees on these initiatives. Therefore, regular feedback from employees plays an important role in achieving effective implementation of culture-based initiates in a company. A senior manager adds –

> *……I think the HR team is the most important aspect, with the management team, can speak of ideas at middle managers. We have a culture of an anonymous drop box in the organisation.*
>
> *Look at twitter the CEO should read about what peoples are saying about the organisations on social media. How many CEOs will give customers their numbers … very few. I'm not the most wants.*
>
> *The effectiveness of an organisation, like I said communication is very important. As they say the tone from the top. If the people at the top are willing to open up and take*

criticism I think the feedback would be very honest and I think this can make an organisation more effective.

It was found through executive interviews, that some organizations even have created formal feedback mechanism in company. An executive reflects on –

We have a platform at any time you can upload your ideas whether it's a new innovation or an innovation they see in another institution they think we should be looking at this so they are thousands of ideas that come on a monthly basis. We even have an annual award for the top suggestion that came through which actually has a large financial sum. Whether that suggestion is in reducing costs? Or in improving customer experience? Whether there is a big impact you can work out the economics of that. So yes we encourage that definitely that is key. So key for me is the deductive ability and our people's cognitive ability. How can we get our people to think on their feet? To really think about this problem that a customer has got. It's difficult because we are such a rigid environment and we spoke earlier about being conservative people just want to follow the rules but they don't always use their own thinking in mind to come up with ideas in their mind how they improve the service to their customers. …So, I think it's important for your staff to have a sense that they contributed that their voice, their suggestions count. The feedback from them is very important ……..

j. Recruiting employees carefully

Careful recruitment of employees is warned by most respondents in study. The kind of employees a company hires, determine many aspects including growth and culture of company. Having a right person to do a right job, is most challenging. An executive from banking sector explained as –

These are the people who hire most of the teams. The kind of people you bring into the organisation ultimately define how the organisation develops. Unless the top

management is inclined to sustainable development you don't think there is much left for the people who come in later to do. I think hiring the right people is the most important thing to do as well as if the top management creates an environment for innovation and this can happen. For example, we have a very open culture, people approaching, cross culture, people changing ideas because there is a lot to learn when you working on projects there is cross learning in terms it does happen automation automation……The priority will be recruiting the right staff to take on the innovation. Sometimes these can even be consultants the right people to define, implement the innovation. The right staff for maintenance and advice afterwards, but critically it is important to get the right human capital on board or as I said even if its consulting

Other respondent highlighted the importance of employing employees or work force to focus on innovation. He elaborated as -

What are the tasks that you think the organisation should put in place to allow its employees to bring new ideas into the organisation and it also effects the implementation of the particular innovation? ……. So we have the last couple of years employed someone in our organisation who looks at innovation particularly because we came to realise the importance of having to be innovative. There were always ideas and that because it didn't go to a controlled environment. So the bank put a massive team and invested heavily in it and put a system in place where you can log in ideas and put suggestions and the whole organisation could put suggestions in that controlled environment and people can vote and it moves to the next phase then the next phase and it can win an award.

6.2.4 Customer Interaction

Customer interaction involves interaction and communication between company and its customers. Companies improve their innovativeness by tapping users and customers for

knowledge has become prominent in recently (Foss, Laursen & Pedersen, 2011). Number of factors have been identified by respondents, particularly challenging interaction with customers. On asking how successful innovations change the people that use them, the respondents illustrated examples as –

> *The successful innovation changes the life of the people. Be it process innovation or be it technological innovation, it changes the lives of the people. Like, the innovation of mobile phones is really great innovation. It brought new way of communicating each other, new way of doing business, new way of organising the day to day life. Also, process Innovation also brought lot of agility in the way processes are managed. Process automation, process management, process operations using Information Technology brought simplicity, focus on the objectives of the process and faster process outcomes. Most of the businesses are also using the IT innovations in the processes while delivering the services to customers.*

a. Involvement of customer in business processes

Businesses need to understand their consumer segments, like rightly quoted by one of the respondent as "*have a feel of their BOP consumer's needs*". Employees and business units representing or involved in product development, marketing and decision-making, should make efforts to understand and interact closely with consumer segments at BOP markets. Interacting and understanding consumers at the bottom of pyramid, is also considered as biggest challenge to continuously improvised product or service offerings by companies. This is illustrated by an example from one of the senior executives as –

> *Like in India...Money is not evenly spread throughout society. We have very rich and very poor, the gap is too wide …. Now the need, belief, behaviour, all these things keep changing…… generally people who are involved in product development, people who are involved in decision making at the company, the people who are involved in the advertising of the company…..have general sketchy perception of the BOP sector but unless the person spends some time with the people at the BOP sector, the person will not have a good feel of their real beliefs, needs and actual behaviour. So to my mind*

this is the biggest hurdle with continuous product improvement at the centre to do marketing at the bottom of the pyramid ……Targeting market at BOP will be a new strategy. Impacts to be analysed through survey before switching to a new strategy.

According to respondents, consumer behaviour and interaction is the single biggest component on which an innovation strategy is based. Right from the need assessment to the feedbacks and other socio economic factors, contribute significantly to the building blocks of an innovative Strategy. By far, the customer or the consumer is the centre piece of the innovation game.

Another executive described customer is the *'fulcrum of all the business activities'* and thus they can play an active role by raising demand for innovative offerings from the companies.

They can voice their opinions on social platforms as well to attract like-minded people and exert pressure on the companies. It is also suggested by respondents to involve customers in think tanks, feedback sessions etc. in company.

b. Identifying opinion leaders or influencers, especially at BOP markets

To establish trust among consumers especially at BOP, it is important to identify representatives or opinion leaders, and convince them on use of product or service offerings. Respondents suggested that starting your marketing efforts from opinion leaders or influencers, will aid in establishing deeper connects with bottom of pyramid segment consumers. A respondent from current study, highlighted -

……from that BOP place just pick up couple of people who are literate and bring them to your company, then represent the company in way through these influencers ……and you will be establishing instant connect with the society for these people .....as target consumers can empathise with these influencers

c. Customer education

Educating customers is a key to successful implementation and adoption of innovative business offerings. Conducting research on what customer's think and feel about a particular product or service offerings, will provide a real picture to businesses and will help in identifying barriers in adoption of same. This is well explained by one of the respondent as –

> *……you have to educate them, because this is not customary, ……you see in our house household we have a lot of appliances, we used to have the folium bulb, then the CFL, and now we talk about the LED…….LED is cheap light so you have to use more. We use to use 2 lights so now we talk about LED we have to use more. We introduced smart meters so that also required some education to consumers ..... If you go to the village you have to educate them….number of factors can become barriers to adoption by these villagers, such as literacy level, limited exposure to media, close-complex society, etc ……Sometimes a pilot study to see what the customers think proves handy to take key marketing decisions*

In another example quoted by an executive from banking sector during an interview, is stated below –

> *Sometimes, what a customer is demanding may not be actually required. You need to educate, you need to explain.. what we call disruptive technologies is something new that has come …. for example this 'what's app' … what happened to all. We have to align our products in such a way that they can sell across. ……..There is something for each category so you cannot totally go out of physical transactions. A pensioner has all the time in the world. He would like to come to the bank, he would like to be treated nicely. He would like to be offered a cup of tea or water, he would like to interact with the teller and there is a person who wants to go to his office he would want to get through the banking process quickly and not want to waste his time*

The above executive highlights the importance of customer relationships of companies, which depends upon the nature or behaviour of consumer and socio-economic factors. An example of this is further added by another respondent as –

> *There are others who want flexible ours like the young generation, they just don't want to come to the bank, they want to use the internet, online purchasing, everything has to be done online, so these are some of the things" …….green – use of technology as they want to*

Consumer education is particularly important when learning new innovative technology. Learning is critical for consumer adoption process. This aspect is stressed by an executive as –

> *……..it's absolutely critical you can innovate and introduce whatever you want out there is the world if you employees internally don't adopt that innovation neither will the customers and what we found in our world is that adoption, adoption is the biggest problem. The biggest mistake we have made is that we have processes and innovations in place to fix bank problems but we had not taken a step back to put the customer in mind. So if you have innovations and processes that put customers in mind they will adopt. The employees, yes massive. You find that the people internally and on the customers' side they have to start using the innovations too, yes that's massive and very important. You also find that very few of the staff use that technology and know about it. I can give an example of mobile banking and internet banking very few of the employees would be knowing about it. If you can get both the staff and the customers to use that technology you find that you can tick a lot of boxes. You have to find a way to get them to use it*

Education to customers has been recognized by most of the interviewees. Besides consumer education, self-learning also plays important role along with customer willingness to adapt and use products. Therefore, it is often two-way learning process. Another banking senior manager explains -

People from this side of the bank are not from outside the society they are also a product of the society. So we look at the young ones of the society who are tech savvy they also part of the client base. We have to educate our customers. We have to educate our customers on how to the use the technology and on how we put it across to our clientele……. This is one of the things we focus on. What I have seen is that our customers are well educated and technologically savvy. It is the society actually driving us to innovate ourselves. There's this debate: How do we educate our customers?..... But you say the people use to go to the bank and draw money. Look at how the ATM card has become popular? I don't think the banks educated people on how to use the ATM card and it would be a lot quicker for them to learn to use it than if any bank would have tried to teach them. So people have caught on to these cards so cards are now being used in the bus machines and various shops. So people are intelligent, we never showed them how to use them but maybe you just have to show them just once….. If one person is taught then it spreads. The people educate themselves this is due to the demand of the public.

the above iteration suggests that customer learning spreads quickly from one consumer to another. And therefore, fosters effective consumer adoption.

d. Customer interaction and feedback mechanism

Customer feedback helps to considerably improvise the functioning of businesses. This was well explained by few executives by quoting examples as follows –

He is giving a change to improve and by improving you are earning customer's trust. If a customer buys a TV and the power bank doesn't work take that complaint because the second customer might not give you that complaint? I bought a washing machine and two days later it worked for two months and stopped working the mechanic came to fix it and it worked for two months and stopped working then then the company said lets us take it to the factory because it was a factory fault. So, your customer is very important because that is how you build trust……. When were are innovating,

whenever we are bringing something new it has to be in line with the needs of that customer. You have to first of all understand the needs of that customer. Only then will the innovation work

Respondents also stressed taking feedback from customers using green technologies is imperative for successful adoption of technology and innovation. *'Moving from paper based to mobile devices',* one of the example from banking executive in South Africa highlighted –

Look as a research consulting firm the manner in which we have been changing is that back in 2005. All our work was paper based and that's the norm in most companies but technology impressed upon use to start using mobile devices and iPad as to get the best responses from our clients who are more 'tech savvy' and will be more comfortable

Further, using technology to gather feedback by establishing call centres is also one of the example –

We have products we have put out there and we have customers I don't want to say are uneducated but we can say that are not technological savvy so there's some education that needs to be done so that is key. I mean some of these customer's technology can change their whole life and they don't have to come to the bank. If you are out there you never have to come to the bank if the bank you use the technology that is available to you. It's also about practice we have a 'call centre'……. customers can call in and get advice over the phone it's free. The interaction saves time rather that the person to person interaction but for more advanced situations you are still going to need a discussion. I believe for certain transaction you are still going to need that face to face interaction. ……..Video conferencing is something that we are looking into too ……..

Receiving feedback from customers, sometimes result in overcoming challenges and combating with competitors. This was well explained by one the banking executive through an example –

> *Any examples in your experience that you would want to offer on a new innovation that was first offered by a bank say on the business segment .....they were certain services A, we offered and our customers would transact on themselves and for the business you would have your safety measures and stuff like that …….the feedback we got from our customers was that it's not available on a tablet whereas our competitors had it on their tablets. So we now have it on the tablet so that development happened over the last year/ 2 years. It's not always about the first to have something but taking what is out there and improving it. We have now introduced it……..*

e. Demographic and psychographics of customers

The demographic and Psychographic profile of the customers are too heterogeneous warranting a newer way of delivering products and services. Besides this, it is imperative that companies particularly involved in manufacturing of innovative green product should carefully research different demographics of their target consumers. With changing demographics of consumers, also lead to change in needs, aspirations, desires and behaviour of consumers. This was explained by one of the respondent as –

> *Those people responsible for product improvement must go to some villages and stay there … get a good feel of the needs of these consumers ……and their thinking will be different once understanding their behaviour. The other thing that comes into my mind with different BOP geographies in India, you will see different behaviours, different needs and desires. For different geographies company will have targeted product ……..*

According to respondents, the BOP segment ecosystem is slightly far off from the normal settings and therefore the last mile connects to reach the innovation to the target audience

becomes increasingly difficult. However, social side of the coin in the BOP market is very strong, building strong connect and trust with people, pave the way for commercialization. In a nutshell, it can be ascribed as –

> *Is the customer or the BOP target AWARE of the innovations*
>
> *Does he accept the Innovation or wants changes to it?*
>
> *Is it affordable – perspective of low price and economy are very different?*
>
> *Is it available? – everything else is given but failure results from non-availability in maximum cases*

Most respondents felt that companies need to better understand their target market and divide them onto manageable segments (based on their demographic features such as income, family size, and education level) and then tailor products and services according to the needs and capabilities. On asking what steps or changes that a company takes into consideration while commercializing their products or services at BOP sector, leading to newer ways of delivering to BOP consumers. Respondents agree on company changing its products or service offerings as per desires of BOP consumers. Interestingly, companies make efforts to go down to the level of BOP consumers to create sensitisation among them. Another senior manager from FMCG company further elaborated as -

> *That's for focus of FMCGs in particular. There's a very interesting case study and we have a large mining company that is being financed by government bank because that's huge money. They approached Bank Y .....There is a huge problem with financial insecurity then we did a further investigation and found that people didn't understand. ……They would charge people huge interest rate and they would have debit orders taken out of their accounts. They would go to the ATM until 12, and in the evening, draw their money because they debit orders could come through. We would teach them financial literacy. We have a 'Centre for Excellency' where we would teach them how to budget……..I think people have a basic sense of wanted to do good. .....We are not saying we don't want to make money anymore because we are in business. But, we want to have relationships with their clients. I do not have any push backs……*

Besides above, geographical location also changes the needs and desires of customers and so as customer adoption of particular innovation and technology. This is well illustrated by using an example quoted by an executive from a leading bank in South Africa -

> *I have been working for this bank for about 21 years which is one of the biggest bank in Africa. .....there is a discrepancy in the rate of adoption in the urban and rural areas. To put it this way people in Johannesburg are from the urban areas. Myself I'm from deep rural in KZN but now I'm in Gauteng running this huge bank and because we are now in urban areas we adopt change very fast. We are more literate and more exposed so we adopt changes very fast. In rural areas we have to spend more time to teach them but once they get it they can run it fast, like cell phone banking. My cousin in Ncuthu, right now can use his cell phone to bank. Once they understand the innovation they adopt it very quickly. My cousin from Venda and Nkandla are able to communicate on Facebook, chat but one can be Soweto and the other in rural areas. I don't think it's a fashion of whether being in urban areas or rural areas. As leaders we must make sure that the people in rural areas understand the importance of this innovation and they can adopt it fast……..*

f. Localization of products and services bringing innovation and value to offerings

Innovation can be brought to product or services through constant product improvement based on changing needs and aspirations of consumers. In other words, bringing innovation through localization and customization of offerings. This innovation can be in terms of quality or quantity, to help increase production. Companies need to conduct cost-benefit analysis of any new product innovation to evaluate product outcome. As per respondents, in process, the innovation can be brought by reducing the number of steps and time in production of product. One of the respondent pointed *"when there is a challenge, it brings out an innovation".* He further adds –

> *Customers can play an immensely important role if they become more acceptable and conscious of the products and services (produced sustainably) that they choose; by*

shifting from consumerist lifestyle to a healthier one and by start thinking in long term instead of thinking to meet short term needs ……

Customers play vital role in enhancing or developing value configuration of product or service offerings by businesses.

Most innovations actually end up failing when it comes to customers because customers do not find any value in that. It's too complicated and they are probably not comfortable with that system. Even if it's a good system the mental level of the customers and the bank are not at the same page ……..

g. Customer communication

Communication with customers leads to better relationships, and building a level of trust and integrity. An example of effective communication depicting integration of IT and communication, for effective reach to customers by service provider and stakeholders of businesses, is quoted by one of the executive as –

… in yesterday news …..something which has come has a pleasant surprise. A young lady on a train who had a small child and was looking for milk and could not find it at all the stops – train stations …..tweeted to the railway minister that there is no milk and to her surprise on the next station someone was waiting with milk. So certain things have started to happen because of the communication becoming so easy ……..

Effective speedy communication with customers, lead to improvement in service offerings by business, on one side. On other side, it helps in building trust of customers when business rectify their inefficiencies in delivery of products/services to their future prospective consumers.

h. Distribution network

As per most respondents, tapping and making use of already existing distribution network, is a winning short-cut for companies trying to market innovative offerings to BOP sector. This is further highlighted by one of the FMCG senior manager as -

> *……FMCG or some of these durable sectors they make use of a distribution network that is already there. It attracts customers and considerably reduces cost of reach to potential consumers….. Example – adapt to innovations in banking sector - Probably someone who is not there to buy anything but is there to use banking services would probably buy some water or some consumables whilst they wait or assess something that paints a very good picture. I agree with you. I think that is actually a very interesting way of looking at how banks are reaching down to the customer at BOP"*

6.2.5 Learning and Training

With incorporation of green technology in business model, it brings two aspects to learning in businesses, particular pertaining to large companies. Firstly, on one hand education and imparting a learning process to customers. And secondly, skill up-gradation and training of employees. As one of the senior manager rightly said -

> *With technological up-gradation and integration of newer and improved technologies in business products, it is evident/ essential to educate consumer for better consumer adoption. ……there is a challenge it brings out an innovation. ….when there is an innovation there is a change that is demanded from the people or let's say the customers who use that innovation. …let's say a behavioural change when there is a new product that is being introduced ….need to educate consumers as they are not accustomed with new innovation*

a. Cross-learning

Innovation bring cross-learning among employees and customers in a company. An incidence quoted by an executive from energy consultancy firms, as –

It is very important and then I take this example of China. Last week there's this young girl. Probably 21 or 22 and our company asked her to do part of the project. So she requested my help you know in terms of articulating some documents to be done and during that process when I was suggesting something. The questions she was asking provided a great deal of inputs to me, to improve my own learning of something on everything when she asked I said give me a chance and I can log on to my computer, do more research and then get prepared to answer better. Now that improves my organisation.

From above it is evident, that, consumers question upon any new innovation or offerings by business, giving a chance to organization to think, research, educate themselves, and find solutions or answers pertaining to their product/services, viz-a-viz improvising their business offerings. A respondent further adds –

…most successful consulting companies will be those who can learn from their companies ….and stay open minded for that …..It's a continuous process

Three major attributes were identified by respondents, when asked by researcher on their view points, on how they think an organisation can be made more effectively by specifying activities that they believe or what tasks an organisation should start incorporating or if they really want to introduce innovation particular if they are looking towards green technologies. These attributes are -

1. **Fostering development of learning centres in organisation** - *And learning centres is not a forum you know? Learning centres can be many things, today with technology you have different ways of these forum you know? So how do you foster development of these learning centres? Because at one level it can create chaos. It can cost you discipline; it can cost you in productivity.*
2. **Allowing a certain amount of chaos** - *Providing a certain amount of discipline. But remain focused on let's say 6 months, 10 moths/ 1 years then we got something important*

to do that another thing that is important is freedom from fear which I also talked about this Idea in the case of sugar and freedom from fear means that when you take the step of innovation changes of failure which is

3. **Freedom of fear** - *Fear means fear of failure and the third is in a much bigger context which are the product of these 2. What do you see is the role of an organisation or a consulting organisation? What is that energy that needs to be released? Can I identify the issue and how do you let it take off? So, in our case for example the energy is everyday challenging what I do because if I prepared a note I should be able to challenge that note tomorrow. I must have that energy to do that. If I achieved it, I will be happy with that not and let it go so this is what in particular we discuss that you know we should not be happy with any output.*

An executive further adds –

> *Experience and willingness of employee to accept and bring change was key to innovations. Further a mix of young and energetic team along with experienced management made it easy to implement the ideas to keep up to the competition*

b. Online Training

Other technological ways to achieve training goals for both employees and customers is online training - making use of visuals to simplify the process and easily understandable. They are particularly useful when businesses know less about their customers, especially in terms of educational and background of customers. Continuous improvement of staff and employees through vigorous training and learning, is also essential to train customers. A respondent further adds –

> *So development team in our organisation and that is how we expose this innovation to our people and they become innovative in the way that they do this training. We have online training, we also got class based. With visuals there is more impact on our staff that through reading through. The benefit there is continuous improvement that we have*

spoken about. I think it's important for your staff to have a sense that they contributed that their voice, their suggestions count. The feedback from them is very important

6.2.6 Operations

Operations basically transform resources into inputs for the production or development of goods, services, and creates and deliver value to customers. Management of such processes and business practices refers to operations management, to create efficiency in a company.

a. Green technology implications

When respondents were asked about implications of integration of green technologies on business, they identified two important implications; namely – economic and technological impact on business model innovation. In terms of economic impact, a business model brings job creation, return on investment, better performance, increase in sales, etc. Respondents further added –

Job satisfaction, improving customer's standard of living, increasing government revenue, development of ancillary units, overall economic growth is among other economic impact on business model of a company

In terms of technological impact, according to respondents –

A business model brings positive impact only if right technology is selected with proper due diligence. Further it leads to evolution of new machines / equipment, and evolve cost effective ways to optimise production. The negative implication could be obsolescence of the incumbent technology

b. Importance of change management

Several respondents realise the importance of change management in a company and its impact on business model innovation. An executive from telecommunication industry expresses -

If it's a limitation, we tend to think in in terms of implementing, the practicality of it, we think implementation is adoption, it's not adoption, adoption is a more of a prolonged process. ……. it's more of how you approach it. I think we can always do better, people internally…… I think its change management. .....people always under estimate the importance of change management from the beginning right up to 3 years. We make something and 2 weeks before the implementation we inform you of this thing. I feel the biggest limitation we have is the change of business process change for such a large organisation

He further adds -

We are working in IT industry. The facet of IT industry is changing rapidly. The IT companies not focused on innovation, which were doing very well few years back before, are fighting for survival. .... they have become stagnant from past few years in terms of innovation .....The changes are going to be normal in the IT world today. We have to abreast and appreciate the changes. For survival, we have to think at least 5 years in advance to survive today.

The above iteration suggests that change is enviable. With fast pace of development of new technologies, and therefore innovations, companies have to manage these to survive in market.

c. Operational pressures as limitation of business in implementation of innovation

Besides Investments, operational pressures are considered as major limitation in businesses while implementing innovation. Respondent believes that traditionally only certain percentage of profit were allocated for the innovation in the name of R&D department. They were not considered as prime or main line of business. However, this notion is changing with increase competition and more and more companies focusing on investing in R&D activities, thereby reducing operational pressures. An executive interview elaborates –

In today's world all the innovation is done as projects, a lot of importance / increasingly companies are focussing to invest considerably in their R&D activities, which gives birth to innovation. The investments are increased drastically. Due to limitations of funding, organisations are prioritising the projects, portfolios, programs are managed very closely reviewed and reported at management and board level. Operational pressures - Stringent and strict timelines. Some of the Employees who can provide the valuable input for innovation is Operations team.

He further explained the meaning of operational teams -

Operations teams are usually under high pressure less chance to focus on Innovation. Doing routine job (comfort zone) - The organisations which are established, has a good market share, usually will be in comfort zone. The whole innovation will happen only out of comfort zone. ……..Nokia is the best example for not focusing on smart phones and eventually losing out the whole market value. Deliberate efforts should be made by companies to experiment and come out of comfort zone, to try something new and in the process strive for innovation.

6.2.7 Infrastructure Management

Management of infrastructure, like operations, is also an essential component of business. It involves management of processes, equipment, human resources, policies, etc. According to respondents in study, infrastructure management seeks to adhere to quality standards, promote adaptability, enhance flow of information, and reduce duplication of efforts. Besides these, infrastructure management also facilitates the following, in context of business model innovation -

a. Development of core competencies

To develop new core competencies in a company, it is imperative to invest sufficiently in development of laboratories, research and development. One of the energy sector executive highlighted importance of investing as stating –

> *Better and efficiently you process the waste higher will be the outcome in terms of quality (Manure & C&D recycled material) & quantity (Power). We actually require competencies in Environment management and mechanical engineering ……. Waste management sector is still in a nascent stage in India so there is shortage of waste management professionals*

Therefore, there is a need to develop competencies for gainfully employed in specified sector.

According to most respondents, the important core competencies are -

- *Innovative process management*
- *Environmental management – intent to give back to the environment / ecology*
- *Human resource management*
- *Determination to lead sustainability pathway*
- *Forecasting risks and developing ability to take risks*
- *Ability to collaborate effectively with partners and stakeholders*
- *Connected to latest technology and being aware of the direction in which markets are moving – deep knowledge of emerging / latent markets like BOP markets*
- *Operating in silos and traditional business model create hindrance*
- *Agility*
- *Relevant …almost radical or difficult to replicate …difficult to imitate and has breadth of application*
- *Customer service*

- *Innovative product or service offerings but ensuring quality*
- *Global experience – bringing experience all over the world*
- *Wide domestic reach – localization of products/service offerings*
- *Customer's trust and confidence in company help business to bring in the technology in phases*
- *Avoiding green washing*
- *Knowledge around the technology realising a green business model is key and will act as a core competency*
- *Awareness of sustainability*
- *Social innovation*
- *Collaboration with relevant partners and other business firms*

b. Involvement of partners

Most respondents agree to involve partners in development and implementation of green technology in business model innovation, to bring success to business. Partnerships often help to guarantee cost recovery and better implementation of business model innovation. As one of the respondent stated –

By making them a partner in the decision making and product/service development

Partners can be involved throughout, right from decision making to product/service development and implementation and post-implementation, during product development, production, distribution or providing service of the product. As per respondents, government partners should also be involved for better support specially to receive financial benefits. Partners add benefit as they will be aware of new trends and development in global environment. They will give a fresh new perspective that a company might not have. A senior manager adds -

Assisting with idea creation …. Participation in the value chain, understanding their operational and other challenges, Make them as strategic partners in the process of innovation. Focus on customers as partners can bring imperative change management of business

Another respondent from energy sector suggests, that to design a green business model innovation, companies have to understand consumer concerns and carefully examine product life cycles and its impacts.

c. Integration of technology to develop efficient infrastructure

There is need to develop right infrastructure and IT structure to foster proper implementation of technology for sustainability in continuum. A senior manager from telecommunications emphasizes -

"Going paperless on the statements had to be supported by a robust IT structure to ensure encrypted and password protected statements are received by the customers. No compromise on the security of the personal information of the customer"

6.2.8 Social Environment

If there is a sudden change in the policy and social environment it can create major problems in implementation of innovation.

a. Changing concept of innovation and influencing positively social environment of consumers

Most respondents interviewed believed that the changing concept of business model towards integration of green technology, is influencing positively social environment. An executive explains this phenomenon by using the below example -

Let's say if you take a country's a country's perspective. It's both positive and negative. I take these two countries China and India. Let's take the positive aspect first. The president of China has created a new definition of the country's mission .....this is my note from my last mission in China: ecologically, civilised society. …….From the earlier slogan they had, creating a sustainable social something something, I'm forgetting. ……. When he said creating an ecological, sustainable and civilised society and in line with that. The policy I was talking to you about. Suddenly in the province of Gian right now there are a 1000 R&D institutes, literally 1000 in one province. The smaller institutes interface between university and the market. Universities which have a high research centre maybe 70. The policies of fostering these centres which are getting technology into businesses. So they are designing R&D centres, over 1000

b. Disintegrate and re-integrate as facilitator or incubator

The phenomenon of disintegrate – re-integrate acts as facilitator on continuous basis for innovation in business model.

As per respondent from a consultancy firm –

You have this permanent institution which is the university and RND centres which are continuously evolving. Develop that technology and have a few people come in you put that idea into the market and have new ideas coming in. That's a positive, and this what happened. I can tell you that after this trip. In the next 10 years China will catch up with the United States on technology. Positive things on innovation, how do you align the policy, culture and administration? Negative is also true suppose in India we have

a Sum Chihara ……I'm sure it is coming, fails in 5 years and the political component come. They will be the first to kill a project so now you can create a huge innovative business in the country if it is fostered partly. A policy in a bigger context is something to my mind if he's responsible……. Even in the organisational context if you see it is the board. For the managing director as the leader. I think it is that key, the leaders especially and have the team to execute very high level in the country and other countries too. A highly innovative African model country to a highly innovative country……..

6.2.9 Sustainability

Sustainability of any company is defined as an impact to three pillars of sustainable development; namely, social, economic and environmental influence. Sustainability of business model requires responsible business practices. As explained by a senior executive -

the principle of sustainability, one input is good for the other which keep the ecosystem moving which completes the cycle which is which is the business model to build. Business cannot work in 'Isolation' ……it has to have variables and components. For example, if you are working at company Y, a soft drink manufacturing company, they are brand agnostic they don't talk about company Y…. the entire brand doesn't talk about company Y…. they only create 'brand awareness'. They only do AIDA – attention, interest, desire and action ….

Sustainability can be achieved by providing sustainable products or services as business offerings, and in the manufacture of same, sustainable or renewable sources from environment are taken care off.

Respondents also feel that no company can just be a profit making, they should have a sense of responsibility towards business practices too.

a. Equal attention to all three pillars of sustainability – environmental, social and economic

Respondents feel that companies should provide equal attention to all three pillars of sustainable development. They also agree to the fact that most companies overlook environmental and social aspect of sustainable development. As one of the executive iterated -

> *Financial part, everyone goes in for the financial part but people tend to ignore the environmental and social part for the sake of the financial part now I feel we should start being more serious with this. Now with what people generally talk of when they talk of the life cycle analysis. …. You carry out life cycle analysis of that product. The moment you get to de the LCA, the social, environmental are supposed to be taken into consideration because I think it is a very important topic and the whole world thinking on environment and social responsibilities. ……The UN has also adopted this development recently and is more related to social responsibility of all the countries. The business is all right, making money is all right, meeting the needs of the people is all right but are you doing it in the correct manner? Are we talking of the inclusiveness of that business? Now these are the factors I feel are definitely important when you are thinking of innovating a product, adapting new technology…….*

b. Policies fostering sustainable practices – 'Going Green'

Government policies and rules play a vital role in re-enforcing companies to implement sustainable practices. A respondent from energy sector mentioned during an interview -

> *Example like in India, it is a mandatory environmental policy for manufacturing units that 10% of company's power should be through renewable energy sources.*

Therefore, making it compulsory for manufacturing companies to utilise renewable energy sources for power generation, and thereby 'going green', and restricting over exploitation of non-renewable resources.

Other sustainable initiatives include recycling waste while safeguarding environment, integration of technology to save paper from wood, etc. One of the senior executive from energy sector mentioned -

> *We provide services for safeguarding environment. Our product line is mainly comprising of the products produced by processing and recycling of waste with proper care to environment, pollution control and waste minimization.……We are producing and selling green power from waste to energy plant, organic manure from Municipal Solid Waste and many useful construction products from Construction and Demolition waste. Environmental conscious customers use such products with a feeling to protecting environment and reducing pollution by using recycled products. Recycled products also reduce the burden on natural resources in big way.*

c. Financial support from government agencies

As setting massive sustainable renewable plants or projects needs considerable amount of money and funding support, especially the initial investment, companies require funding agencies including government and banks, to provide support financially. Initial investment and cost is particularly very high in any green innovation, green product or service, however, over the period, the maintenance cost is low, with better life span of technology. Financial sustainability is also needed to bring sustainability in business process.

Some of the examples of sustainable products shared by respondents are –

> *CFL, LED and smart meters …the consumption of electricity from renewable source is much lesser than conventional sources of non-renewable energy. Integrating renewable energy sources into business offerings is also sustainability, one of the example of sustainability. The solar sector is very dynamic, we have the prime minister is putting*

some regulations, …. the solar energy is going through many changes in the next 2 to 3 years. As a country our targets have changed now… we are talking of 2022. So this could require a lot of funding so since the demand has grown the cost of solar energy has also gone down. Remember when it was 9/10, 1 mega what was able to operate 16/7 crews now it operates 5 and half crews. So 2017 …. So solar has become affordable. When you think of thermal the plant load factor is very high but with solar its lower. It about how fast you can install the product and those transmission lines building up it take a lot of time. So we are bringing some innovation in terms of change engineering.

Sometimes, shift in goals of government limits financial support, as it is no more in the larger interest of government. One such incidence well-articulated by an executive from energy sector

(BMI) in companies with sustainable initiatives, and imp. challenges faced by companies while re-inventing BMI. –Financing and shift of goal post are two major challenges and both of these are inter related. Illustrative example-a Company has made the investment in an off-grid distributed generation based electricity system in the rural areas. During the course of the operation, Government Utility decides to cover that particular area under rural extension scheme. Obviously, he would have no other option but to wind up the show. In the common language, this is called regulatory uncertainty. No commercial bank is likely to finance such projects even if the project demonstrates a good revenue model

Another executive from energy sector, shared his opinions on present energy crises scenario in South Africa -

……The government has already started to do something but the load loading has really gone out of control in India we manage it better. Company Z is the largest producer in the country. Every municipality buys it electricity from Company Z and then they

distribute. Even though in South Africa they are a lot of power generating facilities most of the electricity still comes Company Z. So far everything is still thermal power generated. So 2010 the prescribed to the renewable energy plan. They are now giving support to smaller players who can up with innovation. I can tell you something. I mega roof top installing, 2 mega roof top installation they are coming live now. One of the entities will be able to generate 1 megawatts of power then receive the money. They can make one megawatt or two megawatts and sell it to the entities that do not need him. That the first of its nature and will improve the electricity situation in the country.

According to few respondents, South Africa lacks prescribed renewable energy plan. Major banks providing support to businesses with sustainable development initiatives and act as catalyst, in the form of green and sustainable finance; green bonds etc.

d. Innovation brings sustainable development

Innovation brings sustainable development, and vice-versa is also equally true. Businesses expressing concern about the impact of pollution from bricks and motor industries (manufacturing industries) is going down. One of the respondent quoted –

China is extremely concerned about the impact of pollution from bricks and motor industries going down. .....So you have to go the next scale.

e. Accounting carbon footprint

Controlling carbon footprint is considered as first step towards sustaining business, thereby sustaining business model innovation. Government regulations and pressure from international environmental UN agencies stressing and compelling companies to adopt measures to reduce carbon footprint. A senior manager shares -

So if your company account for carbon foot print it would be the starting point for any sustainability. Would like to be bold enough, courageous enough to know you are inefficient? Most likely you are. Most of us are in efficient and we should be using accounting principles to me that is the first step. There is a bank named the Natural Capitalism. There are many examples in that book but one of the examples that got deeply embedded in my brain is a carpet manufacturing company in the USA. So this carpet manufacturing company started to account for its carbon footprint the promoter got such a shock that in 3 years it changed his business from making carpets to servicing carpets

f. Bringing changes in business model

Business model especially supply chain need to be monitored too, to bring sustainability. On an average, most respondents stated that it takes minimum of five years to scale up current green business model for sustainability. Providing sustainable solutions at ground (BOP) also fosters innovation and helps to codify the business model to make it green business model innovation.

Besides above, respondents also shared that sustainability of business can only succeed in long run if it brings positive changes among the people associated with technological innovation. For example –

…. if people don't have light (electricity) the women and the children are not able to do their chores or study. For an innovation that can make a positive change in their life is solar light. If one is pushing that product solar. Now that has to have a positive change in them. Normally they would adopt that particular solution if one does have kerosene lamps it provides light but it also gives negative effects. It has negative impacts in the long run. In that case the change is not sustainable. It has negative impacts so that's not an ideal innovation in providing light. Similarly, to deliver that product to that consumer segment one needs to innovate on how is that product relevant? So that like that principle takes that example providing that to the remote

village. Let's say rural India. It needs to develop or the product need to through a chain, a supply chain which would make that product available at that village in case there are faults in that product and service in order to rectify that product. The innovation might not be through the traditional chains, existing supply chains that are there at that particular village level.

Sustainability also leads to changes in financial aspects of business model of company. An example is quoted by a senior manager -

We have a lot of people who interact with the customers and we can have a picture of the want the customer thinks. Whether there's pricing structures out there that make us uncompetitive. That feedback is very important and we can link it to the financial aspect. Whether with customers if we reduced fees from our side and knowledge of competitor offerings is crucial. First of all, you need to differentiate yourself on service which is key products will come and go. On month one bank is offering a better product that the others and the other moth it's the other bank that's the way it goes. Relationships, that's where you need to adapt. With strong relationships you will survive at that period when you might not have the best product out there.

g. Combating with competitors

Companies with sustainable business model innovation could only survive the turmoil of recession last decade. Respondents realise that be it booming markets or recession time business model innovation has become an integral part of the success and survival of the companies. They further share –

Booming or emerging markets gives an opportunity to look for business model innovation where targets can be increase in revenue. During recession companies tend to incline towards cost cutting business model innovation. Recession does give an opportunity for more innovative ideas but it is equally challenging to implement ideas during the time. In today's world every company has a pool of talent and there are no surprises that time taken by competitors to innovate and to post a challenge in every

market conditions is negligible. Fall of Nokia is an apt example of what competitors can do to business model innovation……..

By opting for Green products/services, by recommending the Green Products/services to their friends, relatives, colleagues, etc., by declaring one's support and endorsement of Green Products on social media and other forums, customers can play important role in promoting innovation strategy.

Therefore, respondents agreed that with greater use of technology enabled green products results in reduced peak-hour, peak-day rush at the counters, operation efficiency and higher customer satisfaction among other customers as well as benefit who are not opting for Green products/services. Introduction and promotion of green products/services/processes leads company to make foray into client segment (such as youngsters, students, etc.). It also helps expanding the reach of the organisation by offering Green Services (POS, INB/CINB) in areas distant from the physical location of the branch.

6.2.10 Technology

Technology is defined as knowledge applied to products or production processes (Trott, 2012). Technology has been identified as one of the three important attributes for businesses striving to achieve innovation in business. Constant technological upgradation of products or processes aids to keep pace with competitors. Technological innovations incorporate and provide sustainable business solutions to the needs of the consumers. Historically, technological innovation has worked in providing efficiency and saving costs. While integrating technology in business product/service offerings, three important factors have been identified – accessibility, affordability and awareness. According to respondents, scaling-up project makes implementation more complex. Business practices with sense of responsibility and should be environmental, socially and financially sustainable. One of the executive further added -

Greater use of Technology enabled green products results in reduced peak-hour, peak-day rush at the counters, operation efficiency and higher customer satisfaction among other customers as well who are not opting for Green products/services. This will motivate businesses to opt for green products/services ……

Technological upgradation in businesses demands certain amount of change and learning from employees of company. Another senior manager from banking sector, described how increase use of IT enabled technology in businesses processes, lead to training and development of employees. He quoted -

> *When we joined this organisation we were used to a different environment. We were used to a different way of doing things we were doing everything paper based but overtime computers came in the 80s/90s. Now everything is now automated. We did not use computers earlier when we did our education we did not know how to use computers but now all the day to day activities use computers. As an individual and our colleagues had to change ourselves now there are major technological changes, we have internet banking, we have mobile banking, we use ATM cards. All these are products of innovation, had we as an organisation not adapted to these changes we would not have reached this level of innovation. To remain as market leader, we have to adapt to changes. We provide training to those who work under us by upskill them. When they are upskilled they can change themselves. I think this upskilling has really helped us and we become tech savvy. I think innovation is a continuous process and those that are new and come are usually tech savvy and we use them to train us. Beyond innovation the human has to be upgraded on the latest changes in the market because the marketing skill have to be upgraded. Innovation comes in all phases. The marketing skills have to be upgraded, the process skills have to be upgraded. We undertook this big project which is now becoming a common language of business process reengineering. Business process reengineering is now a buzz word so every day we do what root cause analysis. We do a root cause analysis of literally any issue that is brought to us. We look at where we need a process change? A person upgrade? We make a blue print then we implement. So one by one we eliminate the process deficiencies.*

The above also highlights the recent increased importance of 'business reengineering' in companies. The technological innovation helps to reduce costs in organization, besides skill

liftmen of employees in a firm. An executive from energy sector firm, highlights the importance of technological innovation, by quoting several examples (especially of green technology) from current business scenario. He quoted –

> *In the modern environment your biggest competitor is a 20-year-old. In a garage somewhere innovating something that is light years ahead of any legacy organisation and anything that exists today. We have seen countless examples from Facebook all the way to Tesla. Innovation has become so important. Understanding the technological environment is very important. This goes back in history when we used to hunt whales for blubber oil to Thomas Edison inventing the light bulb. We have seen disruptive technologies throughout history. We are at the brink of another disruptive innovative technology whether it is the automotive or energy sector in the days of a centralised distribution sector in the form of Eskom. Individuals can produce their own energy. I also produce my own energy. Small decentralised grids can completely disrupt large historical power sources that handle 100 to 200 megawatts of electricity. I think innovation is very important particularly in the green technology space. I think we have seen very little has been done as far as green innovation is concerned. I think there is a lot of new technology but the rate of technology has been very slow. I think in the next 10 years that will change. There will be 2 primary drivers of that change. The first is the cost of electricity that energy and the second is the demand for that energy. On one hand we are saying a global increase on energy prices and affordability is the key drivers of innovation. Secondly access. If you take China it is at the fore front of adopting renewable in the world. They have to because they have a population that is rapidly modernising and you can continue to rely on nuclear, coal or any fossil based technology. To rapidly deploy any significant new technologies. Renewable is the only source that allows you to rapidly deploy any new sources of energy/ technology. You can have a 75 megawatt solar plant in a year and it will take you 10 years to have a 75 megawatt nuclear plant if you are lucky. That's why we see this sizemick shift in terms of the adoption of renewable technology.*

The executive above also expresses concern on limited progress in green technology space, in terms of innovation. He further highlights that green business model can prove to be useful for the company as well as its customers. Some examples are -

> *Live examples in the Banking industry would be the use of Solar powered ATMs and Branches, going paperless, using tea / coffee mugs instead of disposable paper cups, doing away physical statements, recycling waste paper etc……..*

Few more examples in context of green technologies in banking sector, emphasized by respondents during interview are -

> *1. ICICI Bank*
>
> *'Instabanking' - It is the platform that brings together all our alternate channels under one umbrella and gives customers the convenience of banking anytime anywhere through Internet banking, I-Mobile banking, Tab banking and IVR banking. This reduces the carbon footprint of the customers by ensuring they do not have to resort to physical statements or travel to their branches.*
>
> *'Electronic Branches'- Fully electronic branches have also been set up where customers can conduct all their banking transactions.*
>
> *'E- Drive'- We have sent nearly 200 thousand annual reports in electronic form. In the last quarter we have saved more than 60 tonnes of paper by sending e-statements to over 6.5 million Bank accounts and 300 thousand credit card customers.*
>
> *2. IndusInd bank - Came up with the concept of Solar Powered ATM*

Technological innovation bring change in organizations. It brings change in the way employees and consumers think and work. And therefore, most challenging is to bring this change in behaviour of all stakeholders. A senior manager explained this with an example of Smart ID's in South Africa -

When it comes to change; the capacity, the ability to adopt change is a requirement for all of us, the 7 billion species on this earth. To be able to adopt an innovation fast and run with it. In South Africa smart ID's were introduced but people forever to adopt that thing. But in the case of the banking industry there has been a rise in the use of credit and debit cards in purchases. Its low but it's still a journey. People still want to carry cash. Just for a statement people still come inside the branch even though there is an auto cash just for statements. You can also check your statement on the phone. Change in human nature. Humans do not quickly adopt it. In South Africa we have had a very painful past 400 years of isolation and apartheid. Horrible crime to humanity. In the past 22 years there was democracy and that's a big change what needs to change is the mind-set. The next wave of change is technology and innovation we must make people understand this innovation and give them time to adopt it. We must make people understand change. We have a responsibility as leaders in the banking industry to drive change and make people understand why it's important.

a. Technology and innovation

As already discussed in above section that technology and innovation yet have to make considerable progress in green technology space. This will further lead to inclusiveness of business. According to respondents, the integration or adaptation of any technological development or innovation in business, should be implemented with sense for responsibility, and should be environmentally, socially and financially sustainable. An executive explained above, by using an example from a bank on biometric technology –

Fortunately, the BOP sector has been positive less of the prohibitions and more of the convenience. We have about 8800 agents in the field these are at the end, go into the village with a micro ATM which has biometric technology in it this is not an ATM as we see it. Isn't it with an ATM we load money in it and you put your card pass word and all that money comes out but with this there is no money in it and the customer will put their biometric information into the device and it gives them options. If it, they want to deposit the account is credited. If they want to withdraw the account is debited. The agent has the money on them and even though this is done online the agent will

physically give the customer the money or he's dependencies the cash. The system updates like an ATM.

b. Educating and learning new technologies

Adoption of any new technological innovation is difficult because it takes considerable time and efforts for customers to learn and understand the innovation. As correctly said by an executive *'Technology should be easy to understand and use by common man!'*

Implementation of green technologies is even more challenging. An example of evolution of IT enabled services replacing the old systems, from a banking sector was shared by an executive as -

…. I will give a very precise example. If you look at the banking history in this country. It was around 1944 that X Bank Ltd those days introduced the teller system. It was nowhere in the country and we discovered that someone can just go to a bank, talk to someone and take his payment. It was so easy, subsequently it became a given that a bank teller4 in the country. Similarly, from the late 90s to the current century there was a shift from the physical to the digital.

Then people moved to the computer and the accounting principles had to be fitted, into the software were people had to be trained. Initially there was resistance but today if someone does not have a computer they don't want to work. Similarly, anything that you bring that is new has its own plus and minuses when we had physical ledgers and physical dealings with the customers at the counter initial stages of the computerisation we had what we call local computerised branches. They had what you call advanced ledger posting machines. Total branch automation but only the branch. There was no central database. Those things were not there. In those days, the customer had to deal at the counter of the bank and there was a continued relationship with the front line staff. There was a face you could correlate to and there was an attendant security ledger and an attendant risk management within the space. I will give you another example one day a customer gave a teller his passport details and gave him back and said he had 1200 rupees in his account so he wanted to withdraw 100 rupees and the teller posted it to be passed. Then finally the head cashier made the payment. Then he looked

at the person and he discovered that this is the person who is doing the ironing job at the corner. He realised he couldn't have 100 rupees in his account and asked him "Where did you get this?" The fellow was so shaky. When he came out of the office he said "how did you pass this?" So it transpired that these are 2 pages of the ledger and instead of being posted on the right hand side. But because the head cashier knew this person and hand side but because the head cashier new this person and he knew he doesn't have this kind of money so he questioned it immediately because there was a face to face relationship and they found that the money actually belonged to someone else and it was corrected. So it would have actually amounted to fraud…….

c. Importance of green technologies

Most respondents realize the importance of green technologies in every field, from agriculture to durables/FMCG, to banking, energy, etc. The positive impact highlighted by respondents are – optimized utilization of natural resources, reduction in wastage, responsible behaviour, improved air and water quality and help people appreciate the vast ecosystem services that nature offers us. The major negative impact could be initial uncertain profits to businesses.
One the executive from energy consultancy states –

……Well that's true as a sector but if I talk of India I wish we could do something like that in India. I was reading an article that the other day about Madhya Pradesh on the agriculture. I think they are experts. Despite the drought they have been able to achieve a 14% on year growth in agriculture through many innovative practices. Considering that our country has 70% of the people still in rural areas this ITC technology will only touch the dream, but in terms of biotechnology, green technology someone should actually do. Unfortunately, I don't have the capacity to do so but it is important to innovate in agriculture……..

Respondents also believed that implementation of green technologies enhances brand image of companies. For this, either the green model has to be cost effective or it enhances the overall brand value of the company; thereby creating a positive image about the brand / company amongst its customers and other stakeholders. Examples quoted by respondents are *Coke*

adopting water conservation techniques, NTPC – Distributing e-copies of annual reports, Telecom Companies – Offering discounts for subscribing for e-bills only, etc.

d. Reasons for failure of technologies

Various reasons are identified by respondents for failure of technologies, particularly green technologies. Stabilisation and configuration of technologies often result in greater predictive ability of performance of technologies. A senior manager elaborated on this as –

> *……. India they were at an early stage of development say a couple of decades back, 10 years back, 20 years back. Right now many of these innovations have not matured one is clear on the costs the falling or the stabilisation of costs in the future, the configurations, the specifications one is on a scale right now. So a lot of technical advisory that companies used to provide that also has competitively come down. With the stabilisations of the technologies and the greater predictive ability of the technological development cost structures how they would change in the future. A lot of mainstream of these technologies has already happened for example in the case of solar TV. Earlier a lot of advisory work, consulting work used to happen in designing products, smaller projects: treatment of water that people were working on but with the Government coming up with huge targets on 100KW in the next few years. A lot of in-house capabilities have been built by i.e. revolutionary companies ……. Technical consulting which was outsourced earlier that has come down so that's innovative capabilities that have helped rebuilding. So that's an innovation that their doing themselves but for companies like us that are shrink of the market so the levels of the services we are providing we are not able to. These are the sets of the private clients we used to advice and still do. ……*

6.2.11 Finance

Innovation brings sustainable development and considerably changes the financial aspects of business model innovation of the company. Introduction of green technology leads to business

activities such as proper accounting system or financial accounting, transparent data acquisition, measuring carbon footprint, etc. A senior manager quoted –

> *You see first of all in a very simplistic term proper account system for business. I'm not saying do financial accounting, I don't know what you call this triple benefit. I think some companies in India have started this. They should be very transparent and honest on recording data acquisition. If you try to use this and it creates bad innovation and fudgy. If you are implicit so you become innovation and fudgy. That is also innovation the first test is to do is to measure what they call carbon footprint….*

a. **Green financing**

Green financing is the recent trend with most banks in today's circular economy. Increase focus on global warming and soaring energy needs, have spurred investments in green financing. In order to achieve green growth, it is imperative to have long-term investments and sustained financing. Most respondents realize the importance of role played by Governments in sustaining green finance. Government catalyse policy frameworks across regulatory bodies to overcome barriers to green investment, both nationally and internationally. Banks as financing institutions also play important role in sustaining green financing. An example on how banks take decisions on providing financial support to companies, was shared by one of the executive

> ……. *It actually gives you statistics on green buildings, eco housing and affordable housing that's what I'm talking about. The business process proves itself really, we have a partnering company, an energy services company ESCO we partner with them when they do the energy audit so they bare part of the risk. They would give the client the guarantee. The do the retro fitting of the building and we do the financing. The client would pay the loan in two years in full. So we find different ways of managing the risk. For us to finance any project it has to be financially viable we have to be able to manage the risk either by cash flow, property or collateral. We can get funding from anywhere of which we can get it at a preferential rate. With green banking we pass the benefit to the client for them to take up the offer. I have been very involved in research*

on studies with KPMG on documentation of green finance those documents are actually available and I can send them to you. The first thing is that that as a commercial bank we need to know where the barriers are because funding goes to where the need is. Challenges we have as a commercial bank is that we have risk controls. You can just finance something because it sounds like a good idea so commercial banks stay away from new technologies that have never been proven in the market for example small companies that have accumulated a cash flow or balance sheet……

The next challenge is making green financing sustainable. Another executive from banks reasoned on financing large business -

……. we finance large business they want to help so we make the connection, we are the catalyst so we can be the connection with the local communities. We internally we work towards creating synergy as well as externally. We spend 55 billion to finance large business in renewable energy and we as a group take that facility as a bond, part of that green bond. As far the returns are concerned they are not bad but they do it with a philanthropist view that we think it's good so we also have a muslim finance and I love working with them and they just wanted to do good. I was talking to the bank X and in India the first time they operated they discovered that women managed money better than man and where more obliged to return They would have had women in groups of 4 invest and they found that it works well and they never had not even a single bad debt……

It was found that most banks or financial institutions are seriously considering green finance, as a part of the United Nations G20 policy. An executive from banking sector explained -

We are part of the G20 so the ministry of finance has been tasked with looking at green finance. We receive an email the other day. We are part of a very large group and emails are always flying around they might now know we are around. So I directly responded to the United Nations as well with the questions they had on the G20. I don't

think we are getting the supported we would want to get from them but we are doing everything in our power to reach out to them. Through our business associations we approach government institutions. It's a long process but it's a process of getting the climate funding, with IDC. I don't think they understand exactly what we do as a commercial bank and understand how much invested we are in renewable energy. Part of my research in the group is a huge task because we have 100s of billions of Rand and I have to establish how much of that falls into the terminology of positive impact banking? All those things education, skills, water and agriculture. My responsibility is to quantify all of it. Whether its mining you don't know whether its positive. I am very frequently asked why we are still invested in Eskom and coal? When I am always asked this especially on the United Nations front that why I am still invested in brown and not move to green? It's because we can't just move and being able to provide energy to all is in the constitution and part of the NDP. If the banks where not financing mines we would lose jobs and we can't afford that and with the rate of unemployment but we should look at investing in green, solar. We are work with Cuba and Brazil and the Asias. It won't happen over time and it doesn't matter if it not seen but as long as we know we are doing our part. We have to empower women especially when we hear about these solutions from the UN we always have to say that does not work here in Africa. In August I will be in Dubai we will talk on green financing …….

b. **'Green Washing'**

'Greenwashing' has sharply escalated in recent years among companies. Greenwashing is practice of making false, unwarranted and overblown claims of environmental benefit or sustainability in order to gain market share and attract consumers' attention. A senior manager highlighted this problem by quoting an example -

……. How many people actually poses these luxury brands. I would actually use that money for educating my child rather than buying these expensive brands from ALDO and any other international brand. Spending half or my full salary is not really sensible. When a student came and wanted to look at the cheap China imitations and see if their buying the real ones…….

c. **Financial barriers**

The respondents identified financial barriers to implementation and adoption of green technologies. These are capital intensive ventures, costly as compared to traditional solutions, different consumers making purchase decision to that of users, etc. An executive from energy sector highlighted the barriers by quoting an example as –

> *…….in the case of such communities the positive impacts of the green technology is mainly enjoyed by the consumer segment who generally do not have a say in the acquisition of that technology because the control over the finances at the household level and the peoples' strengths are with the other consumer segment for example the impact of kerosene lamps at the house hold level is felt primarily by the woman and the children do not a say in the purchasing of the lamp because the purchasing is handled by the man because its expensive and the decision making not in their hands plus there other challenges for example another product at house hold level: presence of service network those challenges are there but these I think I think are the primary challenges why I think adoption becomes difficult.*

Financial barriers also impact the transport and logistics of green technologies, especially when marketing offerings to BOP (Bottom of Pyramid). This requires '*huge agility and massive flexibility',* as quoted by an executive from energy consultation company. He further elaborated with an example as -

> *Today do you have I can give you an example look at India and the guy has one truck and goes to all the big companies and maximises with one basket but if you look here in South Africa those people don't exist. Here its formal and you need scale and you are small and it becomes complicated……*

d. **New forms of revenue schemes**

Most respondents shared that their company's business model led to new form of revenue schemes. it also resulted in the reduction of other revenue scheme. Affordability and value for money is most critical for customers, and is critical for companies to compete in the market.

Various challenges were identified by respondents while re-inventing revenue schemes. These are -

- *Very low ticket size for very large customer base*
- *Scattered markets – Distance makes cost prohibitive*
- *Distribution Channel Sanity – adherence to norms and processes*
- *Convincing top management and the decision makers is the biggest challenge. Others include developing such revenue models and organisational re-structuring are the other challenges*
- *Cost versus benefit to customer, delivery mechanism of offering*
- *Investments – Traditionally only certain percentage of profit were allocated for the innovation in the name of R&D department. They were not considered as prime or main line of business. In today's world all the innovation is done as projects.*
- *The investments are increased drastically. Due to limitations of funding, organisations are prioritising the projects, portfolios, programs are managed very closely reviewed and reported at management and board level.*

However, respondents also highlighted that there is no specific kind of payment scheme which is cost effective for green innovations. Therefore, companies have to devise strategies to be cost effective to operate in high volume but low margins among BOP segment. Other alternate payment schemes could be deferred payments, payments against performance, etc.

e. **Cost structure**

Respondents agreed that re-inventing business model with integration of green technologies can lead to negative impacts on the cost structure due to initial failure rate. This will necessitate the firms to improve internal efficiencies and processes within the business. Few respondents also said that re-inventing business model innovation for BOP market, not necessarily leads to any significant changes in the cost structure of companies. An executive quoted an example of financial inclusion in banks -

> *Financial Inclusion is vital part of Banking in India and Bank Y has been one of the leading banks in Financial Inclusion. With its wide reach in rural areas bank Y has been able to achieve targets almost every year for Financial Inclusion. Catering to the BOP does exert pressure on the cost structure of the companies. ……..Absolutely distribution costs go up…… Engagement is going to be higher because you are on many different platforms trying to reach the market. Benefits for example if I bank with my mobile phone it saves me deposit costs……*

Another example quoted by a senior manager -

> *Makro – have collection depots across the country because they can't have a Makro at every small town. This is because it does not fit into their business model. You can order from Makro online and it goes to a delivery point you can go to a service station and pay at the cashier at that service station. This allows big organisations to reach a new market…..*

f. **Financial resources**

The types of financial resources required in the development of company's business model innovation are incentives, rebates, tax credits, equity, etc. However, these financial resources depend on the scale and level at which business model innovation is taking place. In most cases,

large firms rely on their funds to support new business model innovation. A senior manager warned -

> *……kind of changes are brought in company's financing formats to re-invent their business model for BOP sector ……. Typical payback periods for new investments may have to be re-assessed…….*

6.2.11.1 Market offerings – products or services

When an innovation is incorporated among market offerings by a firm, it leads to evolvement of a different product (usually better than the last offerings), or an improvised process, or an improved overall customer experience or a mixture of all of them together. Therefore, respondents agreed to the assumption that innovations can only be termed as successful when stakeholders associated with it, will change with new offerings. Innovative product or services necessitates consumers to switch their thinking or adapt to that change.

Respondents were asked to express their opinion on changes required on firm moving its target segment to BOP. The following changes were suggested –

1. *Mass production – as BOP is characterised by huge volumes*
2. *Constant up gradation*
3. *Lean, adaptive and cost effective*
4. *Fresh marketing and supply chain strategies to serve volumes*

However, respondents also specified important challenges to achieve above mentioned changes. The challenges faced by companies while re-inventing their business model for BOP sector are –

1. *Huge infrastructure*
2. *Wafer thin margins*
3. *Cut throat competition*

a. Need based products and services

As already discussed, in order to overcome above challenges, companies should target BOP consumers, with need-based offerings. An example of such consumer need based cab services, was given by a senior manager –

> *Uber cab services …recognized need as per customers …. I can give you the idea of what I have seen these cabs. They also need some good services in the hired vehicle sector. These people also worked with the drivers, gave them some training and you find that the popularity of the business has increased and many times now if you ask for a cab many times the cabs are not available. Somebody actually identified the need of the customer that now in India with economic growth that segment has become sizable. Those who will have extra money but would want timely services, courteous services. That is how these people came into business see these business is now successful.*

b. Competitive offerings in BOP markets

Based on experience of respondents, they agreed that BOP consumers make choices and preferences, which changes on daily basis. Therefore, the offerings for BOP consumers should come from the bottom-up, and should follow non-conventional methods of marketing these offerings to remain competitive. One of executive quoted an example to explain this –

> *But when you are coming from down up I will ask them which product form do you want to work? Which problem would you like to address? Within this group……It should come from the bottom……. Like I have two information which is very interesting 9-19-year-old females have the highest incidences of anaemia some information which I know from the health sector the 2 to 5 rupees of pocket money every day …..Now get this segment 120 kiros every day. Children in India spend this kind of money of everyday so it's a big market. The point is a chips one day, an ice cream second day and a Pepsi third day. Now, where did your marketing principles lie? We*

end up saying an ice cream will compete with an ice cream but in this segment an ice cream is competing with chips ……. None of these principles follows a conventional marketing thinking.

c. Hitting on consumers' consciousness

Respondents believed that tapping on BOP consumer's perceptions and feelings, which make them change their preference, while making purchase decision can lead to better purchase response of firm's offerings. An example by an executive –

..eco-friendly products or packaging for environmental conscious customers *…Woolworth's in South Africa ….. Woolworths with their strategy of sustainability stewardship (when they increased on recycling and using farmers that do not use pesticides, and farmers that grow organic food as the policy of the organisation)*

Literature shows that consumers usually prefer brands that bring environmental consciousness or that which drives sustainable development. Another respondent from energy sector expressed –

We are producing and selling green power from waste to energy plant, organic manure from Municipal Solid Waste and many useful construction products from Construction and Demolition waste. ……. Environmental conscious customers use such products with a feeling to protecting environment and reducing pollution by using recycled products. Recycled products also reduce the burden on natural resources in big way. ……..Indian Government schemes like Service level benchmark and schemes like Swach Bharat, Smart cities and Namami Gange

Besides above, it is imperative for firm to conduct codification to make it a green business model innovation.

d. Price sensitive business offerings

Most respondents were of opinion that BOP markets are very price sensitive. Usually BOP sector cannot generate the money on skimmed pricing. Therefore, firms have to adopt penetrated pricing. The volume sales will generate the profits for firms. An executive said -

> *Important to get right is the price of products right in comparison to non-green alternatives. ……. Cost, effective delivery mechanism and customer education are the key to succeed.*

An example quoted by an executive from a FMCG company explains –

> *In India, Britannia industries, leading biscuit producer, before 2006, pricing for their biscuits are above the normal Indian consumer's spending. In 2006 the company introduced Tiger biscuits almost the same taste of their premium product and entered into BOP segment by taking care of the 3 points – pricing, value to customers, awareness and availability of the product. ….*

6.2.12 Innovation

Innovation is identified as one the major themes through qualitative analysis, which was found to be relevant to other major themes as well. Innovation is life of any organization. One of the respondent defines innovation as *'keeping pace with changing time'*

To effectively adopt innovation, companies have been changing businesses internally as well as taking considerable initiatives outside too. Innovation is important as, it -

a. Provides competitive advantage
b. Required for constant improvement of product
c. Changes nature of business model
d. Driven by needs of people and competition
e. Requires considerable investments
f. Technology – key success driver for innovation

Innovation strategies, directly or indirectly, focussed to serve the customers better. Thus, customers play a vital role in the success of any innovation strategy. On the executive from banking sector highlighted the importance of customers, as –

> *Until the customer reaps the benefit of the innovation strategy of the bank innovation strategy has no use to the bank. ……. When new ideas are communicated to the customers it shows bank's commitment to cater to the needs of the customers. In turn it builds a relationship of trust between a bank and its customers. ……..Customers play a big role in the innovation strategy e.g. Bank; if you look at app (technology) does everything can reduce cost, increase revenue and increase profit. Some companies merely innovate just for the sake of innovating. ……*

Innovation also enhance the quality of work in the firm by improving business efficiency and leading to best practices. However, a major limitation recognized by company when it comes to implantation of innovation, is *failing to challenge conventional management and organisational models.* A senior manager explains above as -

> ***"****that's true. How do you think that if there is an innovation in the company or if there is a conducive environment for the employees to think to bring new ideas and introduce innovation then off course it is reflected in the products and services also what to deliver to the customers? How do you think that innovation enhances the quality of work in the company? ……. One of the things that innovation brings is the knowledge of market at all levels because in a traditional company only a few people know about the market. But my guess is that in an innovative company all levels know the market, know customers and to that extent the customer requirements gets communicated direct rather than being filtered through the process management hierarchy. Once the customer requirement gets communicated directly the entire organisation gets aligned to meet the customer and the market.*

Besides above, revising organization policies to keep with ever-changing new innovations, is often found to be regular practice with firms. A respondent elaborates –

.....Our organisation's policies are robust and does consider the risk of changes in various industries. Our policies are revised and updated on regular basis to incorporate the changes required to mitigate the risk arising due to changes in the industries having a direct or indirect impact on the bank's exposure to the clients. ……..Every organisation have a goal. Those goals shall be achieved with in the scope of values for which the organisation stands for. Good management and well formulated policies to achieve the goals of the organisation is equally essential as is the implementation of the policies. ……..Once the policies are in place it depends on the organisation's communication of those policies to each level of the organisation. Each and every stakeholder must understand what the organisation stands for and what goal they are contributing to……

Innovation brings change in the existing setups and processes which brings a challenge in implementation of the fresh ideas. Other limitations are cost and time involved in it implementing the new ideas. And some of these most innovative ideas comes from the existing issues and concerns of the value chain. It is quite important to bring all stakeholders (employees, customers, suppliers, etc.), of value chain system of the company to be part of the innovation/ideas. Thereby, creating a common platform for innovation management.

a. **Provides competitive advantage**

From above discussion, innovation indeed provides competitive advantage over other firms with similar product or service offerings. A respondent further elaborated as –

The company may be producing something or service provider but what is the need of the customers of the company works out its business model …most importantly, slowly and gradually you will notice that the expectations of your customers increases and with your competition bringing in new types of services, more developed services than yours, more developed products than yours, more technologically developed products than yours. It necessitates that you keep on improving your product but that

improvement cannot be done by straight forward or simple methods which usually apply that is when you start thinking outside the box. When you think outside the box and come up with some innovative idea to find the solution of your product quality or to find the solution to your customers 'need? That is when you find that the innovations are working in the company. These are the situations to my experience when a company generally goes for applying innovative ideas.

b. **Required for constant improvement of product**

Though innovation should lead to improvement of product or service offerings of firm, but respondents warn that it should not come as *'shock'* to customers. The change should be slow and persistent, providing time to consumers to adapt to change. An executive explains this, as

Let's say some customers find the is need for improvement, let's say data related services and you apply that improvement in services it satisfies your customers need but sometimes if you look at the other half of the innovation effect on the company's end for the ease of doing business, for scaling up of the business you will want certain changes. If you apply innovative ideas in your company that changes the nature of certain businesses, you have to make sure that that customer gets used to that change. Change should not go to that customer as a 'shock' because then you will lose your customer base. I think your question pertains to this part and that is why you say successful innovations change the people?

c. **Changes nature of business model**

Although lot of research and brainstorming takes place before a business model innovation is implemented as it is a change in existing structure & processes, it still comes down to the fact how successfully it has been implemented and how well it has been accepted by the customers. Thus communication (Internal and external) is identified as main driver of the success on any business model innovation. Sharing knowledge resources or building business intelligence, is also equally important for successful business model innovation. An example shared by an executive –

….example of our company when we grew exponentially over one and a half years we started doing too many different things and no one in the organisation new exactly what was happening. People were working on very varied things and we started with small things like getting a google drive account, drop box, data sharing which never happens in a small organisation because people usually know what everyone is doing and people are always accessible and when the organisation grows you start using IT … it was difficult for people to start filling in their sheets. As a consulting firm for the first four years we didn't have the concept of a time sheet (it's not a good idea). So people started to feel that this is my company this is my cost and they started to judge them based on those parameters. Technology needs to be adopted fast that's one example comes into mind. Push technology on to the employees.

d. **Innovation is driven by needs of people and competition**

Innovation will always attract new customers or cement the relationships with already existing ones. As long as customers realize its importance for sustainability, they will adopt it better. A senior manager from energy sector shared –

…. I think the solar energy innovation that was brought about by the George airport improved the relationship with its customers because customers did not have to worry about power shortages.

Besides this, customers also play pivotal role in innovation strategy. This was well explained by a manager from FMCG company -

A customer plays a huge role in innovation strategy which could be passive or active ……Passive - FMCG Company X as a company exists primarily to serve its customers so any innovation we drive has to meet the customers has to meet a customer's expectation. ……. Active – FMCG Company X drives what we call joint business partnering (JBP), where our customers (ShopRite, PnP etc) would jointly drive a mutually beneficial business agenda and in this case a customer will actively influence our innovative strategy. ……. Using the JPB model we invest in and develop unique solutions tailored for each of our customers' needs which would help increase

sales and profits within their business; egg. "Perfect Sishebo with Shoprite" and "What's for dinner drive with PnP" ……..

An executive also stressed that *'Obsession of innovation can bring chaos*'. He further added –

……. innovation cannot always be in direct correlation. Sometimes you can have a positive correlation between the two and sometimes you can face problems simply because of innovation/too much innovation. See our minds, human behaviour is such, our minds get trained to the routine that we follow. In the case of your home you have scattered in different rooms, if you change the location of your toiletries, your location of your cupboard, if you change the location of your tv ever third or fourth day you find that your life can become problematic. If you change a little bit that change will energise your life. If you are talking of innovation and quality of work, I think this is the best example I can give to you. Sometimes we should not be obsessed by innovation but when there is a need for product improvement then you make sure that your people at work also address the issue and on the ……..

e. **Requires considerable investments**

Bringing constant innovation for improvement of firm's offerings, requires considerable amount of investments, especially for research and development activities. A senior manager from energy consultancy added –

…. So you see that there is a technology group doing R&D work on a product, more on that I am also in the group with my technical background but its more about increase the reach and awareness in the rural areas because you talk about India its operating in a unique way, still we have households that do not have power. So this is one big part of the company do we have our own targets? We constantly think how do we bring our company to help the poorest of the poor? To make sure that the power really reaches those areas. A lot of innovation is happening some of the project end up becoming big……

f. **Technology – key success driver for innovation**

As already discussed, technology is indeed a key success driver for innovation. Technological innovation is important because, that is how companies can shift from traditional practices to new pro-environmental practices, products, processes and technologies itself. Sustainability and Innovation are closely linked, as sustainability is a building block of an organizational and technological innovations, which in turn will yield long-term returns. A CEO of an energy company shares -

> *You see one of the things personally. I tried to tell it everybody don't ever be afraid to accept any challenge. If in fact sometimes both from my junior and senior colleagues, I know have put them into real trouble by accepting a project about with we don't know anything. An example is 2 years back. I saw a bank which had been loaned before by a company which was doing very well was one of their very good customers until that company decided to make a very good investment using a Chinese technology which was not proven in India and then they decided to setup four projects and none was operating. I see a bank came from somewhere and can probably help. I went to the bank and told them this. I told them the truth our knowledge in this are in not so exhaustive because first of all this technology is new in India and it is from China. However, the fundamentals of this technology we know. We immediately found out what was going on and so when I came and discussed with the team they were all scared and they didn't tell me but one of the youngsters here did a brilliant job of analysis. I learned from that analysis and off course, he would be able to communicate with that analysis and off course he would be able to communicate with the ISS bank, brilliant analysis to me this was one of the best examples get into a new technology innovation the process by which it could be made to work and it worked. So this is what I'm saying…….*

6.3 SECTION 2: Differences between business model innovation of companies in South Africa and India

The following section discusses the themes that were found different among business model innovation of companies between South Africa and India (refer table 6.2). While most the major themes revealed commonalities among companies from South Africa and India. But,

differences between companies from South Africa and India, were found among few major themes, namely: learning and training, company culture and social environment. It is concluded by researcher, that these differences among business model innovation of companies also reflect the social –cultural- economic differences among two emerging countries (South Africa and India).

Table 6.2: Differences between Business model innovation of companies between South Africa and India

Bases of distinctions	South Africa	India
1. Learning and Training	Evident but needs to be part of firm's business model innovation	Significant and considerable part of firm's business model innovation, advance trainings through integration of technology, such as, online training
2. Company culture	Intense culture and practices leading to environmental restoration and sustainability	Open culture to employees to bring new and innovative ideas, with a sense of ownership towards sustainable business practices
3. Social Environment	Effectively sensitize consumers towards environmental degradation and sustainable solutions to resolve same	Considers as incubator to bring sustainable innovative practices

The difference was also found among mandatory policies re-enforced by governments of these two countries, especially towards sustainable business practices. Indian government has well enforced mandatory sustainable development policies for companies (egg. Manufacturing

industries) operating in their territory, which was found to be lacking in South Africa. Despite this, the focus on training and development was found at more significant level in companies operating in India. Infact, training and development is very much an integral part of their business model innovation. However, creating a conducive social environment to sensitize consumers towards sustainable development and bringing environmental consciousness, was found as top priority with companies operating in South Africa. One such example shared by a senior executive from energy sector company emphasized the efficient waste collection system in South Africa. But, he also highlighted on limited accessibility to sustainable business opportunities by South African companies, which was found to be better accessible to companies in India. He explains –

> *In terms of waste to energy in South Africa we have nothing going on in terms of waste to energy. They only have what is called a dump yard, they don't have management. They only have collection. The collection in the country is very efficient. All of the dumping, the industrial waste is managed by the municipalities and each of the municipalities and the municipality only has a responsibility for 3 years while all the technology from the old to new for example up to the ethanol stage it requires a long time. Technology requires a long time so we need a payback period of 20 years. So for that to work the municipalities do not have the control over the leases or can take up the responsibility to sign of the waste removal for 20 years. Without securing the feed stock supply no waste investment can take place. This is a practical problem that many have been facing. People have been knocking and no initiative have taken of the ground. We are underway with 5 municipalities to sign off and it has been committees after committees, committees after committees. The department wanted to come on board but there is still no policy it's a very practical problem that we are facing.*

6.4 SECTION 3: Conceptual framework and hypothesis

Section 1 presented discussion on themes and sub-themes originated after coding process through qualitative data analysis, by using NVivo 11 software. This section uses the interpreted and organized data from section 1, to formulate prepositions. Based on common themes from South Africa and India - qualitative data analysis, these themes are auxiliary categorized in

terms of their properties and dimensions. Themes are clubbed together to match the various components of business model innovation, green technology and sustainable development. After categorization, the researcher formulated series of prepositions depicting the relationships between themes (Strauss & Corbin, 1990). Table 6.3 presents prepositional inventory for green business model innovation for sustainable development at BOP markets. The inventory acts as a vehicle for specifying prepositions to guide theory construction and quantitative research to generalise these results from qualitative data analysis. These prepositions depicting direct casual relationships connecting constructs, are developed throughout the text.

Table 6.3: Prepositional inventory for Green Business Model Innovation (GBMI) for BOP markets

Common themes between South Africa and India	Prepositions developed using content analysis approach	Further relevant literature review	Final identified constructs after categorization, for development of conceptual model
Technology Product Innovation	The integration of green technology in a company impacting the performance of product or service and leads to green product or service innovation	(Hung Lau, 2011) (Lai et al., 2003; Wen & Chen, 1997) (Chen et al. 2006; Chen & Chang, 2011)	Green Technology Green Product or Service Innovation Green Process Innovation
	The integration of green technology in a company impacting the performance of green process and	(Lai et al., 2003; Wen & Chen, 1997)	

	leads to green process innovation		
Infrastructure management **Operations**	The performance of green product or service innovation has relationship with infrastructure management of company	(Smith & Perks, 2010)	Infrastructure Management
	The performance of green process innovation has relationship with infrastructure management of company		
Customer interaction **Innovation at Bottom of pyramid (BOP)**	The performance of green product or service innovation has relationship with customer interface of company	(Smith & Perks, 2010)	Customer Interface
	The performance of green process innovation has relationship with customer interface of company		
Features of business model leading to	The customer interface impacts the sustainability of		Sustainability of Business Model

business model innovation	business model of company	(Bocken, Short, Rana & Evans, 2014)	
Sustainability	The infrastructure management impacts the sustainability of business model of company		
Finance	The sustainability of business model impacts financial aspects of company	(Smith & Perks, 2010)	Financial Aspects

Thus, findings about the relationship between different themes depicted in above table, are summarized in the form of prepositions below:

P1 The integration of green technology in a company impacting the performance of product or service and leads to green product or service innovation

P2 The integration of green technology in a company impacting the performance of green process and leads to green process innovation

P3 The performance of green product or service innovation has relationship with infrastructure management of company

P4 The performance of green process innovation has relationship with infrastructure management of company

P5 The performance of green product or service innovation has relationship with customer interface of company

P6 The performance of green process innovation has relationship with customer interface of company

P7 The customer interface impacts the sustainability of business model of company

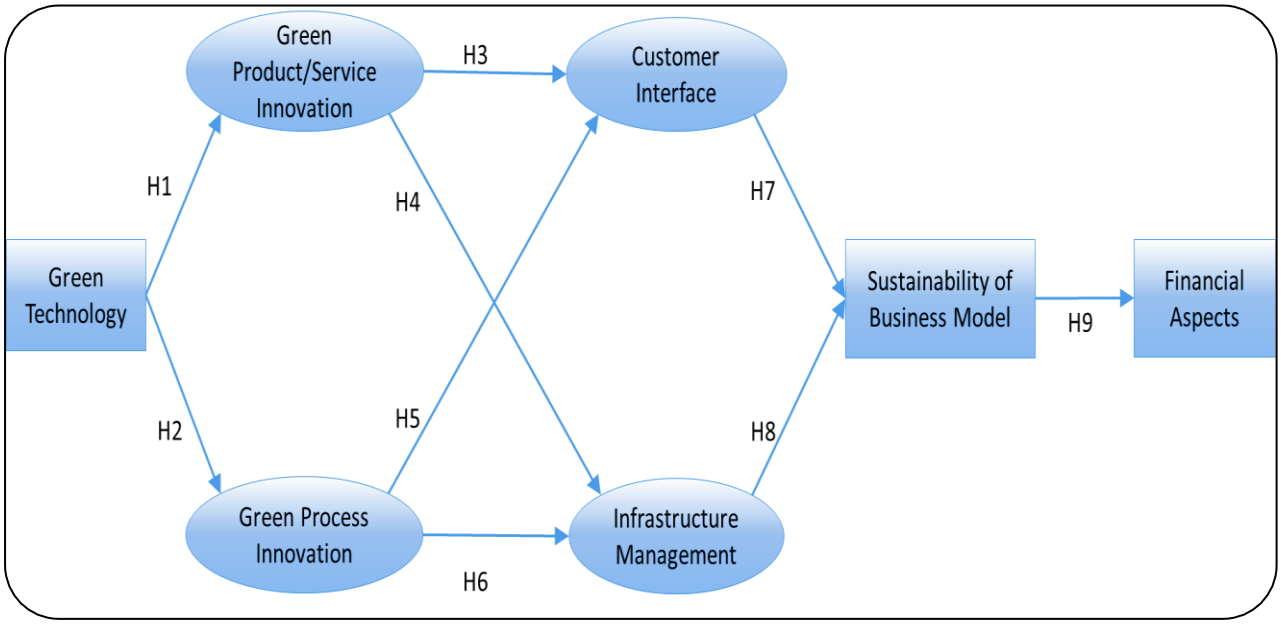
P8 The infrastructure management impacts the sustainability of business model of company

P9 The sustainability of business model impacts financial aspects of company

Based on qualitative content analysis (Mayring, 2014) and identified variables, a conceptual framework is proposed by researcher. Figure 6.1: Conceptual framework represents proposed conceptual framework for green business model innovation for sustainable development at BOP markets. The researcher conducted further literature review using content analysis approach, to match identified major themes with proposed variables and scales for development of measuring instrument (Bazeley & Jackson, 2013).

Figure 6.1: Conceptual framework

(Developed by researcher, 2016)



Business can be green by providing green products or provide services that green other businesses or consumers (green products/services); or businesses can be green by greening

their own processes or the process in other parts of their value chain (greening of processes). In simple words, the integration of green technology either as product/service offerings, or as part of process of business.

For the present study, researcher has divided green innovation into – green product/service innovation and green process innovation. In order to testify the proposed conceptual framework, quantitative study (phase 3) was conducted on employees from South African companies, targeting bottom of pyramid (BOP) with integration of green technologies for sustainable development and sustainability of business models.
Based on the theoretical and empirical literature and results from qualitative analysis, the present research postulates the following hypothesis –

Hypothesis 1
The integration of green technology (GT) is positively associated with performance of green product/service innovation (GP/SI)

Hypothesis 2
The integration of green technology (GT) is positively associated with performance of green process innovation (GPI)

Hypothesis 3
The performance of green product/service innovation (GP/SI) is positively associated with customer interface (CI)

Hypothesis 4
The performance of green product/service innovation (GP/SI) is positively associated with infrastructure management (IM)

Hypothesis 5
The performance of green process innovation (GPI) is positively associated with customer interface (CI)

Hypothesis 6

The performance of green process innovation (GPI) is positively associated with infrastructure management (IM)

Hypothesis 7

The customer interface (CI) positively impacts sustainability of business model (SBM)

Hypothesis 8

The infrastructure management (IM) positively impacts sustainability of business model (SBM)

Hypothesis 9

The sustainability of business model (SBM) positively impacts financial aspects (FA)

6.5 Summary

The first section of this chapter provided the qualitative analysis in the form of themes and sub-themes, to recognize common emerging patterns of qualitative data from South Africa and India. Followed by second section, highlighting differences among business model innovation of companies from two emerging countries, i.e. South Africa and India. Based on themes and sub-themes, prepositions were proposed, and a theoretical framework was conceptualized by researcher in third section of present chapter. The conceptual framework integrates green technology, sustainability and concepts of business model innovation. And finally, hypothesis was formulated for quantitative testing of conceptual framework in phase 3 of current research.

QUANTITATIVE PHASE 3

CHAPTER 7: QUANTITATIVE ANALYSIS OF PERCEPTIONS OF EMPLOYEES ON BUSINESS MODEL INNOVATION FOR SUSTAINABILITY: BOTTOM OF PYRAMID AND GREEN TECHNOLOGY

7.1 Introduction

This chapter focuses on the quantitative analysis to validate the model derived from qualitative analysis. The quantitative analysis was done on 206 respondents in South Africa across companies and various demographic profiles. The data collected using various measurement instruments was tested for reliability and validity and the path modelling statistics. This chapter has two main sections. The first section will provide descriptive statistics for both the demographic data and the measurement instruments. The second section will provide the results for hypotheses testing. Structural Equation Modelling was used to derive at various coefficients.

7.2 Demographics Data Descriptive results

Figure 7.1: Gender Graph

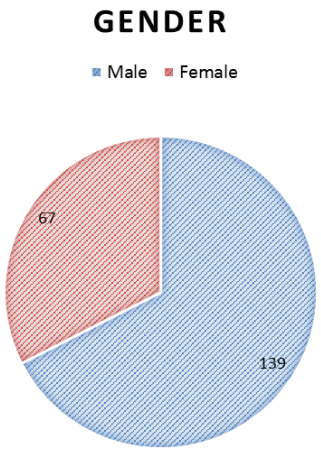


Table 7.1: Gender Table

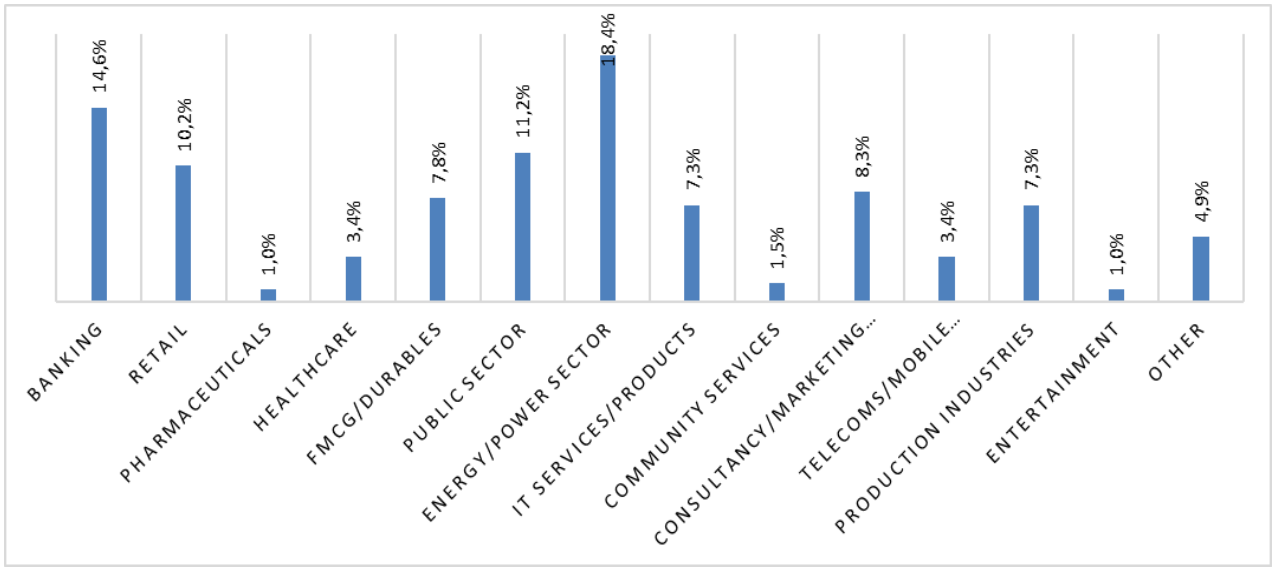
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	139	67,5	67,5	67,5
	Female	67	32,5	32,5	100,0
	Total	206	100,0	100,0	

As can be seen in table 7.1, above is an illustration of the gender distribution of participants. Most of the participants were male and represented 67.5% (139 out of 206) of the total sample. On the other hand, female participants represented 32.5% (67 out of 206) of the total sample.

Table 7.2: Industry / Sector Category

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Banking	30	14,6	14,6	14,6
	Retail	21	10,2	10,2	24,8
	Pharmaceuticals	2	1,0	1,0	25,7
	Healthcare	7	3,4	3,4	29,1
	FMCG/Durables	16	7,8	7,8	36,9
	Public sector	23	11,2	11,2	48,1
	Energy/Power sector	38	18,4	18,4	66,5
	IT services/products	15	7,3	7,3	73,8
	Community services	3	1,5	1,5	75,2
	Consultancy/marketing services	17	8,3	8,3	83,5
	Telecoms/mobile communication	7	3,4	3,4	86,9
	Production industries	15	7,3	7,3	94,2
	Entertainment	2	1,0	1,0	95,1
	Other	10	4,9	4,9	100,0
	Total	206	100,0	100,0	

Figure 7.2: Industry / Category Graph



The table above shows the various industries in which respondents were employed. About 18.93% are employed in Public Sector and 9.71 % in banking sector. Majority of them were employed in Other Category. Other category included sectors such as Education, Mining, Insurance, Construction etc.

Table 7.3: Years Involved in BOP

Please indicate number of years you are involved in green practices/Bottom of Pyramid?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1 year	47	22,8	22,8	22,8
	2-3 years	33	16,0	16,0	38,8
	4-6 years	29	14,1	14,1	52,9
	>6 years	97	47,1	47,1	100,0
	Total	206	100,0	100,0	

Figure 7.3: Years Involved in BoP Graph

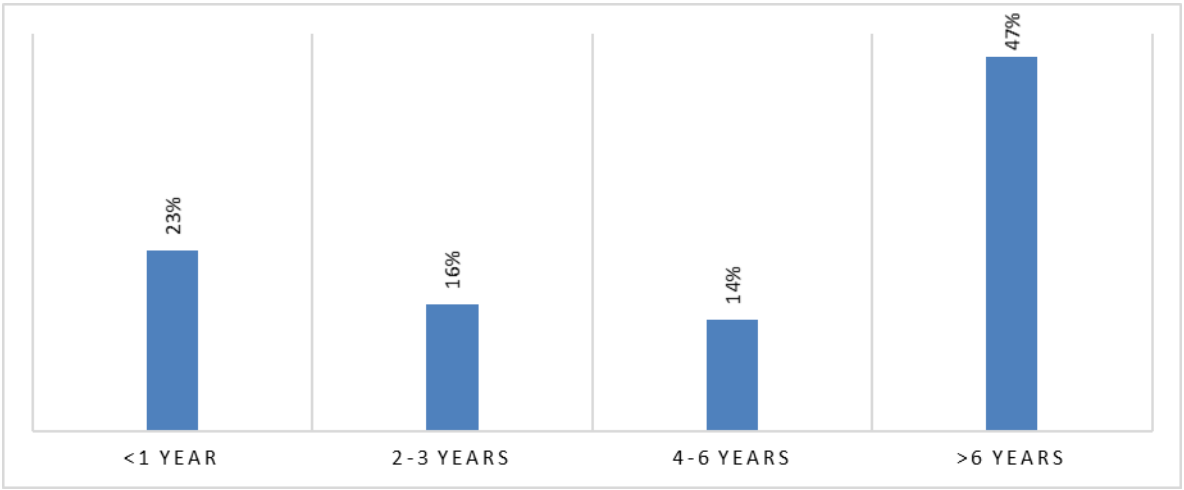


Table 7.3: Years Involved in BOP, showcases the number of years' respondents were involved with Green Practices / Bottom of Pyramid. The majority of respondents 47.09% had more than 6 years' experience with Green Practice/ Bottom of Pyramid.

Table 7.4: Functional Area in Company

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Marketing/sales	42	20,4	20,4	20,4
	Finance	32	15,5	15,5	35,9
	Manufacturing	9	4,4	4,4	40,3
	Operations	90	43,7	43,7	84,0
	Purchasing/supply chain	8	3,9	3,9	87,9
	Human resources	23	11,2	11,2	99,0
	Logistics	2	1,0	1,0	100,0
	Total	206	100,0	100,0	

Figure 7.4: Functional Area in Company Graph

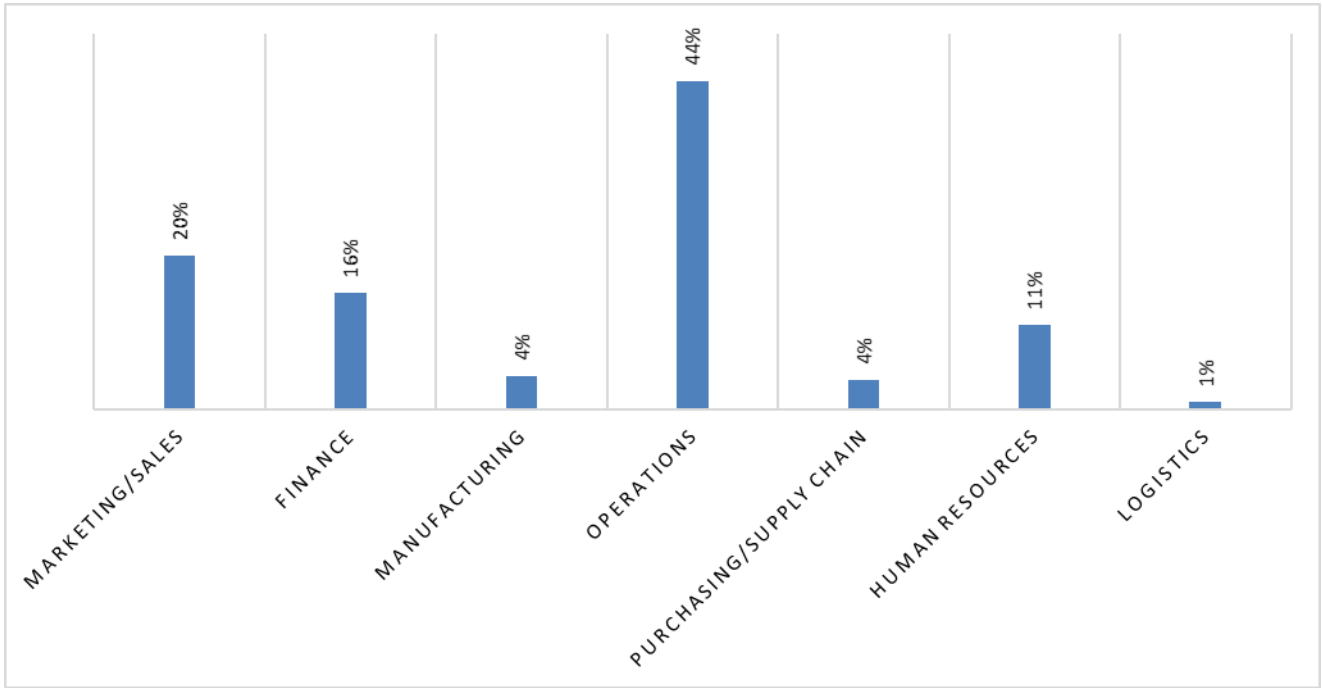


Table 7.4: Functional Area in Company, showcases that majority of respondents were from operations. 43.69% of respondents were from Operations. 20.39% were from Marketing / Sales department of various industries.

7.3 Structural Equation Modelling Approach

Data analysis was performed using the structural equation modelling (SEM). Structural equation modelling has become a popular statistical technique to test theory in several fields of knowledge (Hair, Anderson, Tatham & Black 1998; Schumacker & Lomax, 2004). Qureshi and Kang (2014) describe SEM as "a multivariate, statistical technique largely employed for studying relationships between latent variables (or constructs) and observed variables that constitute a model". Additionally, it is according to Bollen (1989), Hoyle (1995) Malaeb, Summers and Pugesek (2000) Reckhow, Arhonditsis, Kenny, Hauser, Tribo, Wu, Elcock, Steinberg, Stow and Mcbrid (2005) and Grace (2006) a statistical method with which a researcher can create theoretical concepts and validate proposed causal relationships through two or more structural equations. It is recognized as being similar to regression analysis but more predominant in that it assesses the casual relationships among constructs while concurrently accounting for measurement error (He, Gai, Wu & Wan, 2012; Sarstedt, Ringle, Smith, Reams & Hair, 2014). SEM's ability to address numerous modelling difficulties, the endogeneity among constructs and composite underlying data structures found in various phenomena (Washington, Karlaftis & Mannering, 2003) can be assumed to be part of the reason for its popularity.

SEM is fundamentally a framework that involves concurrently solving systems of linear equations and includes procedures such as regression, factor analysis and path analysis (Beran & Violato, 2010; Stein, Morris & Nock, 2012). SEM with Smart PLS involve performing a procedure known as Confirmatory Factor Analysis (CFA) and path analysis (Chen, Zhang, Liu & Mo 2011:243) concurrently. The function of CFA is to evaluate how well the latent variables are measured by the observed variables (Chen et al., 2011) while that of path analysis is to investigate causal relationships among unobserved variables (Nusair, K., & Hua, N., 2010).

Scholars have advocated many advantages of PLS-SEM. They are as follows:

- SEM can 'tackle' research questions related to intricate causal relationships between unobserved variables (Nusair & Hua, 2010; Hair, Hult., Ringle & Sarstedt, 2016) with empirical data (Sarstedt et al. 2014);

- SEM can extend explanatory power and statistical efficiency for model examination with one complete model (Hair et al. 2016);
- It can include latent constructs in the analysis while accounting for measurement errors in the estimation process (Hair et al. 2016);
- SEM provides support for examining and validating hypotheses of causal relationships due not only to its ability to model measurement error, but also to its ability to do away with bias and distortion (Pugesek & Tomer 1995:449; Iriondo, Albert & Escudero 2003:367);
- "SEM minimizes the differences between the observed covariance and the model predicted covariance using methods such as the Maximum Likelihood algorithm to estimate the free parameters" (Malaeb et al. 2000);
- SEM can concurrently model and illustrate the direct and indirect interrelationships that exists among many dependent and independent constructs (Gefen, Straub & Boudreau 2000);
- SEM possess a gradual characteristic that allows it to produce separate and individually different coefficients (Jenatabadi & Ismail 2014:26);
- SEM technique allows for ensuring and evaluating a complete model generating goodness-of-fit statistics and assessing the overall fit (Hair et al. 2016);
- SEM can permit the modelling of graphic interfaces;
- SEM permits researchers to model mediator constructs and to examine the entire system of indicators therefore enabling the establishment of rational models that need simultaneous assessment (Kline & Klammer 2001); and
- SEM is an efficient and most favourable method for evaluating and examining the relationships among mediator constructs.

7.3.1 Reliability and Validity tests in Confirmatory Factor Analysis (CFA)

Once an appropriate overall fit was established, the following step was to assess reliability and validity, under the guide of previous literature (Byrne 1994; Hair et al. 2016). As advocated by Chau (1997) the squaring of factor loadings was conducted to assess item reliability. Item reliability recognizes "the amount of variance in an item due to underlying construct rather than to error" (Chau 1997). Discriminant and convergent validity was also examined by using the AVE as suggested by Hair et al. (2016). According to Nusair et al. (2010) a low-cross

correlation signifies discriminant validity while the strong loading of items on their familiar construct is an indication of convergent validity. Sarstedt et al. (2014) describes discriminant validity as the degree to which a construct is empirically different from other constructs in the model, both in terms of how it links with other constructs and in terms of how specifically the items represent only this single construct. Convergent validity alternatively is referred to as the degree to which a construct is represented by its measurement items (Sarstedt et al. 2014).

7.3.2 Path Modelling

The next phase of data analysis through the use of SEM involved path analysis (Beran & Violato, 2010; Stein et al. 2012). Path modelling describes the relationships between observed or measured variables and theoretical constructs (Roche, Duffield & White 2011) and tests the structural paths of the conceptualized research model. This SEM procedure was carried out in order to demonstrate and test the theoretical underpinnings of the study and the significance of the relationships between model constructs (Jenatabadi et al. 2014). The study's structural model was evaluated by examining the p-values as well as standardized regression coefficients. In conducting path modelling, a particular responsibility is to explain standardized regression coefficients as well as predictive ability (Wu, 2010).

7.3.3 Summary of Measurement Accuracy Statistics

Based on the data collection, below table highlights the basic measurements of mean, standard deviation along with factor loading.

Table 7.5: Scale accuracy analysis

Research constructs		Scale item		Cronbach's test				Factor loadings
		Mean	SD	Item-Total	□ value	CR	AVE	
Green Technology	GT1	4,10	1,941		**0,908**	**0,924**	**0,552**	0,851
	GT2	3,74	1,985					0,742
	GT3	4,28	1,760					0,636
	GT4	3,54	1,831					0,772
	GT5	3,92	1,942					0,77
	GT6	4,10	1,910					0,823
	GT7	3,57	1,849					0,785
	GT8	3,84	1,710					0,566
	GT15	3,93	1,925					0,703
	GT16	3,80	1,952					0,739
Green Product / Services Innovation	GPS1	3,77	1,938		**0,837**	**0,892**	**0,674**	0,787
	GPS2	4,15	1,863					0,769
	GPS5	4,16	1,937					0,886
	GPS6	3,83	1,945					0,836
Green Process Innovation	GP1	3,98	2,031		**0,904**	**0,929**	**0,722**	0,835
	GP2	3,98	2,022					0,874
	GP3	3,80	2,044					0,852
	GP4	4,01	1,886					0,863
	GP5	4,09	2,013					0,824
Customer Interface	CI1	3,96	1,834		**0,917**	**0,929**	**0,503**	0,696
	CI2	4,00	1,771					0,72
	CI3	4,01	1,946					0,733
	CI4	4,14	1,836					0,78
	CI10	3,70	1,831					0,653
	CI11	4,07	1,802					0,643
	CI12	4,13	1,719					0,733
	CI14	3,97	1,798					0,725
	CI15	3,97	1,830					0,689
	CI17	4,07	1,801					0,687
	CI18	4,05	1,847					0,721

	CI19	4,16	1,780					0,668
	CI20	3,91	1,795					0,755
Infrastructure Management	IM2	3,91	1,782		**0,915**	**0,930**	**0,626**	0,772
	IM3	3,87	1,947					0,759
	IM5	3,93	1,829					0,791
	IM8	4,12	1,886					0,786
	IM9	3,82	1,873					0,82
	IM10	3,69	2,022					0,75
	IM11	4,25	1,959					0,826
	IM12	3,85	1,953					0,823
Sustainability	S2	4,12	1,901		**0,853**	**0,895**	**0,629**	0,804
	S3	4,22	1,892					0,789
	S6	4,15	1,879					0,777
	S7	4,20	1,826					0,789
	S8	4,10	1,812					0,807
Financial Aspects	FA1	4,22	1,962		**0,931**	**0,941**	**0,574**	0,722
	FA2	3,72	1,876					0,647
	FA3	3,88	1,992					0,614
	FA4	4,20	1,898					0,727
	FA5	4,02	1,882					0,672
	FA6	4,32	1,615					0,774
	FA7	4,40	1,604					0,791
	FA8	4,38	1,639					0,799
	FA9	4,30	1,558					0,816
	FA10	4,39	1,657					0,819
	FA11	4,39	1,642					0,833
	FA12	4,14	1,636					0,837

SD= Standard Deviation CR= Composite Reliability AVE= Average Variance Extracted

** Scores: 1 – Strongly Disagree; 5 –Agree; 7 – Strongly Agree*

7.3.3.1 Cronbach's Alpha test

Literature asserts that a higher level of Cronbach's coefficient alpha indicates a higher reliability of the measurement scale (Chinomona & Pretorius, 2011). From the results provided in Table 7.5: Scale accuracy analysis, the Cronbach's Alpha value for each research construct ranges from 0.837 to 0.931 and as these are above 0.6 as recommended by Nunnally and Bernstein (1994), validity is indicated. Furthermore, the item to total values ranged from 0.503 to 0.722 and were therefore above the cut-off point of 0.5 as advised by Dunn, Seaker and Waller (1994). The Cronbach's Alpha results indicated in Table 7.5: Scale accuracy analysis, therefore validate the reliability of measures used in the current study.

7.3.3.2 Composite Reliability (CR)

The Composite Reliability test was also conducted in order to examine the internal reliability of each research construct, as recommended by Chinomona (2011:108) and Nunnally (1967). By means of the following formula, $CR\eta = (\Sigma\gamma yi)2 / [(\Sigma\gamma yi)2 + \Sigma\varepsilon i]$, the Composite Reliability was calculated and tabulated in Table 7.6.

Table 7.6: Composite Reliability Estimates

Research constructs		Factor loadings	Composite reliability (CR)		
			$(\sum\lambda Yi)^2$	$\sum\acute{\varepsilon}i$	CR
Green Technology	GT1	0,851	54,568	4,478	0,924
	GT2	0,742			
	GT3	0,636			
	GT4	0,772			
	GT5	0,77			
	GT6	0,823			
	GT7	0,785			
	GT8	0,566			

	GT15	0,703			
	GT16	0,739			
Green Product / Services Innovation	GPS1	0,787	10,745	1,305	0,892
	GPS2	0,769			
	GPS5	0,886			
	GPS6	0,836			
Green Process Innovation	GP1	0,835	18,046	1,389	0,929
	GP2	0,874			
	GP3	0,852			
	GP4	0,863			
	GP5	0,824			
Customer Interface	CI1	0,696	84,695	6,466	0,929
	CI2	0,72			
	CI3	0,733			
	CI4	0,78			
	CI10	0,653			
	CI11	0,643			
	CI12	0,733			
	CI14	0,725			
	CI15	0,689			
	CI17	0,687			
	CI18	0,721			
	CI19	0,668			
	CI20	0,755			
Infrastructure Management	IM2	0,772	40,031	2,990	0,930
	IM3	0,759			
	IM5	0,791			
	IM8	0,786			
	IM9	0,82			
	IM10	0,75			
	IM11	0,826			
	IM12	0,823			
Sustainability	S2	0,804	15,729	1,854	0,895
	S3	0,789			
	S6	0,777			

	S7	0,789			
	S8	0,807			
Financial Aspects	FA1	0,722	81,921	5,109	0,941
	FA2	0,647			
	FA3	0,614			
	FA4	0,727			
	FA5	0,672			
	FA6	0,774			
	FA7	0,791			
	FA8	0,799			
	FA9	0,816			
	FA10	0,819			
	FA11	0,833			
	FA12	0,837			

For the Composite Reliability to be accepted, the index should be greater than 0.7 (Hair, et al., 2009). In this regard, the results of Composite Reliability that range from 0.968 to 0.995 in Table 7.6 confirm the existence of internal reliability for all constructs of the study.

a) Green Technology

$(\Sigma\gamma yi)^2 = (0,851 + 0,742 + 0,636 + 0,772 + 0,77 + 0,823 + 0,785 + 0,566 + 0,703 + 0,739)^2 = 54.57$

$\Sigma\varepsilon i = (1\text{-}0.\ 851^2)+(1\text{-}0.\ 742^2)+(1\text{-}0.\ 636^2)+(1\text{-}0.\ 772^2) + (1\text{-}0.77^2) + (1\text{-}0.\ 823^2) + (1\text{-}0.\ 785^2) + (1\text{-}\ 0.566^2)+ (1\text{-}\ 0.703^2) +(1\text{-}0.739^2) = 4.478$

$CR = 54.57/(54.57+4.478) = 0.924$

b) Green Product / Service Innovation

$(\Sigma\gamma yi)^2 = (0,787 + 0,769 + 0,886 + 0,836)^2 = 10.745$

$\Sigma\varepsilon i = (1\text{-}0.787^2) + (1\text{-}0.769^2) + (1\text{-}0.886^2) + (1\text{-}0.836^2) = 1.305$

$CR = 10.745/(10.745 +1.305) = 0.892$

c) Green Process Innovation

$(\Sigma\gamma yi)^2 = (0{,}835 + 0{,}874 + 0{,}852 + 0{,}863 + 0{,}824)^2 = 18.046$

$\Sigma\varepsilon i = (1\text{-}0.835^2)+(1\text{-}0.874^2)+(1\text{-}0.852^2)+(1\text{-}0.863^2)+(1\text{-}0.824^2) = 1.389$

$CR = 18.046/(18.046+1.389) = 0.929$

d) Customer Interface

$(\Sigma\gamma yi)^2 = (0{,}696 + 0{,}72 + 0{,}733 + 0{,}78 + 0{,}653 + 0{,}643 + 0{,}733 + 0{,}725 + 0{,}689 + 0{,}687 + 0{,}721 + 0{,}668 + 0{,}755)^2 = 84.695$

$\Sigma\varepsilon i = (1\text{-}0{,}696^2) + (1\text{-}0.72^2) + (1\text{-}0.733^2) + (1\text{-}0.78^2) + (1\text{-}0.653^2) + (1\text{-}0.643^2) + (1\text{-}0.733^2) + (1\text{-}0.725^2) + (1\text{-}0.689^2) + (1\text{-}0.687^2) + (1\text{-}0.721^2) + (1\text{-}0.668^2) + (1\text{-}0.755^2) = 6.466$

$CR = 84.695/(84.695+6.466) = 0.929$

e) Infrastructure Management

$(\Sigma\gamma yi)^2 = (0{,}772 + 0{,}759 + 0{,}791 + 0{,}786 + 0{,}82 + 0{,}75 + 0{,}826 + 0{,}823)^2 = 40{,}031$

$\Sigma\varepsilon i = (1\text{-}0.772^2)+(1\text{-}0.759^2)+(1\text{-}0.791^2)+(1\text{-}0.786^2)+(1\text{-}0.82^2)+(1\text{-}0.75^2)+(1\text{-}0.826^2)+(1\text{-}0.823^2) = 2.990$

$CR = 40.031/(40.031+2.990) = 0.930$

f) Sustainability

$(\Sigma\gamma yi)^2 = (0{,}804 + 0{,}789 + 0{,}777 + 0{,}789 + 0{,}807)^2 = 15.729$

$\Sigma\varepsilon i = (1\text{-}0.804^2)+(1\text{-}0.789^2)+(1\text{-}0.777^2)+(1\text{-}0.789^2)+(1\text{-}0.807^2) = 1.854$

$CR = 15.729/(15.729+1.854) = 0.895$

g) Financial Aspects

$(\Sigma\gamma yi)^2 = (0{,}722 + 0{,}647 + 0{,}614 + 0{,}727 + 0{,}672 + 0{,}774 + 0{,}791 + 0{,}799 + 0{,}816 + 0{,}819 + 0{,}833 + 0{,}837)^2 = 81.929$

$\Sigma\varepsilon i = (1\text{-}0.722^2)+(1\text{-}0.647^2)+(1\text{-}0.614^2)+(1\text{-}0.727^2)+(1\text{-}0.672^2)+(1\text{-}0.774^2)+(1\text{-}0.791^2)+(1\text{-}0.799^2)+(1\text{-}0.816^2)+(1\text{-}0.819^2)+(1\text{-}0.833^2)+(1\text{-}0.837^2) = 5.109$

$CR = 81.929/(81.929+5.109) = 0.941$

7.3.4 Average Variance Extracted (AVE)

According to Chinomona (2011) "The average variance extracted estimate reflects the overall amount of variance in the indicators accounted for by the latent construct". A good representation of the latent construct by the item is identified when the variance extracted estimate is above 0.5 (Sarstedt et al. 2014; Fraering & Minor 2006). Therefore the results of AVE that range from 0.744 to 0.988 in Table 7.6 authenticate good representation of the latent construct by the items. This section presents the manual calculation of the AVE for each variable by using the following formula: AVE = $\Sigma\gamma yi2 / [\Sigma\gamma yi2 + \Sigma\varepsilon i]$.

a) Green Technology

$(\Sigma\gamma yi)^2 = (0{,}851^2 + 0.742^2 + 0.636^2 + 0.772^2 + 0.77^2 + 0.823^2 + 0.785^2 + 0.566^2 + 0.703^2 + 0.739^2) = 5.52$

$\Sigma\varepsilon i = (1\text{-}0.851^2) + (1\text{-}0.742^2) + (1\text{-}0.636^2) + (1\text{-}0.772^2) + (1\text{-}0.77^2) + (1\text{-}0.823^2) + (1\text{-}0.785^2) + (1\text{-}0.566^2) + (1\text{-}0.703^2) + (1\text{-}0.739^2) = 4.478$

AVE = 5.52/(5.52+4.478) = 0.552

b) Green Product / Service Innovation

$(\Sigma\gamma yi)^2 = (0{,}787^2 + 0.769^2 + 0.886^2 + 0.836^2) = 2.69$

$\Sigma\varepsilon i = (1\text{-}0.787^2) + (1\text{-}0.769^2) + (1\text{-}0.886^2) + (1\text{-}0.836^2) = 1.305$

AVE = 2.69/(2.69 +1.305) = 0.674

c) Green Process Innovation

$(\Sigma\gamma yi)^2 = (0{,}835^2 + 0.874^2 + 0.852^2 + 0.863^2 + 0.824^2) = 3.61$

$\Sigma\varepsilon i = (1\text{-}0.835^2) + (1\text{-}0.874^2) + (1\text{-}0.852^2) + (1\text{-}0.863^2) + (1\text{-}0.824^2) = 1.389$

AVE = 3.61 /(3.61 +1.389) = 0.722

d) Customer Interface

$(\Sigma\gamma yi) = 0{,}696^2 + 0.72^2 + 0.733^2 + 0.78^2 + 0.653^2 + 0.643^2 + 0.733^2 + 0.725^2 + 0.689^2 + 0.687^2 + 0.721^2 + 0.668^2 + 0.755^2 = 6.534$

$\Sigma\varepsilon i = (1\text{-}0{,}696^2) + (1\text{-}0.72^2) + (1\text{-}0.733^2) + (1\text{-}0.78^2) + (1\text{-}0.653^2) + (1\text{-}0.643^2) + (1\text{-}0.733^2) + (1\text{-}0.725^2) + (1\text{-}0.689^2) + (1\text{-}0.687^2) + (1\text{-}0.721^2) + (1\text{-}0.668^2) + (1\text{-}0.755^2) = 6.466$

AVE = 6.534/(6.534+6.466) = 0.503

e) Infrastructure Management

$(\Sigma\gamma yi)^2 = 0.772^2 + 0.759^2 + 0.791^2 + 0.786^2 + 0.82^2 + 0.75^2 + 0.826^2 + 0.823^2 = 5.01$

$\Sigma\varepsilon i = (1-0.772^2)+(1-0.759^2)+(1-0.791^2)+(1-0.786^2)+(1-0.82^2)+(1-0.75^2)+(1-0.826^2)+(1-0.823^2) = 2.990$

AVE = 5.01/(5.01+2.990) = 0.626

f) Sustainability

$(\Sigma\gamma yi)^2 = 0.804^2 + 0.789^2 + 0.777^2 + 0.789^2 + 0.807^2 = 3.15$

$\Sigma\varepsilon i = (1-0.804^2)+(1-0.789^2)+(1-0.777^2)+(1-0.789^2)+(1-0.807^2) = 1.854$

AVE = 3.15/(3.15+1.854) = 0.629

g) Financial Aspects

$(\Sigma\gamma yi)^2 = 0.722^2+0.647^2+0.614^2+0.727^2+0.672^2 + 0.774^2 + 0.791^2 + 0.799^2+ 0.816^2 + 0.819^2 +0.833^2 +0.837^2= 6.89$

$\Sigma\varepsilon i = (1-0.722^2)+(1-0.647^2)+(1-0.614^2)+(1-0.727^2) + (1-0.672^2) + (1-0.774^2) + (1-0.791^2) + (1- 0.799^2)+ (1- 0.816^2) +(1-0.819^2) +(1-0.833^2) +(1-0.837^2)= 5.109$

AVE = 6.89/(6.89+5.109) = 0.574

7.3.5 Validity

Validity tests were conducted and convergent and discriminant validity were evaluated. Both tests are described below as well as the findings.

7.3.5.1 Convergent validity

Convergent validity determines the degree to which a construct converges in its indicators by giving explanation of the items' variance (Sarstedt et al. 2014). Factor loadings were also

examined in order to identify convergent validity of measurement items as recommended by Sarstedt et al. (2014). According to Nusair & Hua (2010) items exhibit good convergent validity when they load strongly on their common construct.

Table 7.7: Factor Loading

Research constructs		Factor loadings
Green Technology	GT1	0,851
	GT2	0,742
	GT3	0,636
	GT4	0,772
	GT5	0,77
	GT6	0,823
	GT7	0,785
	GT8	0,566
	GT15	0,703
	GT16	0,739
Green Product / Services Innovation	GPS1	0,787
	GPS2	0,769
	GPS5	0,886
	GPS6	0,836
Green Process Innovation	GP1	0,835
	GP2	0,874
	GP3	0,852
	GP4	0,863
	GP5	0,824
Customer Interface	CI1	0,696
	CI2	0,72
	CI3	0,733
	CI4	0,78
	CI10	0,653
	CI11	0,643

	CI12	0,733
	CI14	0,725
	CI15	0,689
	CI17	0,687
	CI18	0,721
	CI19	0,668
	CI20	0,755
Infrastructure Management	IM2	0,772
	IM3	0,759
	IM5	0,791
	IM8	0,786
	IM9	0,82
	IM10	0,75
	IM11	0,826
	IM12	0,823
Sustainability	S2	0,804
	S3	0,789
	S6	0,777
	S7	0,789
	S8	0,807
Financial Aspects	FA1	0,722
	FA2	0,647
	FA3	0,614
	FA4	0,727
	FA5	0,672
	FA6	0,774
	FA7	0,791
	FA8	0,799
	FA9	0,816
	FA10	0,819
	FA11	0,833
	FA12	0,837

Literature maintains that a loading that is above 0.5 signifies convergent validity (Anderson & Gerbing, 1988). In this regard, the final items used in the current study loaded well on their

respective constructs with the values ranging from 0.566 - 0.886 (see Table 7.7**:** Factor Loading). This therefore indicates good convergent validity where items are explaining more than 65% of their respective constructs. Furthermore, since CR values are above the recommended threshold of 0.7, this substantiates the existence of convergent validity.

7.3.5.2 Discriminant validity

Proceeding from the discussion of discriminant validity in chapter five, Hair, Hult, Ringle and Sarstedt (2015) assert that when determining if there is discriminant validity or not, what must be done is to identify whether the observed variable displays a higher loading on its own construct than on any other construct included in the structural model.

Table 7.8: Discrimination Validity Using Hetrotrait - Monotrait Ratio (HTMT)

	Customer Interface	Financial Aspects	Green Process Innovation	Green Product / Service Innovation	Green Technology	Sustainability of Business Model
Customer Interface						
Financial Aspects	0.855					
Green Process Innovation	0.738	0.654				
Green Product / Service Innovation	0.786	0.720	0.867			
Green Technology	0.785	0.674	0.771	0.891		
Sustainability of Business Model	0.862	0.778	0.803	0.816	0.783	
infrastructure Management	0.897	0.853	0.793	0.857	0.833	0.863

To check if there is discriminant validity is to assess if the correlation between the researches constructs is less than 1.0 as recommended by Chinomona (2011). As indicated in Table 7.8: Discrimination Validity Using Hetrotrait - Monotrait Ratio (HTMT) below, the inter-correlation values for all paired latent variables are less than 1.0 hence confirming the existence of discriminant validity.

7.3.5.3 Goodness of Fit

Hair et al. (2014) states in his recent book that: "Tenenhaus et al. (2004, 2005) proposed a PLS goodness-of-fit index (GoF) as 'an operational solution to this problem as it may be meant as an index for validating the PLS model globally (Tenenhaus et al., 2005, p.173)'. Henseler and Sarstedt (2013) recently challenged the usefulness of the GoF both conceptually and empirically. Their research shows that the GoF does not represent a goodness-of-fit criterion for PLS-SEM.

7.3.6 Structural Model Testing

As the second procedure in Structural Equation Modelling (Chen et al. 2011), structural modelling was conducted. Essentially, the procedure is conducted for the purpose of evaluating causal relationships among latent variables (Nusair & Hua, 2010). This procedure includes “multiple regression analysis and path analysis and models the relationship among latent variables” (Chen et al. 2011). Figure 7.5: Original Model below is a representation of the path model. Much like the CFA model, the ovals represent the latent variables while the rectangles represent the observed variables. The unidirectional arrow signifies the influence of one variable on another.

The below model shows the original model with all measurement items in measurement instruments. In all there were 79 measurement items. However, on analysis of these measurement items researcher realized that many were repeated and very close to each other. These items were removed and items were reduced to 57 measurement items. Figure 7.6: Final Model shows the final model with 57 measurement items.

Following final models, section presents the results of the hypotheses and the correlating path coefficients. The main advantage of using path modelling (over regression analysis), is that the indirect and total effects are analysed, as opposed to only analysing direct effects which are prevalent when using regression analysis (Keith, 2015). Furthermore, path analysis provides a clearer understanding of the cause and effect between variables and is often a better choice for the explanatory analysis of nonexperimental data (Keith, 2015). In Table 7.9: Hypothesis testing results, the path coefficients reflect the nature of the strength between the variables: the higher the value, the stronger the relationship. To detect whether the hypotheses are supported or not, the p-values are analysed. At a 95% level of significance, the supported hypotheses are indicated with three asterisks (***).

Figure 7.5: Original Model

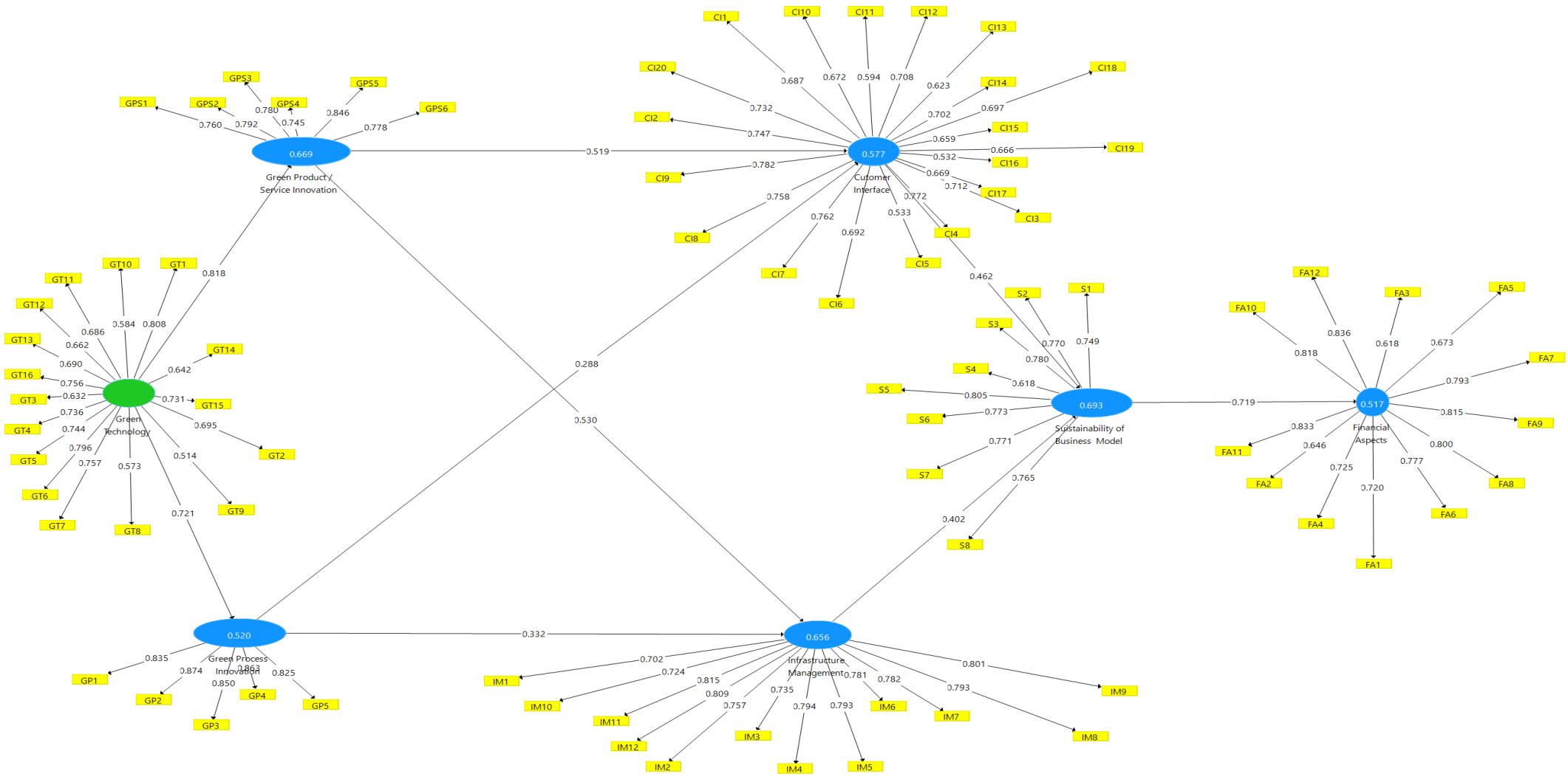
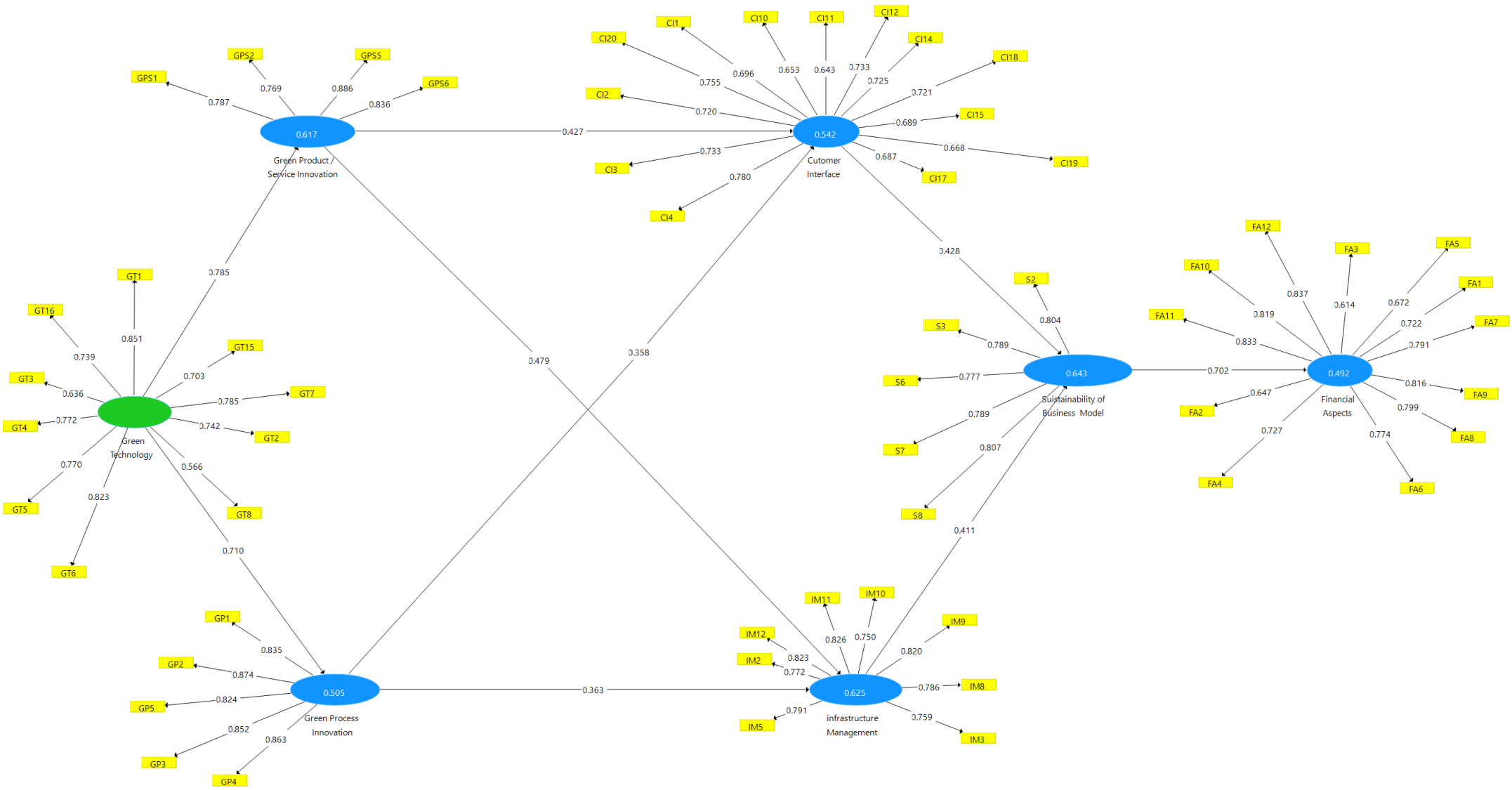


Figure 7.6: Final Model



7.3.6.1 Hypothesis testing

As the hypothesized measurement and structural model has been assessed and finalized, researcher examined relationships among latent variables by path analysis (Nusair & Hua 2010). According to Byrne (2001) and; Nusair and Hua (2010), SEM asserts that particular latent variables directly or indirectly influence certain other latent variables with the model, resulting in estimation results that portray how these latent variables are related.

Table 7.9: Hypothesis testing results

Path Coefficients	Hypothesis	Path Coeff.	P Value	Rejected / Supported
Green Technology -> Green Process Innovation	H1	0.710	***	Supported and Significant
Green Technology -> Green Product / Service Innovation	H2	0.785	***	Supported and Significant
Green Process Innovation -> Customer Interface	H3	0.358	***	Supported and Significant
Green Process Innovation -> infrastructure Management	H4	0.363	***	Supported and Significant
Green Product / Service Innovation -> Customer Interface	H5	0.427	***	Supported and Significant
Green Product / Service Innovation -> Infrastructure Management	H6	0.479	***	Supported and Significant
Infrastructure Management -> Sustainability of Business Model	H7	0.411	***	Supported and Significant
Customer Interface -> Sustainability of Business Model	H8	0.428	***	Supported and Significant
Sustainability of Business Model -> Financial Aspects	H9	0.702	***	Supported and Significant

*** Significant at 0.05 significance level

For this study, estimation results elicited through hypothesis testing are indicated in Table 7.9. The table indicates the proposed hypotheses, path coefficients, t-statistics and whether a hypothesis is rejected or supported. Literature asserts that t >1.96 are indicators of relationship significance and that higher path coefficients indicate strong relationships among latent variables (Chinomona, Lin, Wang & Cheng 2010).

Upon examining the results in Table 7.9 (above), it was found that all nine hypotheses are significant and supported. More specifically, the strongest relationship was found to be hypothesis H2, which tested the relationship between Green Technology and Green Product / Service Innovation (0.785). This indicates that Green Technology has a strong positive influence on Green Product / Service Innovation Thus there has to be strong Product / Service innovation for Green Technology to exist. Furthermore, hypotheses H1, is also strong between Green Technology and Green Process Innovation (0.710). This signifies that if Green Technology exist, there is strong chances of innovation in Product / Service and Process. The weakest relationships were found to be hypotheses H3, Green Process Innovation and Customer Interface. (0.358), H4, Green Process Innovation and Infrastructure Management (0.363). The five remaining hypotheses' (H5, H6, H7, H8, H9) indicate moderately strong relationships with path coefficient estimates ranged between 0.411 and 0.702. To conclude, the results support all nine proposed hypotheses with Green Technology and Product /Service innovation the strongest relationship, while Infrastructure Management and Sustainability of Business Model having the weakest relationship.

H1: There is positive relation between Green Technology and Green Process Innovation

The results obtained following the test of H1 confirmed that they are an association between Green Technology and Green Process Innovation. A path coefficient of 0.710 was realized after testing H1. This means that Green Technology has strong influence on Green Process Innovation. Furthermore, the results indicate that the relationship of Green Technology and Green Process Innovation are positively related in a significant way.

H2: There is a positive relationship between Green Technology and Green Product/ Service Innovation.

The findings indicate that there is a positive relationship between Green Technology and Green Product / Service Innovation. It indicates that Green Technology had significant impact on Green Product/ Service Innovation. Thus, for Green Technology to exist there has to be innovation in Product/ Service and Process. The strength of the relationship (0.785) is similar to that of H1, therefore confirmed to be strong.

H3: There is a positive relationship between Process Innovation and Customer Interface.

The third hypothesis was found to be significant. The proposed hypothesis was therefore supported, and this indicates that Process Innovation Influences Customer Interface. In other words, customers are impacted by Process Innovation is positive way. However, the strength of this relationship is explained by the path coefficient of 0.358, indicating relatively weak relationship.

H4: There is a positive relationship between Process Innovation and Infrastructure Management.

The results obtained following the test of H4 confirmed that they are an association between Process Innovation and Infrastructure Management. A path coefficient of 0.363 was realized after testing H4. This means that Process Innovations does have positive influence on Infrastructure Management.

H5: There is a positive relationship between Green Product / Service Innovation and Customer Interface.

The results obtained following the test of H5 confirmed that they are a relationship between Green Product / Service innovation and Customer Interface. A path coefficient of 0.427 was realized after testing H5. This means that Green Product / Service innovation has a stronger effect on Customer Interface. Furthermore, the results indicate that Green Product / Service innovation and Customer Interface are positively related in a significant way.

H6: There is a positive relationship between Green Product / Service Innovation and Infrastructure Management.

It was found that Hypothesis H6 is supported, thus indicating that Green Product / Service Innovation has a positive influence on Infrastructure Management. In other words, Infrastructure Management does get impacted by Green Product / Service Innovation and is accordingly modified. The path coefficient is 0.479, therefore indicating a moderate relationship between Green Product / Service Innovation and Infrastructure Management.

H7: There is a positive relationship between Infrastructure Management and Sustainability of Business Model.

The relationship between Infrastructure Management and Sustainability of Business Model was found to be significant. The hypothesis proposed that a positive relationship exists and from the findings it is evident that Infrastructure Management has a positive impact on Sustainability of Business Model. Therefore, the more Infrastructure in managed in respect to Green Technology, the more likely there is Sustainability of Business Model. The strength of the relationship is reflected by the path coefficient of 0.411, which indicates a weak relationship between the variables

H8: There is a positive relationship between Customer Interface and Sustainability of Business Model.

It was found that Hypothesis 8 is supported, thus indicating that Customer Interface has a positive influence on Sustainability of Business Model. In other words, customers interface has an impact towards Sustainability of Business Model. The path coefficient is 0.428, therefore indicating a moderate relationship.

H9: There is a positive relationship between Sustainability of Business Model and Financial Aspects.

The last hypothesis (H9) was supported, which indicates that Sustainability has a positive influence on Financial Aspects. Upon examination of the path coefficient (0.702), the results

reflect a strong relationship, therefore confirming a positive relationship. This means that if a Business Model is Sustainable, it has positive impact on Financial Aspects of the organization.

7.3.6.2 Overall analysis of hypotheses testing results

Individual path coefficients of H1, H2, H3, H4, H5, H6, H7, H8 and H9 were 0.710, 0.785, 0.358, 0.363, 0.427, 0.479, 0.411, 0.428 and 0.702 respectively. These results indicate that Green Technology, Green Process Innovation, Green Product / Service Innovation, Customer Interface, infrastructure Management, Sustainability of Business Model, Financial Aspects all have strong relationships and are significant.

7.3.7 Summary

To conclude, this chapter provided the statistical analysis and results obtained from the data collected on Green Technology impacts various aspects resulting in Sustainable Business Models. The following was discussed: an overview of the descriptive statistics, an analysis of the reliability and validity of the measurement instruments, and path modelling with the results from the hypotheses were conducted and presented. Structural Equation Modelling was undertaken subsequently. All nine hypothesized relationships were supported in a significant way.

CHAPTER 8: CONCLUSION, RECOMMENDATIONS AND CONTRIBUTIONS

8.1 Introduction

This chapter presents an overview of the main findings of the research study. Furthermore, it discusses the interpretation of all three phases of present exploratory research. Followed by, discussion on theoretical and managerial implications of the study, the contributions and limitations, and lastly, recommendations for future research.

8.2 Overview of the study objectives

The primary objective of the research study is to design a new green business model innovation for sustainable development across companies with focus on green technologies for BOP markets. The secondary objective is to identify and compare the differences and similarities of green business model innovation for BOP markets of both South Africa and India. Furthermore, the specific objectives of present research includes identification of key factors related to BMI and BOP markets for green technologies and understanding underpinning relationships among these factors.

8.3 Conclusion

The overall conclusion of the present research is the development of green business model innovation for sustainable development. The green business model innovation for sustainable development applies to large companies with focus on green technologies for BOP markets. The conclusion is discussed under the following headings –

8.3.1 Conclusion of Qualitative phase 1 and 2

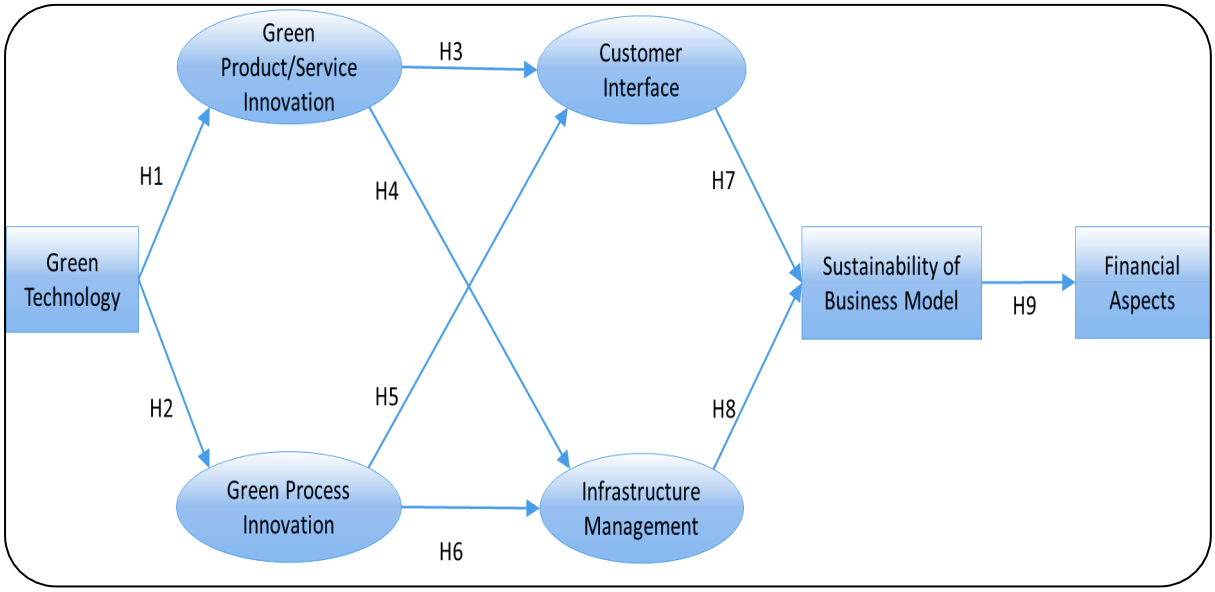
To conclude, all major themes and sub-themes from qualitative analysis of data from South Africa and India, were found to be relevant to business model innovation of companies, particularly operating in these two emerging countries. It was found that innovation is driven by needs and aspirations of consumers at bottom of pyramid (BOP). Role of multiple stakeholders, innovative distribution channels, and ultimately commercialization of innovation, ensure effective adoption of innovation at BOP. Various features of business model innovation, such as product improvement, providing competitive edge with other firms, generating new and innovative ideas from identified felt needs of BOP consumers, all this leads to bring innovation to business model for sustainability. Customer interaction was identified as one of the significant aspect. It involves identification of opinion leaders or influencers, customer education, understanding of demographics and psychographics of customers, feedback mechanism, etc. Localization of firm's offerings bring innovation and customer value. Therefore, value for sustainability exist in a business practices/processes or in business's product or service offerings, or it can be both. Increase challenges to finance green technologies leads to new forms of revenue schemes and financial resources. However, recently, some companies are using 'greenwashing' as a strategy to falsely create illusion of sustainable development among potential financers. Technology is identified as key success driver for innovation and requires considerable investments on long-term basis. Implementation of green technologies lead to considerable implications on operations of businesses. This creates operational pressures, which further limits implementation of innovation. Therefore, need-based product and service offerings are required to market by firms, especially to price sensitive BOP consumers. Besides operational management, infrastructure management, also aids in green business model innovation for sustainability. It helps in development of core competencies by involving partners. Sustainability of green business model innovation, needs firm's equal attention to all three pillars – environmental, social and economic. Financial support from government agencies, along with policies fostering conducive sustainable practices brings positive changes in business model. Factors like social environment, learning and training, also helps to disintegrate and re-integrate business model innovation. Cross-learning was found to be most effective in bringing innovative ideas from employees for development of new business model innovation in a company.

Hence, business can be made green and sustainable, by providing green products or services that green other businesses, or by greening their own processes or part of it. The integration of green technology either as product/ service offerings, or as part of process of business, impacts the performance of offerings (product/service/process). This performance of products/services/processes, bring changes in various elements of business model. These elements are infrastructure management and customer interaction. The changes in these two elements impacts the sustainability of business model, and ultimately, impacts the financial aspects of company.

Based on qualitative findings, the researcher proposed a conceptual framework of green business model innovation for sustainability, depicting possible prepositions and hypothesis. Refer Figure 8.1: Conceptual framework.

Figure 8.1: Conceptual framework

(Developed by researcher, 2016)



8.3.2 Conclusion of Quantitative phase 3

To conclude quantitative findings from phase 3 of current research, all nine hypotheses are significant. Therefore, the integration of green technology is positively associated with performance of green product or service innovation, and green process innovation. Further, the performance of green product or service or process is positively associated with customer interface and infrastructure management of business. And finally, infrastructure management and customer interface positively impacts sustainability of business model innovation, ultimately leading to positive impact on financial aspects of company. From the findings, it is evident that the strongest relationship was found to be hypothesis, which tested the relationship between Green Technology and Green Product / Service Innovation (0.785). This indicates that Green Technology has a strong positive influence on Green Product / Service Innovation. Thus, there has to be strong Product / Service innovation for Green Technology to exist. Furthermore, also strong relation exists between Green Technology and Green Process Innovation (0.710). This signifies that if Green Technology exist, there is strong chances of innovation in Product / Service and Process. The weakest relationships were found to be among, Green Process Innovation and Customer Interface. (0.358), Green Process Innovation and Infrastructure Management (0.363). The five remaining hypotheses indicate moderately to strong relationships with path coefficient estimates ranged between 0.411 and 0.702. To conclude, the results support all nine proposed hypotheses with Green Technology and Product /Service innovation being the strongest relationship, while Infrastructure Management and Sustainability of Business Model having the weakest relationship.

8.3.3 Interpretation of phase 1, 2 and 3

The present research study (1) firstly, analysed and understand factors affecting the existing business models of various organizations with green technologies targeting BOP markets for sustainable development. (2) Secondly, the research brought an identification and understanding of number of key factors related to BMI and BOP consumers for green technologies and proposed a conceptual framework based on a series of underpinning relationships among these factors. (3) And lastly, it testified the conceptualized theoretical

framework on green business model innovation for sustainable development for BOP markets, among large companies.

8.4 Contributions

The contributions of this research study are four-fold – conceptual, methodological, theoretical and managerial, as discussed below –

8.4.1 Conceptual Contributions

Conceptually, the present study makes a very significant contribution to research in both South African and Indian context. This study was conducted amongst the large companies in South Africa and India, with focus on marketing green technologies to BOP consumers. More specifically, it studied how the integration of green technologies brings changes in the BMI of these companies. Previous studies have only focused on BMI in general and broad context, whereas, this research investigates the impact of green technologies on various elements of BMI and thereby constructs within specifically emerging markets (South Africa and India) context. By exploring the importance of green technologies (either as products/services or processes) and BMI for sustainability, this adds to contextual knowledge on green business model innovation for sustainability. Furthermore, the interrelated framework of theoretically existing concepts of BMI, BOP and green technologies for sustainability, provides a holistic conceptual framework, which have not been studied previously.

8.4.2 Methodological Contribution

The methodological approach used in the present research also significantly contributes to the existing literature. The study undertook a sequential exploratory mixed method approach, and was carried out in three phases. Previously, no such research has been done using a mixed method approach. The present research spreads into three phases – phase 1, exploration and

study of business model innovation of identified industries/sectors with green technologies, targeting BOP segment for sustainable development, using qualitative research methods to formulate multiple cases. Phase 2, identification of underpinning factors related to BMI, sustainable development and BOP consumers for green technologies, using qualitative methods and content analysis of results from phase 1, leading to design and development of theoretical framework of green business model innovation for South Africa and India. Phase 3, testing of conceptualized framework of green business model innovation for sustainable development using quantitative research methods. The use of both inductive and deductive approaches across phases of present research, makes it even more unique. The combination of qualitative (constructivism) and quantitative (postpositivism) approaches, brought a deeper understanding of research problems. This combination of research approaches has not been used previously in any of earlier researches in related areas.

8.4.3 Theoretical Contributions

Theoretically, the present research study makes a significant contribution in context of emerging economies: South Africa and India. This study was conducted on employees of large companies, who are targeting BOP segment with green technologies for sustainable development. Previous research shows the importance of investing in the BOP segment (Prahalad & Hart, 2008). Teece (2010) recognises the lack of the business model concept within economics or business study topics. Chesbrough (2010) suggests that companies may have extensive investments and processes for exploring new technologies, however they often lack the ability to innovate their business models to facilitate the new technologies. Teece (2010) and; Chesbrough and Rosenbloom (2002) finds a crucial link between business models and technological innovation. Prahalad and Hart (2008) suggest the crucial link between technological innovation and the bottom of the pyramid. However, there is very limited research that links these concepts together.

Very limited research evidence is present in literature on link between concepts of green technologies and business model innovation (Bisgaard, Henriksen, & Bjerre, 2012). Infact, there is no internationally acknowledged definition of green business model innovation,

especially addressing integration of green innovation in form of green products, or services and green processes.

Moreover, these linkage of above concepts – BMI, BOP and green technology, has not been sufficiently explored with focus on emerging economies like South Africa and India, for sustainable development.

Therefore, the present research paper addresses the above gap. The study investigates and conceptualizes green business model innovation for sustainable development at BOP markets. It links the three concepts – business model innovation, bottom of pyramid and green technology, to achieve sustainable development and originates a conceptual framework depicting the relationship between above concepts. The validated conceptual framework highlights the integration of green technology in the form of green products/services or process, impacting the performance of main pillars of business model innovation, as well as, influences the sustainability of business model.

8.4.4 Managerial Contributions

The present research offers several practical managerial implications for business developers, managers and marketers. The results of the present study provide guidelines to the companies targeting BOP with green technologies for sustainable development. The study further brings an understanding of different ways of incorporating green technologies and achieving sustainable development of business model innovation. Through case-studies, the study provides examples of green business model innovation for sustainability in emerging countries (South Africa and India). Companies targeting BOP segment in emerging countries, can use present research as a guideline to develop common green business model innovation for sustainable development.

Recent deliberations and increase focus of firms on innovation of green technologies (Bisgaard, Henriksen, & Bjerre, 2012), is paving way for companies to adopt cleaner production methods promoting green economic growth (Bobonea & Joia, 2012). It is evident from research, that integration of green technologies brings positive impact on performance of green product or service innovation, viz-a-viz green process innovation. Therefore, companies should make considerable investment on research and development of green technologies. Technology and innovation, has been identified as a success key to achieve business model for sustainable development (Boons & Ludeke-Freund, 2013). The research also depicts that performance of green product or service or process innovation, has positive influence on infrastructure management and customer interface of business model. Thus, these components of business model need to be carefully planned and considered by managers, during integration of green technologies. Moreover, the results of this study demonstrated that infrastructure management and customer interface, positively influence sustainability of business model, and further influences the firm's financial aspects. There is consequently no doubt that the present study will provide managers, marketers and business developers with a better understanding of the crucial role of integration of green technologies on aspects of business model to bring innovation for BOP and ultimately achieving sustainable development.

8.5 Limitations of the study

Although this research study has made significant contributions to literature and marketing practitioners, but it has some limitations. The present research selected case-studies based on desk research and recommendations from experts. The sample was however small and qualitative data analysis is based on limited number of companies. The industry specific case-studies provide a general impression of characteristics of successful large companies with green business model innovation for sustainability. Therefore, case-studies may not be considered as representative for the group of companies in entire industry, working with green business model innovation. Another limitation of the research is that it may be biased towards large companies. The study was conducted on large companies, as it is easier to identify their actions and performance. Large firms seem to embrace business model innovation to foster innovation and bring sustainable development. Moreover, these companies have better well-defined business models and have sufficient financial muscle to invest in research and

development of green technologies. The study was limited to two emerging countries, South Africa and India. Therefore, the results may not be generalized to other emerging economies or developing countries. The quantitative survey was online conducted on employees of large companies. There is possibility of the respondent not having completed the survey personally. They could ask their peers, colleagues or friends to complete the survey. The survey language was designed in English, which is not the first language of the majority of respondents, can also possess limitation on responses. Lastly, due to time and money constraint, the conceptualized framework of green business model innovation for sustainability, was quantitatively tested in South Africa only.

8.6 Recommendations for further research

The results of the present research significantly contribute to the literature on business model innovation, sustainable development, green technologies, BOP. The critical analysis of the development of framework of green business model innovation for sustainable development at BOP segment, provides business developers and managers, provides imperative guidelines. Having highlighted the importance of present research study, future research in the same area will compliment this study. Future research could address green business model innovation for sustainability, in other geographical locations in other emerging countries. Another unexplored area of research, is to investigate differences between business model innovation targeting BOP in urban and rural areas. A comparative study between emerging economies and developed countries could also be conducted in future. The present study is from industry-perspective, future studies can further explore consumer-perspective on green technological innovations and sustainable development.

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APPENDIX A: RESEARCH INTERVIEW SCHEDULE

Interview Schedule

PhD Thesis on Business Model Innovation for Sustainable Development

Interview No	
Position of interviewee	
Sector	
Name of the company	
Type of Business Model Innovation	
Ownership of Company	Private/Public/Joint venture/ PPP/ Any other ……
Major products/services	
Date of Interview	

General viewpoints

1. Why do you think innovation is important in the company?
2. 'Successful innovations change the people that use them'. What do you think about this?
3. How are you adapting your work to changes in industries that you are associated with?
4. How do you think an organization can be more effective?

5. How do you encourage innovation in the companies that you have worked?
6. How does innovation enhance the quality of work in the company?
7. What are the limitations that company faces when it comes to innovation?
8. What innovative tasks/activities a company takes into account for success?

Business Model Innovation

Value Prepositions

9. What makes a business model green?
10. In your view, how you think that present green business model captures and delivers value to customers? Can you cite few examples?

Innovativeness

11. What can be innovative features of green business model?
12. How you think a company can built its ability to innovate at scale?
13. How you think a company can go about codifying the business model to make it a green business model?

Customer Relationships

14. In your opinion, what role customers can play in the innovation strategy?
15. Did the innovation of company's business model lead to any relationships with your customers?

Target Customers (BOP)

16. According to you, what changes are required when company move its target segment to BOP (bottom of pyramid)?
17. Please specify any three most important challenges that you think are faced by companies while re-inventing their business model for BOP sector.

Channels

18. According to you, what steps/changes that a company takes to commercialize their products/services to BOP sector?
19. Did the change in target market to BOP, lead to new ways of delivering company's products/services?

Revenue Model

20. What kind of payment schemes are in green business model innovation?
21. Did the innovation of company's business model lead to any new form of revenue schemes?
22. As per you, please specify any three most important challenges while re-inventing revenue scheme of business model?

Partner Network

23. Do you think it is correct to involve partners in the development and implementation of business model innovation?
24. If yes to above question, how they can be involved? Please share few examples, if any.

Core competencies

25. What kind of core competencies are required to realize a green business model innovation?
26. As per you, please specify any three most important competencies?

Cost Structure

27. Do you think the business model innovation for BOP sector lead to any significant changes in the cost structure of companies?
28. If yes to above question, how can those changes be incorporate to make it suitable/affordable for BOP consumers?

Value Configuration

29. What kind of challenges companies face while bringing changes to value chain of business model innovation?

Conditions behind business model innovation

30. In your view, what market conditions encourage company's business model innovation?
31. What market conditions formed as barriers (if any) to business model innovation?

32. How you think competitors can affect the development of business model innovation?

Financial resources for business model innovation

33. What types of financial resources are required in the development of company's business model innovation?
34. What kind of changes are brought in company's financing formats to re-invent their business model for BOP sector?

Other aspects of business model innovation

35. What kind of environmental impact does a business model innovation bring about? Please specify both positive and negative impacts.
36. In your opinion, what kind of economic impact does a business model innovation bring about? Please specify benefits. (job creation/return on investment/better performance/increase in sales, etc)
37. What kind of technological impact does a business model innovation bring about? Please specify both positive and negative impacts.
38. What you think are the most important drivers (internal/external factors) to a business model innovation?
39. What you think are the most important barriers (internal/external factors) to a business model innovation?
40. Please specify, how can a company overcome barriers to its business model innovation?
41. In your opinion, can re-invented green business model innovation be applied throughout the emerging markets? Please quote few examples, if any.

Thankyou so much for your valuable responses. This information will be used purely for academic and research purposes. Confidentiality and anonymity is guaranteed.

APPENDIX B: RESEARCH QUESTIONNAIRE

Research Title: Business Model Innovation for Sustainable Development: Green Technology and BoP (Bottom of pyramid) in Emerging Countries: South Africa and India

OPINION SURVEY

Perceptions of employees on business model innovation for sustainability: bottom of pyramid and green technology

Please answer the following questions by marking appropriate answer(s) with an X. Your responses will be kept fully confidential and will be strictly use for research purpose only.

SECTION A: GENERAL INFORMATION

This section seeks your background information. Please indicate your answer by marking (X) on the appropriate box.

1. Please indicate your gender

Male	1	Female	2	Others	3

2. Please indicate your industry/sector category

Banking	1
Retail	2
Pharmaceuticals	3
Healthcare	4

FMCG/Durables	5
Public sector	6
Energy/Power sector	7

IT services/products	8
Community services	9
Consultancy/marketing services	10
Telecoms/mobile communication	11
Production industries	12
Entertainment	13
Any other ……	14

3. Please indicate your position occupied in your company

Owner	1
Co-owner	2
Senior Manager	3
Middle-level manager	4
Employee	5

4. Please indicate your functional area in your company

Marketing/sales	1
Finance	2
Manufacturing	3
Operations	4
Purchasing/supply chain	5
Human resources	6
Logistics	7

5. Please indicate number of years you are involved in green practices/Bottom of Pyramid

<1 year	1
2-3	2
4-6	3
>6	4

The questions below will seek your opinions regarding green business model innovation for BoP (Bottom of Pyramid) sector. Green business model innovation results from integration of green technology to bring green innovation in either product/service offerings of the company; or to bring green innovation in processes of the company.

Below are statements about **Green Technology, Green Product/Service Innovation, Green Process Innovation, Sustainability of Business Model, Customer Interface, Infrastructure Management and Financial Aspects.** You can indicate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 5 point scale below:

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly Agree

SECTION B: GREEN TECHNOLOGY

Please indicate to what extent you agree or disagree with each statement regarding integration of green technology in a company.								
		Strongly disagree	**disagree**	**Slightly disagree**	**neutral**	**Slightly agree**	**agree**	**Strongly agree**
		1	2	3	4	5	6	7
GT1	The company purchases environment-friendly raw materials							
GT2	The company substitute environment harmful raw materials with friendly ones							
GT3	The company purchases recycled raw materials							
GT4	The company use suppliers that meet stipulated environmental criteria							
GT5	The company is in compliance with international environmental regulations in purchasing.							
GT6	The company uses environment-friendly design & materials in packaging							
GT7	The company uses cleaner technology in packaging							
GT8	The company uses recycled packaging materials that are purchased externally							
GT9	The company takes back waste packaging materials from customers for recycling							
GT10	The company is into optimisation of efficiency through the use of energy efficient vehicles							
GT11	The company is into optimisation of distribution process through better routing and scheduling							
GT12	The company uses integrated delivery to reduce transportation							
GT13	The company uses environment-friendly technology in transportation							
GT14	The company manages reverse material flows to reduce transportation							
GT15	The company's management adopts green technology in product/service innovation							
GT16	The company's management adopts green technology in process innovation							

SECTION C: GREEN PRODUCT/SERVICE INNOVATION

Please indicate to what extent you agree or disagree with each statement regarding innovation of green product/service in a company.

		Strongly disagree	disagree	Slightly disagree	neutral	Slightly agree	agree	Strongly agree
		1	2	3	4	5	6	7
GPS1	The company chooses the materials of the product that produce the least amount of pollution for conducting the product development or design.							
GPS2	The company chooses the materials of the product that consume the least amount of energy and resources for conducting the product development or design.							
GPS3	The company uses the fewest amount of materials to comprise the product for conducting the product development or design.							
GPS4	The company would circumspectly deliberate whether the product is easy to recycle, reuse, and decompose for conducting the product development or design.							
GPS5	Overall, company can said to have adopted green product innovation							
GPS6	Overall, company can said to have adopted green service innovation							

SECTION D: GREEN PROCESS INNOVATION

Please indicate to what extent you agree or disagree with each statement regarding innovation of green process in a company.

		Strongly disagree	disagree	Slightly disagree	neutral	Slightly agree	agree	Strongly agree
		1	2	3	4	5	6	7
GP1	The manufacturing process of the company effectively reduces the emission of hazardous substances or waste.							
GP2	The manufacturing process of the company recycles waste and emission that allow them to be treated and re-used.							
GP3	The manufacturing process of the company reduces the consumption of water, electricity, coal, or oil.							
GP4	The manufacturing process of the company reduces the use of raw materials.							
GP5	Overall, company can said to have adopted green process innovation							

SECTION E: SUSTAINABILITY OF BUSINESS MODEL

Please indicate to what extent you agree or disagree with each statement regarding sustainability of business model in a company.								
		Strongly disagree	**disagree**	**Slightly disagree**	**neutral**	**Slightly agree**	**agree**	**Strongly agree**
		1	2	3	4	5	6	7
S1	The company maximise material and energy efficiency (egg: low-carbon manufacturing solutions, lean/additive manufacturing, de-materialisation of product/packaging, increased functionality)							
S2	The company create value from waste (egg: circular economy, industrial symbiosis, use excess capacity, sharing assets or collaborative consumption, reuse, recycle, re-manufacture)							
S3	The company substitute with renewables and natural processes (egg: use of renewable energy sources, solar and wind based energy innovations, blue economy, green chemistry, slow manufacturing)							
S4	The company deliver functionality rather than ownership (egg: product-oriented/use-oriented/result-oriented PSS (Product Service System), private finance initiative)							
S5	The company adopt a stewardship role (egg: biodiversity protection, promoting consumer care, consumer health and well-being, ethical trade, resource stewardship, radical transparency about environmental and social impacts)							
S6	The company encourages sufficiency (egg: consumer education, communication and awareness, demand management, product longevity, frugal business, responsible product distribution/ promotion)							
S7	The company repurpose for society/environment (egg: not for profit, social enterprise, social and biodiversity regeneration initiatives, base of pyramid solutions, localisation, home based flexible working)							
S8	The company develops scale up solutions (egg: collaborative approaches, incubators and entrepreneur support models, licencing franchising, open innovation, crowd sourcing/funding, patient/slow capital collaborations)							

SECTION F: CUSTOMER INTERFACE

Please indicate to what extent you agree or disagree with each statement regarding customer interface of business model in a company. Customer interface includes relationship with customer and distribution channel.

		Strongly disagree	disagree	Slightly disagree	neutral	Slightly agree	agree	Strongly agree
		1	2	3	4	5	6	7
CI1	The company uses green initiatives to attract new market opportunities viz-a-viz new customers							
CI2	The company uses only green packaging for products to attract customers							
CI3	The company is committed to investing in green research and development initiatives for the benefit of customers							
CI4	The company uses green marketing to make customers aware of environmentally friendly business for customer education							
CI5	The company sells only green products							
CI6	The company ensure brand loyalty by being an environmentally friendly business for the benefit of customers							
CI7	The company honour commitments by advertising positive environmentalism to involve customers							
CI8	The company continually remind customers in advertisements of eco-friendly products to enhance brand loyalty among customers							
CI9	The company develops a reputation for supplying eco-friendly products among customers							
CI10	The company assess the impact of suppliers on the environment prior to purchasing of products by customers							
CI11	The company ensure that all businesses in the supply chain meet ISO 14000 standards for benefit of customers							
CI12	The company purchase only from suppliers selling environmentally friendly products for the benefit of customers							
CI13	Produce/supply eco-friendly products in spite of higher production costs for the benefit of customers							
CI14	The company uses space-saving warehousing or storage facilities to reduce environmental impact to enhance brand image among customers							
CI15	The company has a ‘green’ warehouse in terms of the construction materials used, heating and cooling facilities to sustain environment for the benefit of customers							
CI16	The company uses biofuels in transportation fleet and limit the number of distribution trips to reduce the carbon footprint for the benefit of customers							

CI17	The company uses alternative means of transport to make transport efforts greener for effective penetration to customers							
CI18	The company uses containers at full capacity to reduce the number of trips to distribute products effectively among customers							
CI19	The company shares warehouse facilities/transportation networks to avoid traffic congestions and overcrowding in order to bring efficiency in distribution network							
CI20	Overall, a company can be said to change its customer relationship and thereby bringing changes in distribution channels							

SECTION G: INFRASTRUCTURE MANAGEMENT

Please indicate to what extent you agree or disagree with each statement regarding infrastructure management of business model in a company. Infrastructure management includes partner-network, core-competencies and value configuration.

		Strongly disagree	**disagree**	**Slightly disagree**	**neutral**	**Slightly agree**	**agree**	**Strongly agree**
		1	2	3	4	5	6	7
IM1	The company produce or sell eco-friendly products according to stakeholders' needs to improve network with partners							
IM2	The company implement green human resource policies to cultivate a green business culture							
IM3	The company support community action programmes (for example, to make use of reusable containers) to bring value to existing products/services/processes							
IM4	The company ensure top management support in all green initiatives							
IM5	The company establish a formal team of people to monitor and promote green issues							
IM6	The company prioritise the reduction of the impact of facility construction and operation							
IM7	The company uses resources more efficiently to develop core competencies							
IM8	The company create by-products, recycle and re-use to eliminate waste to bring value to products/services offerings							
IM9	The company intensify production processes to reduce environmental impacts while							

	lowering the costs of inputs and waste disposal							
IM10	The company consciously avoid actions causing changes to the climate, water infrastructure and forestry							
IM11	The company uses alternative energy sources in production and manufacturing processes							
IM12	The company uses green technology to remain competitive and increase productivity							

SECTION H: FINANCIAL ASPECTS

Please indicate to what extent you agree or disagree with each statement regarding financial aspects of business model in a company. Financial aspects include cost structure and revenue model.

		Strongly disagree	**disagree**	**Slightly disagree**	**neutral**	**Slightly agree**	**agree**	**Strongly agree**
		1	2	3	4	5	6	7
FA1	The company institutes green accounting policies to reduce the cost of paper used							
FA2	The company takes part in socially responsible investing (SRI)							
FA3	The company avoid penalties, fines and legal costs for non-compliance with environmental legislation							
FA4	The company expands the use of sustainable paper products while reducing the use of paper							
FA5	The company completes a green business audit to ensure that green business standards are met							
FA6	Over past 3 years, the company's return on investment and sales is well above industry average							
FA7	Over past 3 years, the company's profit and growth is well above industry average							
FA8	Over past 3 years, the company's market share and sales volume growth, is well above industry average							
FA9	Overall improvement in general level of profitability, after adoption of green practices							
FA10	Overall improvement in level of production costs, after adoption of green practices							
FA11	Overall improvement in cost of raw materials or components, after adoption of green practices							
FA12	Overall improvement in packaging costs, after adoption of green practices							

APPENDIX C: LIST OF INTERVIEWS CONDUCTED (SOUTH AFRICA / INDIA)

South Africa

No.	Industry	Interviewee position	Date	Duration/Hours
1	Financial services/Banking sector	Executive Manager – Sales and Marketing	8th April' 2016	2:00
2	Financial services/Banking sector	Senior Manager – Strategy and Innovation	15th March' 2016	2:30
3	Financial services/Banking sector	Manager – Network Services	21st April' 2016	2:00
4	Energy sector	Chief Executive Officer (CEO)	13th April' 2016	2:00
5	Consultant companies	Managing Director – Research and Development	28th Feb' 2016	2:00
6	Financial services/Banking sector	Executive Officer – Operations	5th April' 2016	2:30
7	Financial services/Banking sector	Manager – Operations	13th Jan' 2016	1:30
8	Financial services/Banking sector	Chief Financial Officer (CFO) – Services	22nd Jan' 2016	1:30
9	Financial services/Banking sector	Senior Manager – IT services	26th Jan' 2016	2:00
10	FMCG/ consumer durable sector	Vice-president – Supply Chain Management	27th April' 2016	2:00

11	Financial services/Banking sector	Chief Executive – Sustainable Development	10th Feb' 2016	2:30
12	FMCG/ consumer durable sector	Senior Manager – Procurement	28th April' 2016	2:00
13	FMCG/ consumer durable sector	Head – Strategy and Planning	30th April' 2016	1:30
14	FMCG/ consumer durable sector	Head – Sales and Marketing	22nd April' 2016	2:00
15	Energy sector	Global Managing Director	4th Feb' 2016	1:30
16	Consultant companies	Head – IT Services	7th Jan' 2016	2:00
17	Consultant companies	Vice President – Sales and Business Development	4th Jan' 2016	2:00
18	FMCG/ consumer durable sector	Head – Innovation Hub	1st Oct' 2015	2:00

India

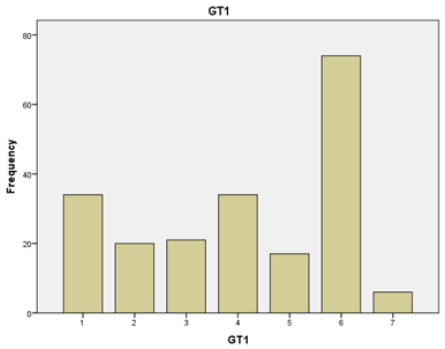
No.	Industry	Interviewee position	Date	Duration/Hours
1	Consultant companies	Chief Executive Officer – Operations	7th Dec' 2015	2:30
2	Energy sector	Senior Vice President – Corporate Strategy and Planning	8th Dec' 2015	2:00
3	Consultant companies	Partner – Innovation Hub	15th Nov' 2015	2:30
4	Energy sector	Executive Officer – Strategy	8th Dec' 2015	2:40

5	Energy sector	Senior Manager – Strategic Planning	9th Dec' 2015	2:00
6	Consultant companies	Managing Director – Sales and Marketing	13th Nov' 2015	2:00
7	Energy sector	Senior Manager – Operations	20th Nov' 2015	1:30
8	Energy sector	Executive Officer – Procurement	18th Dec' 2015	2:00
9	Consultant companies	Senior Executive Manager – Sales	16th Dec' 2015	2:30
10	Financial services/Banking sector	Vice President – Services	15th Nov' 2015	2:00
11	Financial services/Banking sector	Senior Executive Manager	14th Nov' 2015	2:30
12	Financial services/Banking sector	Senior Vice President	14th Dec' 2015	2:30
13	Energy sector	Vice President – Solar	14th Nov' 2015	1:30
14	Telecommunication sector	Senior Business Development Manager	16th Dec' 2015	2:00
15	FMCG/ consumer durable sector	Head – Sales and Marketing	12th Nov' 2015	2:00

APPENDIX D: DETAIL TABLES OF QUANTITATIVE ANALYSIS

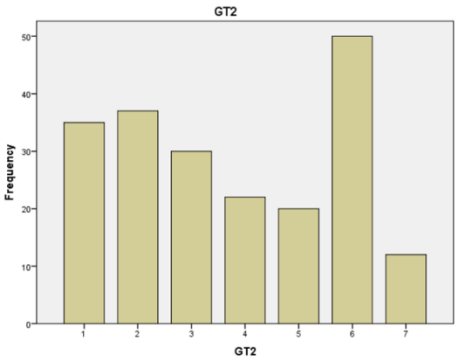
GT1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	34	16.5	16.5	16.5
	2	20	9.7	9.7	26.2
	3	21	10.2	10.2	36.4
	4	34	16.5	16.5	52.9
	5	17	8.3	8.3	61.2
	6	74	35.9	35.9	97.1
	7	6	2.9	2.9	100.0
	Total	206	100.0	100.0	



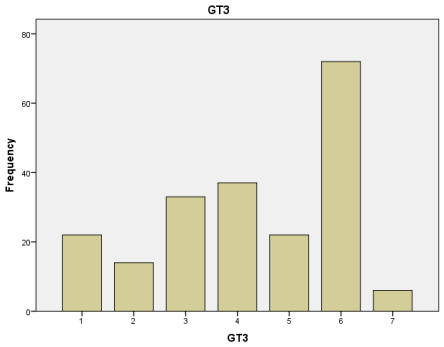
GT2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	35	17.0	17.0	17.0
	2	37	18.0	18.0	35.0
	3	30	14.6	14.6	49.5
	4	22	10.7	10.7	60.2
	5	20	9.7	9.7	69.9
	6	50	24.3	24.3	94.2
	7	12	5.8	5.8	100.0
	Total	206	100.0	100.0	



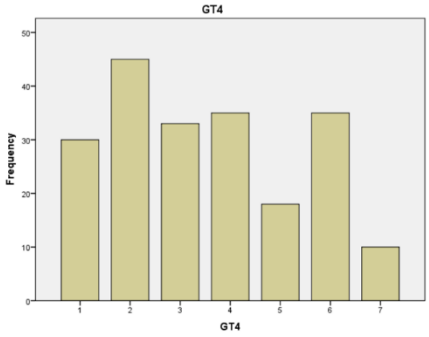
GT3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	10.7	10.7	10.7
	2	14	6.8	6.8	17.5
	3	33	16.0	16.0	33.5
	4	37	18.0	18.0	51.5
	5	22	10.7	10.7	62.1
	6	72	35.0	35.0	97.1
	7	6	2.9	2.9	100.0
	Total	206	100.0	100.0	



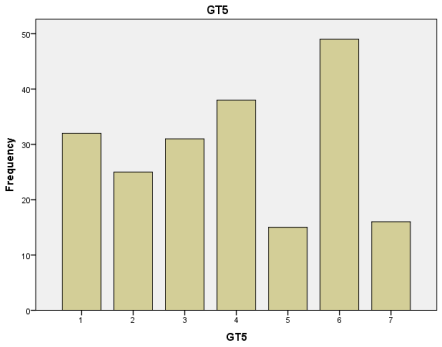
GT4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	30	14.6	14.6	14.6
	2	45	21.8	21.8	36.4
	3	33	16.0	16.0	52.4
	4	35	17.0	17.0	69.4
	5	18	8.7	8.7	78.2
	6	35	17.0	17.0	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



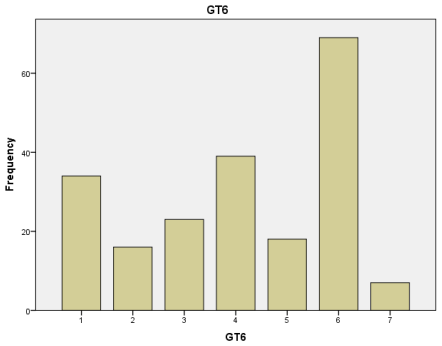
GT5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	32	15.5	15.5	15.5
	2	25	12.1	12.1	27.7
	3	31	15.0	15.0	42.7
	4	38	18.4	18.4	61.2
	5	15	7.3	7.3	68.4
	6	49	23.8	23.8	92.2
	7	16	7.8	7.8	100.0
	Total	206	100.0	100.0	



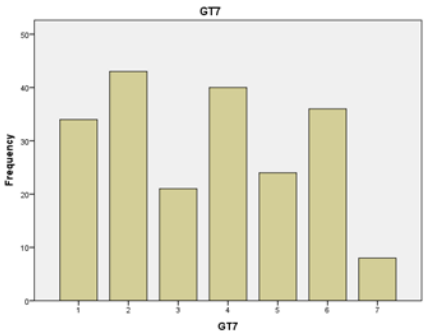
GT6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	34	16.5	16.5	16.5
	2	16	7.8	7.8	24.3
	3	23	11.2	11.2	35.4
	4	39	18.9	18.9	54.4
	5	18	8.7	8.7	63.1
	6	69	33.5	33.5	96.6
	7	7	3.4	3.4	100.0
	Total	206	100.0	100.0	



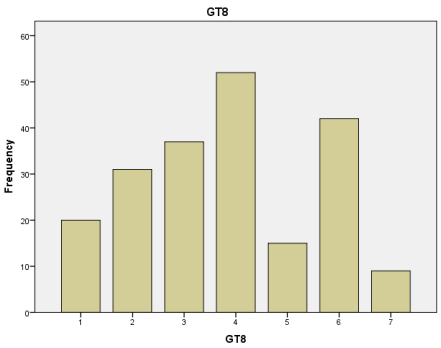
GT7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	34	16.5	16.5	16.5
	2	43	20.9	20.9	37.4
	3	21	10.2	10.2	47.6
	4	40	19.4	19.4	67.0
	5	24	11.7	11.7	78.6
	6	36	17.5	17.5	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



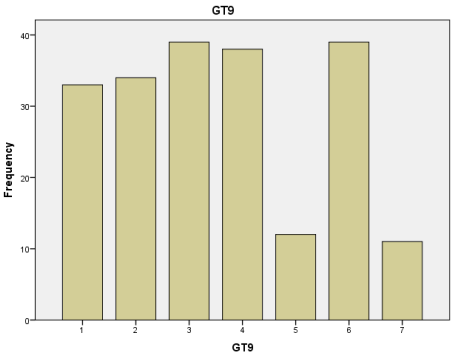
GT8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	20	9.7	9.7	9.7
	2	31	15.0	15.0	24.8
	3	37	18.0	18.0	42.7
	4	52	25.2	25.2	68.0
	5	15	7.3	7.3	75.2
	6	42	20.4	20.4	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



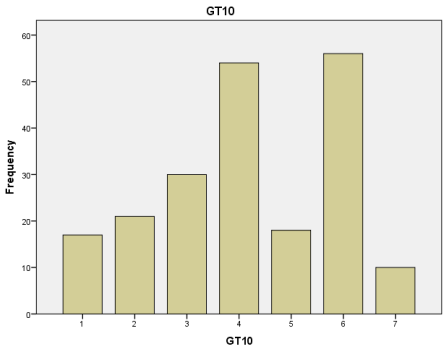
GT9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	33	16.0	16.0	16.0
	2	34	16.5	16.5	32.5
	3	39	18.9	18.9	51.5
	4	38	18.4	18.4	69.9
	5	12	5.8	5.8	75.7
	6	39	18.9	18.9	94.7
	7	11	5.3	5.3	100.0
	Total	206	100.0	100.0	



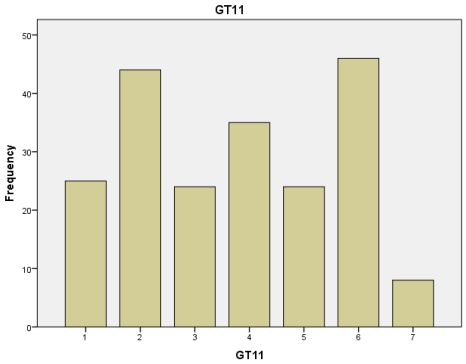
GT10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	17	8.3	8.3	8.3
	2	21	10.2	10.2	18.4
	3	30	14.6	14.6	33.0
	4	54	26.2	26.2	59.2
	5	18	8.7	8.7	68.0
	6	56	27.2	27.2	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



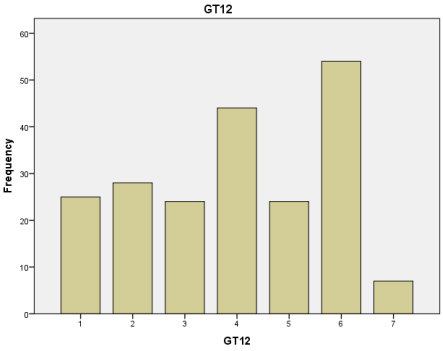
GT11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	12.1	12.1	12.1
	2	44	21.4	21.4	33.5
	3	24	11.7	11.7	45.1
	4	35	17.0	17.0	62.1
	5	24	11.7	11.7	73.8
	6	46	22.3	22.3	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



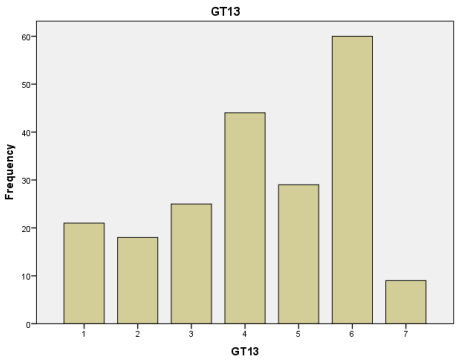
GT12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	12.1	12.1	12.1
	2	28	13.6	13.6	25.7
	3	24	11.7	11.7	37.4
	4	44	21.4	21.4	58.7
	5	24	11.7	11.7	70.4
	6	54	26.2	26.2	96.6
	7	7	3.4	3.4	100.0
	Total	206	100.0	100.0	



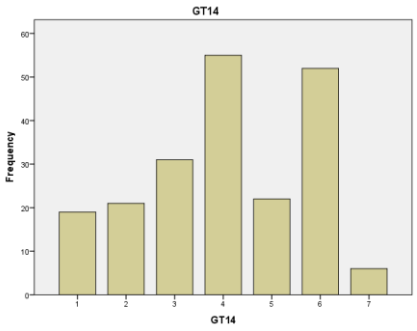
GT13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	21	10.2	10.2	10.2
	2	18	8.7	8.7	18.9
	3	25	12.1	12.1	31.1
	4	44	21.4	21.4	52.4
	5	29	14.1	14.1	66.5
	6	60	29.1	29.1	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



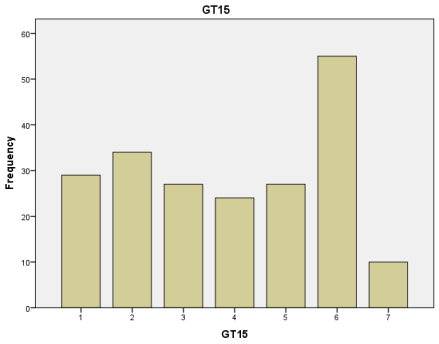
GT14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	19	9.2	9.2	9.2
	2	21	10.2	10.2	19.4
	3	31	15.0	15.0	34.5
	4	55	26.7	26.7	61.2
	5	22	10.7	10.7	71.8
	6	52	25.2	25.2	97.1
	7	6	2.9	2.9	100.0
	Total	206	100.0	100.0	



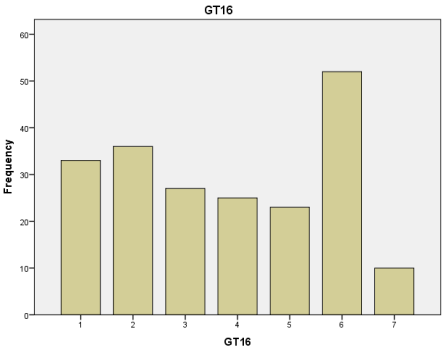
GT15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	29	14.1	14.1	14.1
	2	34	16.5	16.5	30.6
	3	27	13.1	13.1	43.7
	4	24	11.7	11.7	55.3
	5	27	13.1	13.1	68.4
	6	55	26.7	26.7	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



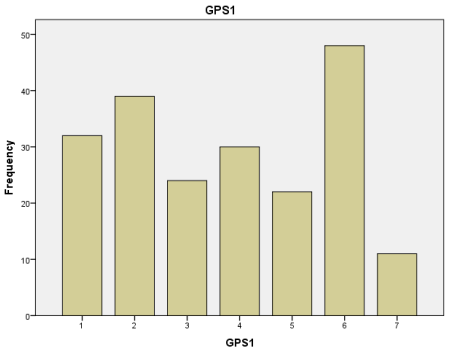
GT16

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	33	16.0	16.0	16.0
	2	36	17.5	17.5	33.5
	3	27	13.1	13.1	46.6
	4	25	12.1	12.1	58.7
	5	23	11.2	11.2	69.9
	6	52	25.2	25.2	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



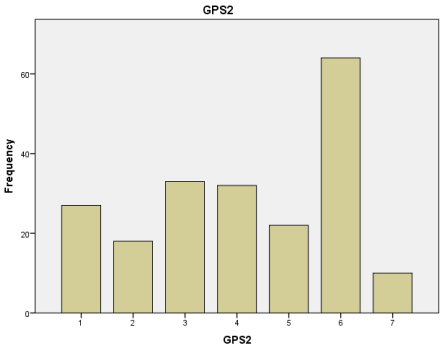
GPS1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	32	15.5	15.5	15.5
	2	39	18.9	18.9	34.5
	3	24	11.7	11.7	46.1
	4	30	14.6	14.6	60.7
	5	22	10.7	10.7	71.4
	6	48	23.3	23.3	94.7
	7	11	5.3	5.3	100.0
	Total	206	100.0	100.0	



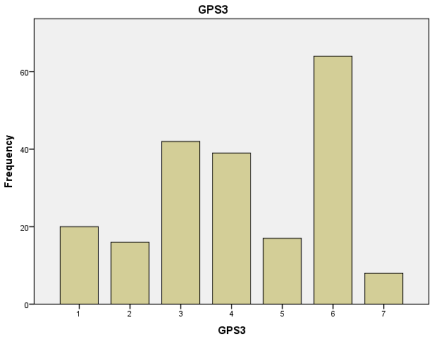
GPS2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	27	13.1	13.1	13.1
	2	18	8.7	8.7	21.8
	3	33	16.0	16.0	37.9
	4	32	15.5	15.5	53.4
	5	22	10.7	10.7	64.1
	6	64	31.1	31.1	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



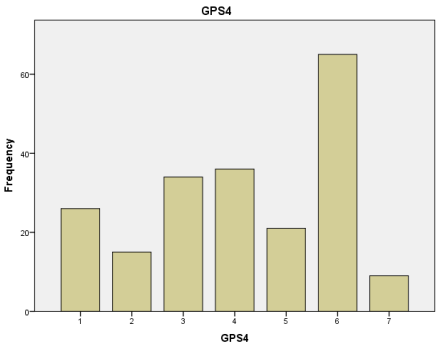
GPS3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	20	9.7	9.7	9.7
	2	16	7.8	7.8	17.5
	3	42	20.4	20.4	37.9
	4	39	18.9	18.9	56.8
	5	17	8.3	8.3	65.0
	6	64	31.1	31.1	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



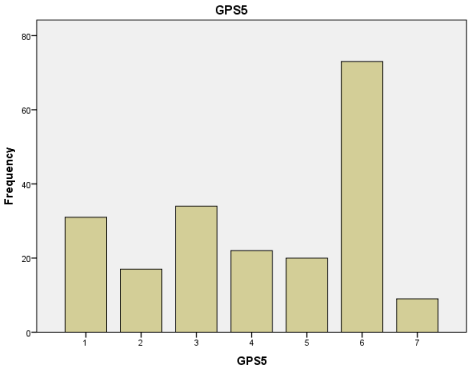
GPS4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	26	12.6	12.6	12.6
	2	15	7.3	7.3	19.9
	3	34	16.5	16.5	36.4
	4	36	17.5	17.5	53.9
	5	21	10.2	10.2	64.1
	6	65	31.6	31.6	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



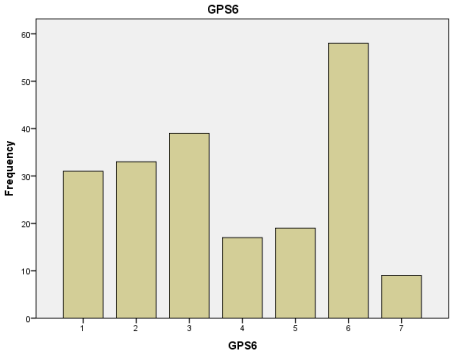
GPS5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	31	15.0	15.0	15.0
	2	17	8.3	8.3	23.3
	3	34	16.5	16.5	39.8
	4	22	10.7	10.7	50.5
	5	20	9.7	9.7	60.2
	6	73	35.4	35.4	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



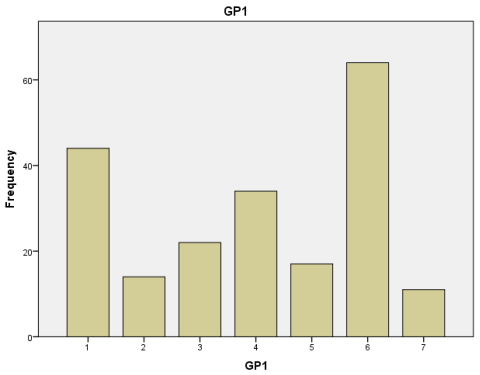
GPS6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	31	15.0	15.0	15.0
	2	33	16.0	16.0	31.1
	3	39	18.9	18.9	50.0
	4	17	8.3	8.3	58.3
	5	19	9.2	9.2	67.5
	6	58	28.2	28.2	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



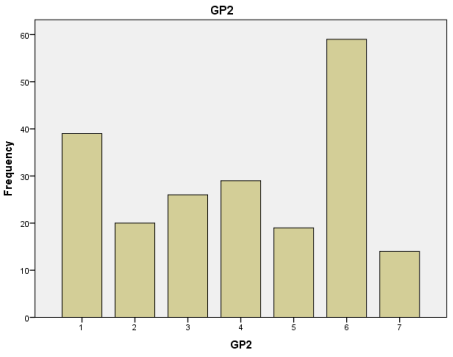
GP1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	44	21.4	21.4	21.4
	2	14	6.8	6.8	28.2
	3	22	10.7	10.7	38.8
	4	34	16.5	16.5	55.3
	5	17	8.3	8.3	63.6
	6	64	31.1	31.1	94.7
	7	11	5.3	5.3	100.0
	Total	206	100.0	100.0	



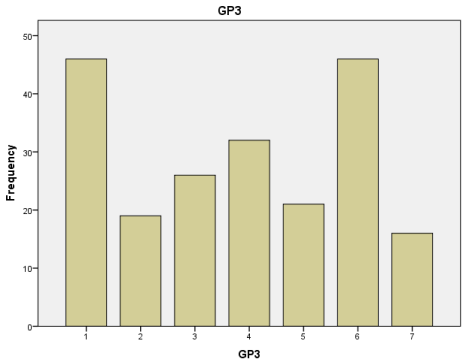
GP2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	39	18.9	18.9	18.9
	2	20	9.7	9.7	28.6
	3	26	12.6	12.6	41.3
	4	29	14.1	14.1	55.3
	5	19	9.2	9.2	64.6
	6	59	28.6	28.6	93.2
	7	14	6.8	6.8	100.0
	Total	206	100.0	100.0	



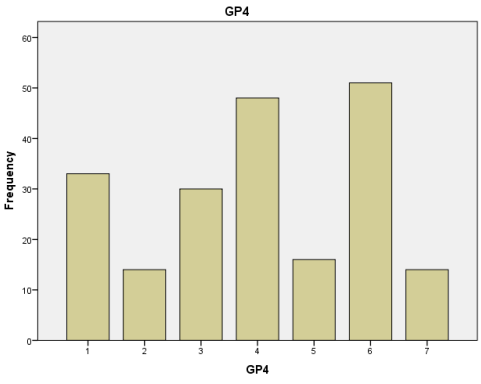
GP3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	46	22.3	22.3	22.3
	2	19	9.2	9.2	31.6
	3	26	12.6	12.6	44.2
	4	32	15.5	15.5	59.7
	5	21	10.2	10.2	69.9
	6	46	22.3	22.3	92.2
	7	16	7.8	7.8	100.0
	Total	206	100.0	100.0	



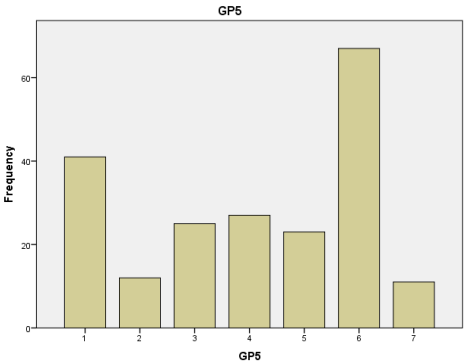
GP4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	33	16.0	16.0	16.0
	2	14	6.8	6.8	22.8
	3	30	14.6	14.6	37.4
	4	48	23.3	23.3	60.7
	5	16	7.8	7.8	68.4
	6	51	24.8	24.8	93.2
	7	14	6.8	6.8	100.0
	Total	206	100.0	100.0	



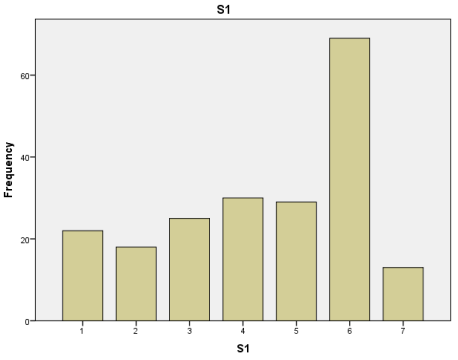
GP5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	41	19.9	19.9	19.9
	2	12	5.8	5.8	25.7
	3	25	12.1	12.1	37.9
	4	27	13.1	13.1	51.0
	5	23	11.2	11.2	62.1
	6	67	32.5	32.5	94.7
	7	11	5.3	5.3	100.0
	Total	206	100.0	100.0	



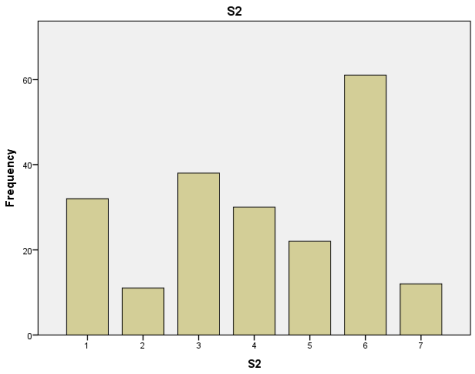
S1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	10.7	10.7	10.7
	2	18	8.7	8.7	19.4
	3	25	12.1	12.1	31.6
	4	30	14.6	14.6	46.1
	5	29	14.1	14.1	60.2
	6	69	33.5	33.5	93.7
	7	13	6.3	6.3	100.0
	Total	206	100.0	100.0	



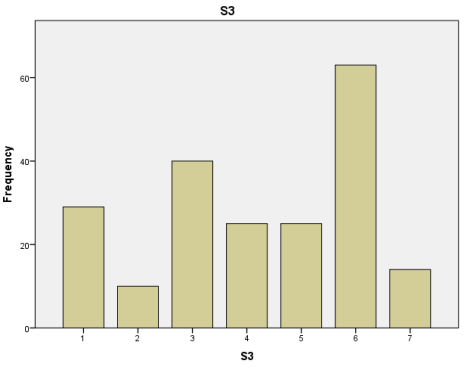
S2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	32	15.5	15.5	15.5
	2	11	5.3	5.3	20.9
	3	38	18.4	18.4	39.3
	4	30	14.6	14.6	53.9
	5	22	10.7	10.7	64.6
	6	61	29.6	29.6	94.2
	7	12	5.8	5.8	100.0
	Total	206	100.0	100.0	



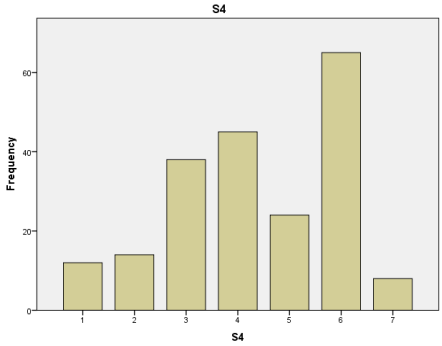
S3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	29	14.1	14.1	14.1
	2	10	4.9	4.9	18.9
	3	40	19.4	19.4	38.3
	4	25	12.1	12.1	50.5
	5	25	12.1	12.1	62.6
	6	63	30.6	30.6	93.2
	7	14	6.8	6.8	100.0
	Total	206	100.0	100.0	



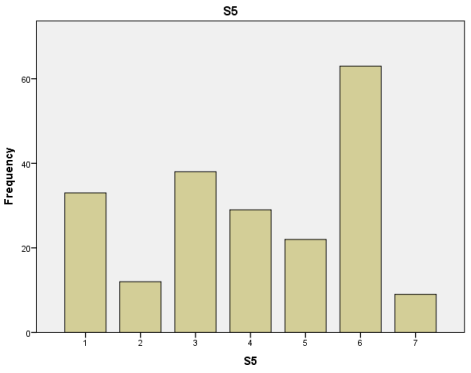
S4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	12	5.8	5.8	5.8
	2	14	6.8	6.8	12.6
	3	38	18.4	18.4	31.1
	4	45	21.8	21.8	52.9
	5	24	11.7	11.7	64.6
	6	65	31.6	31.6	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



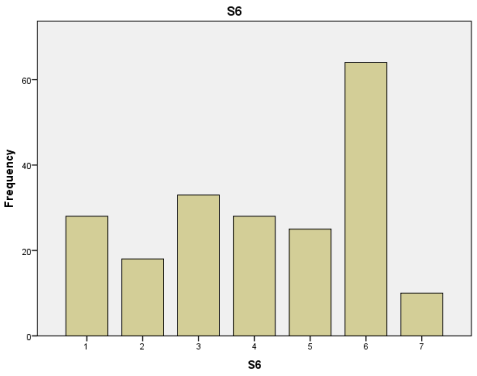
S5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	33	16.0	16.0	16.0
	2	12	5.8	5.8	21.8
	3	38	18.4	18.4	40.3
	4	29	14.1	14.1	54.4
	5	22	10.7	10.7	65.0
	6	63	30.6	30.6	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



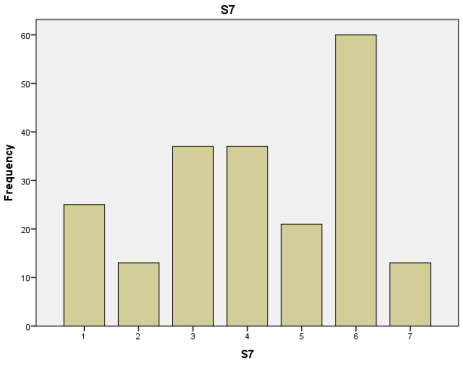
S6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	28	13.6	13.6	13.6
	2	18	8.7	8.7	22.3
	3	33	16.0	16.0	38.3
	4	28	13.6	13.6	51.9
	5	25	12.1	12.1	64.1
	6	64	31.1	31.1	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



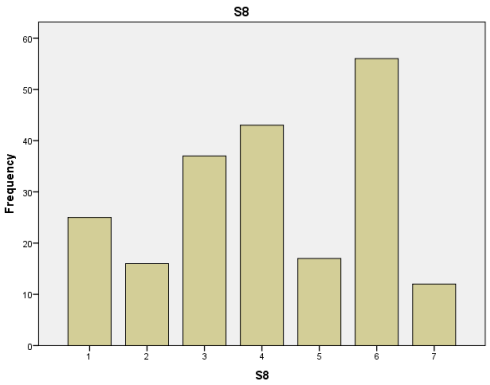
S7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	12.1	12.1	12.1
	2	13	6.3	6.3	18.4
	3	37	18.0	18.0	36.4
	4	37	18.0	18.0	54.4
	5	21	10.2	10.2	64.6
	6	60	29.1	29.1	93.7
	7	13	6.3	6.3	100.0
	Total	206	100.0	100.0	



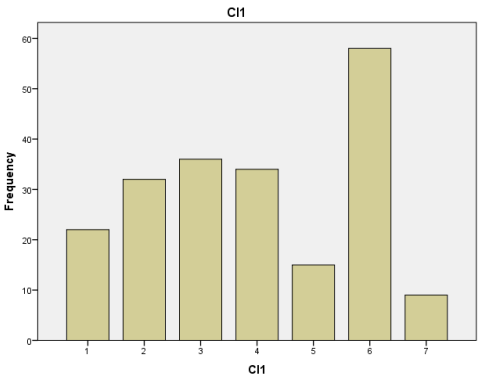
S8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	12.1	12.1	12.1
	2	16	7.8	7.8	19.9
	3	37	18.0	18.0	37.9
	4	43	20.9	20.9	58.7
	5	17	8.3	8.3	67.0
	6	56	27.2	27.2	94.2
	7	12	5.8	5.8	100.0
	Total	206	100.0	100.0	



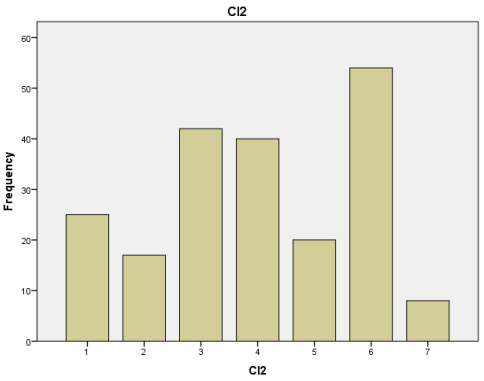
CI1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	10.7	10.7	10.7
	2	32	15.5	15.5	26.2
	3	36	17.5	17.5	43.7
	4	34	16.5	16.5	60.2
	5	15	7.3	7.3	67.5
	6	58	28.2	28.2	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



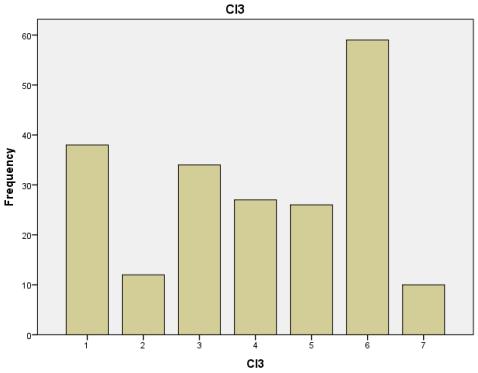
CI2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	12.1	12.1	12.1
	2	17	8.3	8.3	20.4
	3	42	20.4	20.4	40.8
	4	40	19.4	19.4	60.2
	5	20	9.7	9.7	69.9
	6	54	26.2	26.2	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



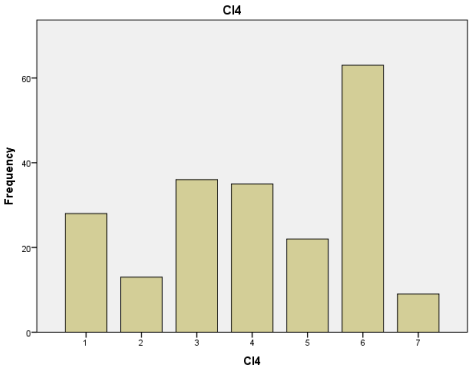
CI3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	38	18.4	18.4	18.4
	2	12	5.8	5.8	24.3
	3	34	16.5	16.5	40.8
	4	27	13.1	13.1	53.9
	5	26	12.6	12.6	66.5
	6	59	28.6	28.6	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



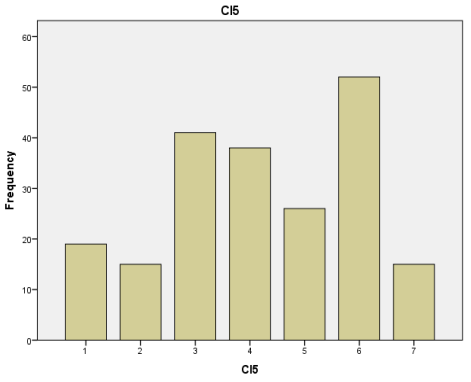
CI4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	28	13.6	13.6	13.6
	2	13	6.3	6.3	19.9
	3	36	17.5	17.5	37.4
	4	35	17.0	17.0	54.4
	5	22	10.7	10.7	65.0
	6	63	30.6	30.6	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



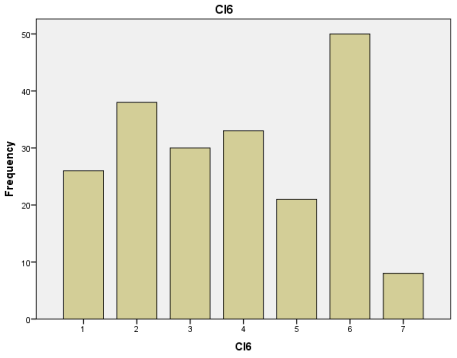
CI5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	19	9.2	9.2	9.2
	2	15	7.3	7.3	16.5
	3	41	19.9	19.9	36.4
	4	38	18.4	18.4	54.9
	5	26	12.6	12.6	67.5
	6	52	25.2	25.2	92.7
	7	15	7.3	7.3	100.0
	Total	206	100.0	100.0	



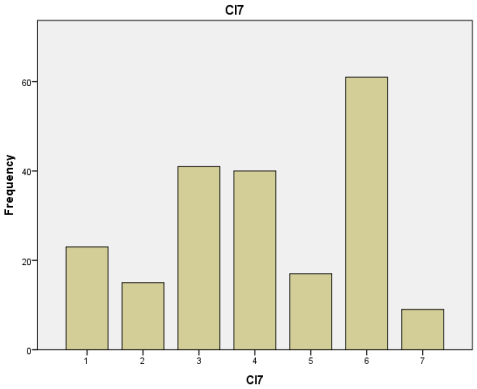
CI6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	26	12.6	12.6	12.6
	2	38	18.4	18.4	31.1
	3	30	14.6	14.6	45.6
	4	33	16.0	16.0	61.7
	5	21	10.2	10.2	71.8
	6	50	24.3	24.3	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



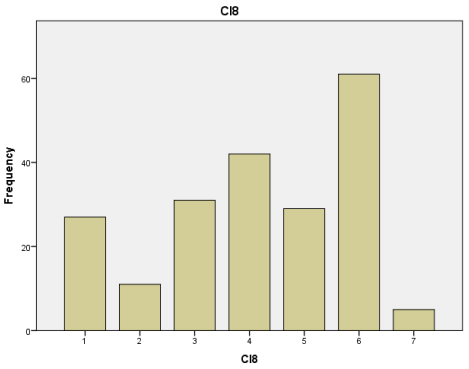
CI7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	23	11.2	11.2	11.2
	2	15	7.3	7.3	18.4
	3	41	19.9	19.9	38.3
	4	40	19.4	19.4	57.8
	5	17	8.3	8.3	66.0
	6	61	29.6	29.6	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



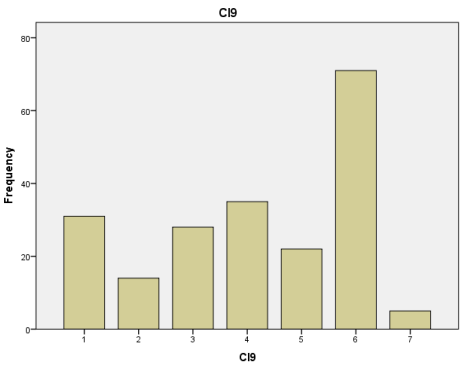
CI8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	27	13.1	13.1	13.1
	2	11	5.3	5.3	18.4
	3	31	15.0	15.0	33.5
	4	42	20.4	20.4	53.9
	5	29	14.1	14.1	68.0
	6	61	29.6	29.6	97.6
	7	5	2.4	2.4	100.0
	Total	206	100.0	100.0	



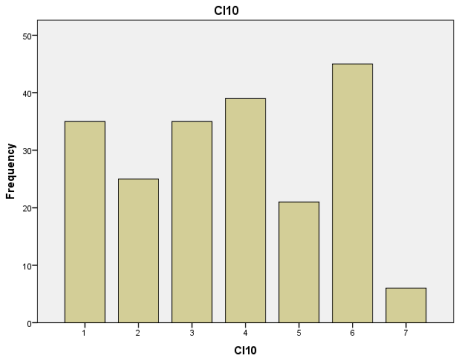
CI9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	31	15.0	15.0	15.0
	2	14	6.8	6.8	21.8
	3	28	13.6	13.6	35.4
	4	35	17.0	17.0	52.4
	5	22	10.7	10.7	63.1
	6	71	34.5	34.5	97.6
	7	5	2.4	2.4	100.0
	Total	206	100.0	100.0	



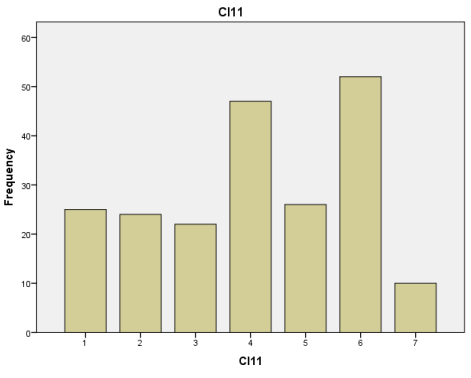
CI10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	35	17.0	17.0	17.0
	2	25	12.1	12.1	29.1
	3	35	17.0	17.0	46.1
	4	39	18.9	18.9	65.0
	5	21	10.2	10.2	75.2
	6	45	21.8	21.8	97.1
	7	6	2.9	2.9	100.0
	Total	206	100.0	100.0	



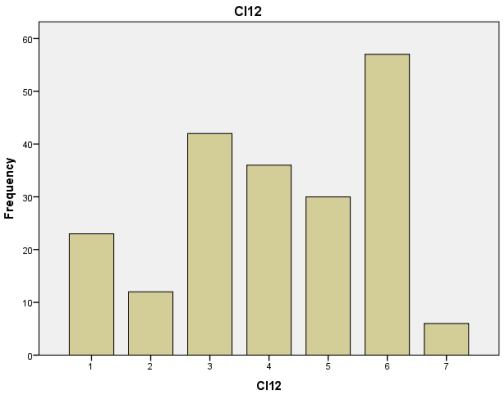
CI11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	12.1	12.1	12.1
	2	24	11.7	11.7	23.8
	3	22	10.7	10.7	34.5
	4	47	22.8	22.8	57.3
	5	26	12.6	12.6	69.9
	6	52	25.2	25.2	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



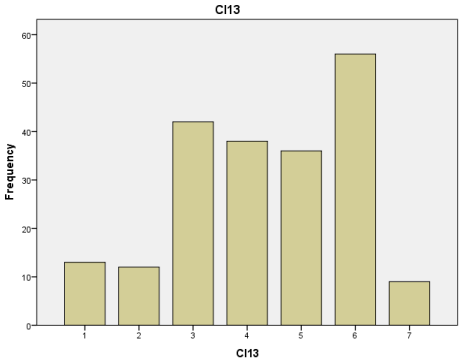
CI12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	23	11.2	11.2	11.2
	2	12	5.8	5.8	17.0
	3	42	20.4	20.4	37.
	4	36	17.5	17.5	54.
	5	30	14.6	14.6	69.
	6	57	27.7	27.7	97.
	7	6	2.9	2.9	100.
	Total	206	100.0	100.0	



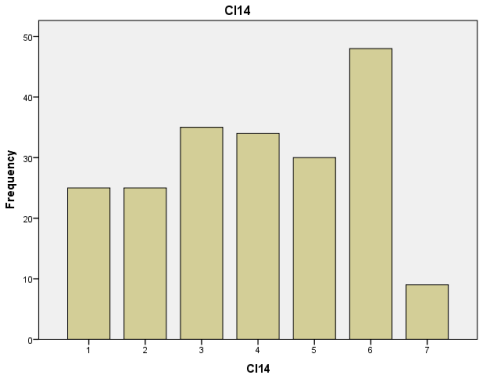
CI13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	13	6.3	6.3	6.3
	2	12	5.8	5.8	12.1
	3	42	20.4	20.4	32.5
	4	38	18.4	18.4	51.0
	5	36	17.5	17.5	68.4
	6	56	27.2	27.2	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



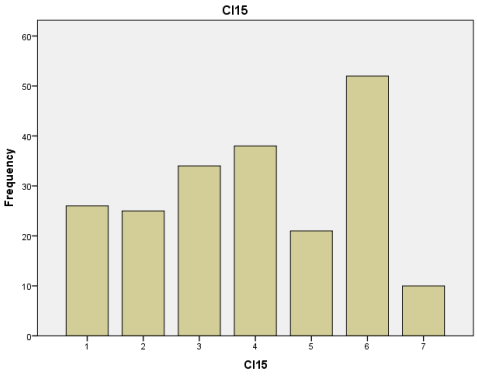
CI14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	12.1	12.1	12.1
	2	25	12.1	12.1	24.3
	3	35	17.0	17.0	41.3
	4	34	16.5	16.5	57.8
	5	30	14.6	14.6	72.3
	6	48	23.3	23.3	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



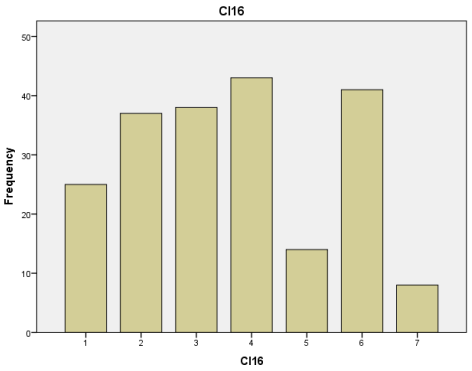
CI15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	26	12.6	12.6	12.6
	2	25	12.1	12.1	24.8
	3	34	16.5	16.5	41.3
	4	38	18.4	18.4	59.7
	5	21	10.2	10.2	69.9
	6	52	25.2	25.2	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



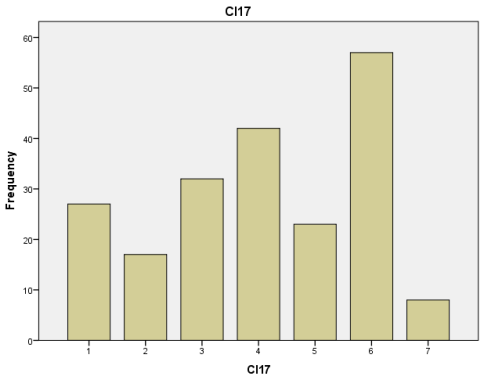
CI16

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	12.1	12.1	12.1
	2	37	18.0	18.0	30.1
	3	38	18.4	18.4	48.5
	4	43	20.9	20.9	69.4
	5	14	6.8	6.8	76.2
	6	41	19.9	19.9	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



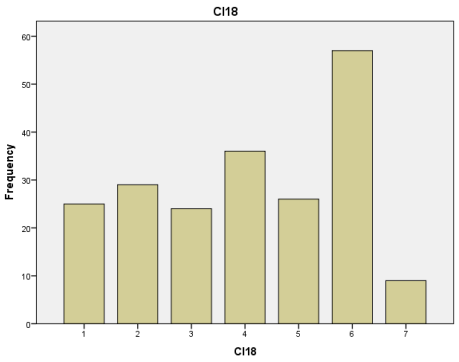
CI17

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	27	13.1	13.1	13.1
	2	17	8.3	8.3	21.4
	3	32	15.5	15.5	36.9
	4	42	20.4	20.4	57.3
	5	23	11.2	11.2	68.4
	6	57	27.7	27.7	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



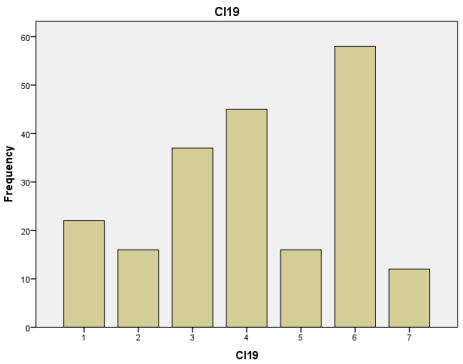
CI18

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	25	12.1	12.1	12.1
	2	29	14.1	14.1	26.2
	3	24	11.7	11.7	37.9
	4	36	17.5	17.5	55.3
	5	26	12.6	12.6	68.0
	6	57	27.7	27.7	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



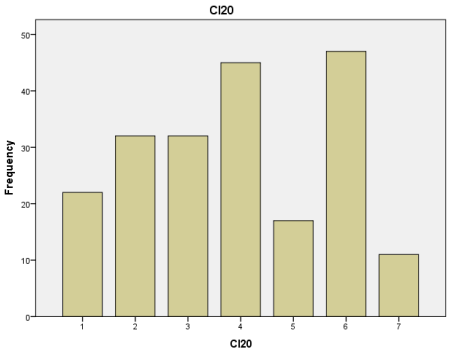
CI19

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	10.7	10.7	10.7
	2	16	7.8	7.8	18.4
	3	37	18.0	18.0	36.4
	4	45	21.8	21.8	58.3
	5	16	7.8	7.8	66.0
	6	58	28.2	28.2	94.2
	7	12	5.8	5.8	100.0
	Total	206	100.0	100.0	



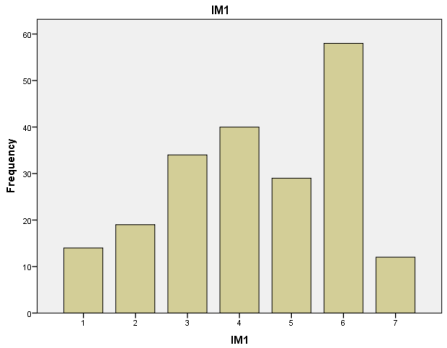
CI20

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	10.7	10.7	10.7
	2	32	15.5	15.5	26.2
	3	32	15.5	15.5	41.7
	4	45	21.8	21.8	63.6
	5	17	8.3	8.3	71.8
	6	47	22.8	22.8	94.7
	7	11	5.3	5.3	100.0
	Total	206	100.0	100.0	



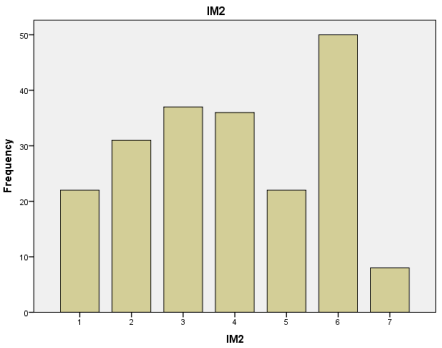
IM1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	14	6.8	6.8	6.8
	2	19	9.2	9.2	16.0
	3	34	16.5	16.5	32.5
	4	40	19.4	19.4	51.9
	5	29	14.1	14.1	66.0
	6	58	28.2	28.2	94.2
	7	12	5.8	5.8	100.0
	Total	206	100.0	100.0	



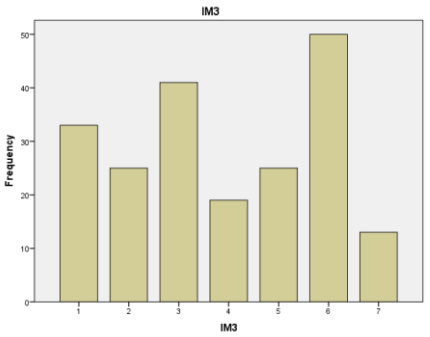
IM2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	10.7	10.7	10.7
	2	31	15.0	15.0	25.7
	3	37	18.0	18.0	43.7
	4	36	17.5	17.5	61.2
	5	22	10.7	10.7	71.8
	6	50	24.3	24.3	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



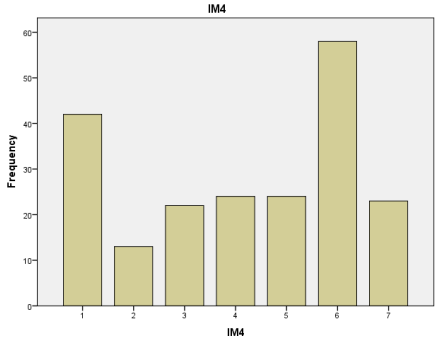
IM3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	33	16.0	16.0	16.0
	2	25	12.1	12.1	28.2
	3	41	19.9	19.9	48.1
	4	19	9.2	9.2	57.3
	5	25	12.1	12.1	69.4
	6	50	24.3	24.3	93.7
	7	13	6.3	6.3	100.0
	Total	206	100.0	100.0	



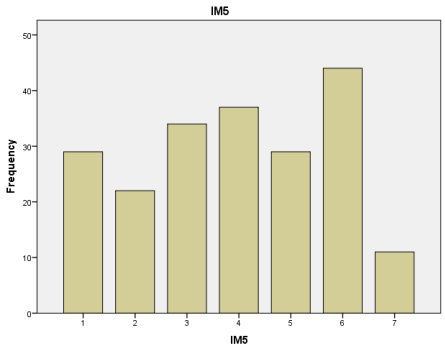
IM4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	42	20.4	20.4	20.4
	2	13	6.3	6.3	26.7
	3	22	10.7	10.7	37.4
	4	24	11.7	11.7	49.0
	5	24	11.7	11.7	60.7
	6	58	28.2	28.2	88.8
	7	23	11.2	11.2	100.0
	Total	206	100.0	100.0	



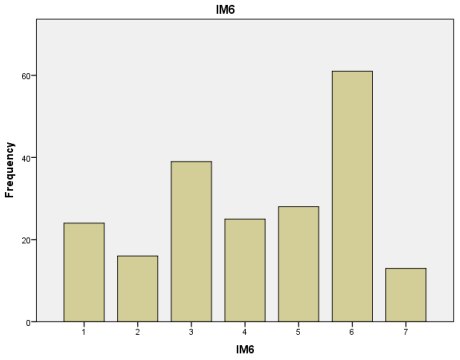
IM5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	29	14.1	14.1	14.1
	2	22	10.7	10.7	24.8
	3	34	16.5	16.5	41.3
	4	37	18.0	18.0	59.2
	5	29	14.1	14.1	73.3
	6	44	21.4	21.4	94.7
	7	11	5.3	5.3	100.0
	Total	206	100.0	100.0	



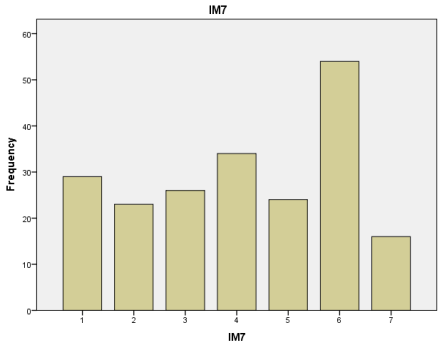
IM6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	24	11.7	11.7	11.7
	2	16	7.8	7.8	19.4
	3	39	18.9	18.9	38.3
	4	25	12.1	12.1	50.5
	5	28	13.6	13.6	64.1
	6	61	29.6	29.6	93.7
	7	13	6.3	6.3	100.0
	Total	206	100.0	100.0	



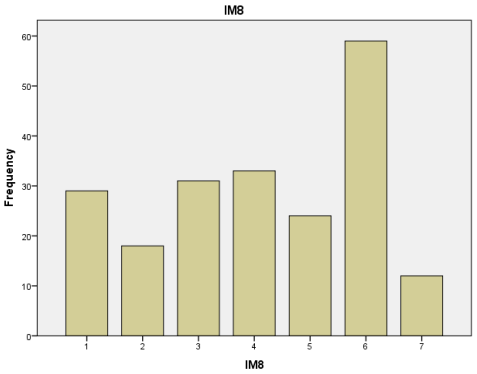
IM7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	29	14.1	14.1	14.1
	2	23	11.2	11.2	25.2
	3	26	12.6	12.6	37.9
	4	34	16.5	16.5	54.4
	5	24	11.7	11.7	66.0
	6	54	26.2	26.2	92.2
	7	16	7.8	7.8	100.0
	Total	206	100.0	100.0	



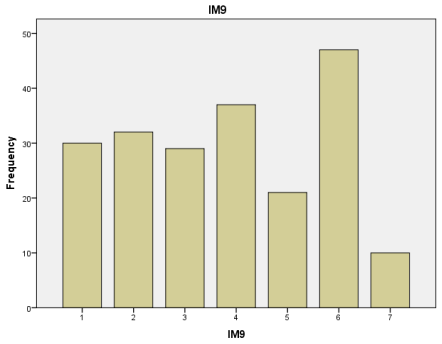
IM8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	29	14.1	14.1	14.1
	2	18	8.7	8.7	22.8
	3	31	15.0	15.0	37.9
	4	33	16.0	16.0	53.9
	5	24	11.7	11.7	65.5
	6	59	28.6	28.6	94.2
	7	12	5.8	5.8	100.0
	Total	206	100.0	100.0	



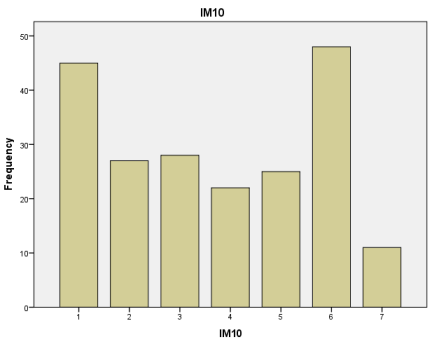
IM9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	30	14.6	14.6	14.6
	2	32	15.5	15.5	30.1
	3	29	14.1	14.1	44.2
	4	37	18.0	18.0	62.1
	5	21	10.2	10.2	72.3
	6	47	22.8	22.8	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



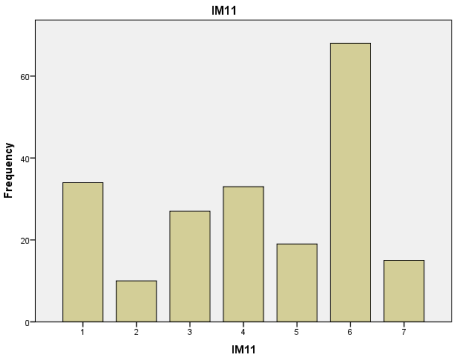
IM10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	45	21.8	21.8	21.8
	2	27	13.1	13.1	35.0
	3	28	13.6	13.6	48.5
	4	22	10.7	10.7	59.2
	5	25	12.1	12.1	71.4
	6	48	23.3	23.3	94.7
	7	11	5.3	5.3	100.0
	Total	206	100.0	100.0	



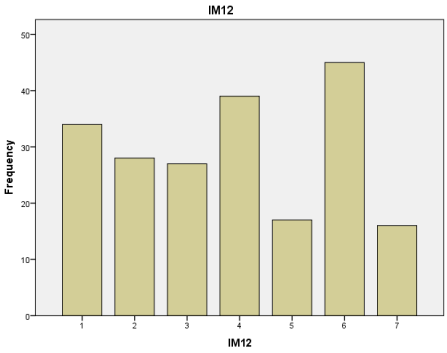
IM11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	34	16.5	16.5	16.5
	2	10	4.9	4.9	21.4
	3	27	13.1	13.1	34.5
	4	33	16.0	16.0	50.5
	5	19	9.2	9.2	59.7
	6	68	33.0	33.0	92.7
	7	15	7.3	7.3	100.0
	Total	206	100.0	100.0	



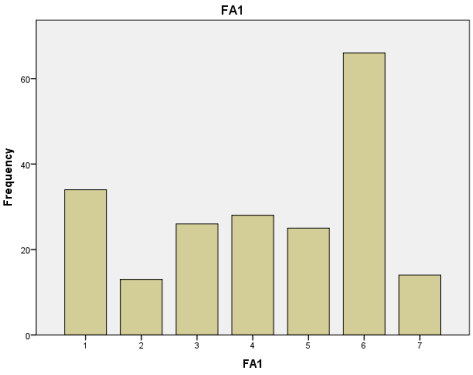
IM12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	34	16.5	16.5	16.5
	2	28	13.6	13.6	30.1
	3	27	13.1	13.1	43.2
	4	39	18.9	18.9	62.1
	5	17	8.3	8.3	70.4
	6	45	21.8	21.8	92.2
	7	16	7.8	7.8	100.0
	Total	206	100.0	100.0	



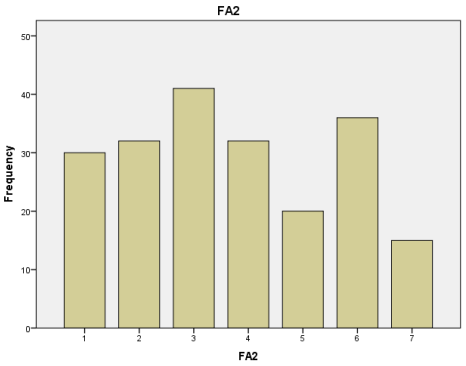
FA1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	34	16.5	16.5	16.5
	2	13	6.3	6.3	22.8
	3	26	12.6	12.6	35.4
	4	28	13.6	13.6	49.0
	5	25	12.1	12.1	61.2
	6	66	32.0	32.0	93.2
	7	14	6.8	6.8	100.0
	Total	206	100.0	100.0	



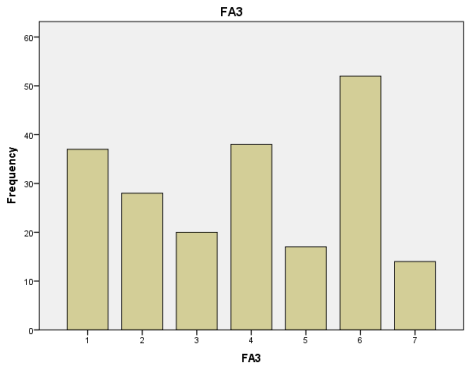
FA2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	30	14.6	14.6	14.6
	2	32	15.5	15.5	30.1
	3	41	19.9	19.9	50.0
	4	32	15.5	15.5	65.5
	5	20	9.7	9.7	75.2
	6	36	17.5	17.5	92.7
	7	15	7.3	7.3	100.0
	Total	206	100.0	100.0	



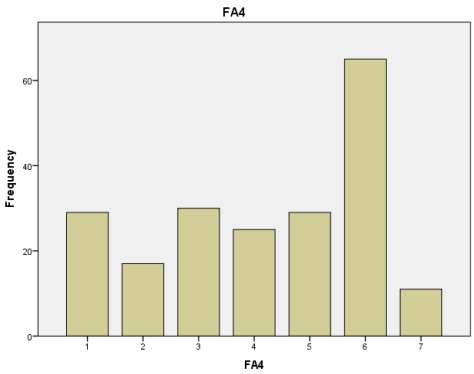
FA3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	37	18.0	18.0	18.0
	2	28	13.6	13.6	31.6
	3	20	9.7	9.7	41.3
	4	38	18.4	18.4	59.7
	5	17	8.3	8.3	68.0
	6	52	25.2	25.2	93.2
	7	14	6.8	6.8	100.0
	Total	206	100.0	100.0	



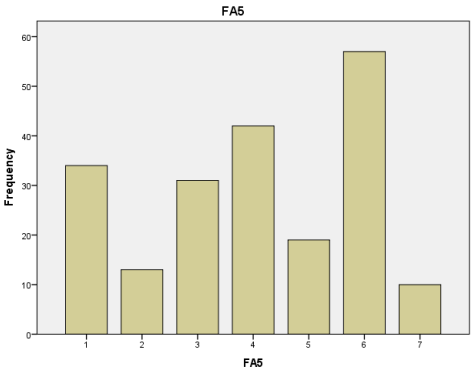
FA4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	29	14.1	14.1	14.1
	2	17	8.3	8.3	22.3
	3	30	14.6	14.6	36.9
	4	25	12.1	12.1	49.0
	5	29	14.1	14.1	63.1
	6	65	31.6	31.6	94.7
	7	11	5.3	5.3	100.0
	Total	206	100.0	100.0	



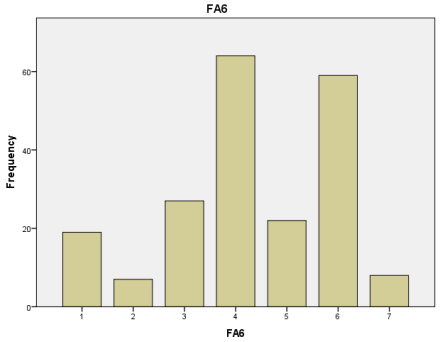
FA5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	34	16.5	16.5	16.5
	2	13	6.3	6.3	22.8
	3	31	15.0	15.0	37.9
	4	42	20.4	20.4	58.3
	5	19	9.2	9.2	67.5
	6	57	27.7	27.7	95.1
	7	10	4.9	4.9	100.0
	Total	206	100.0	100.0	



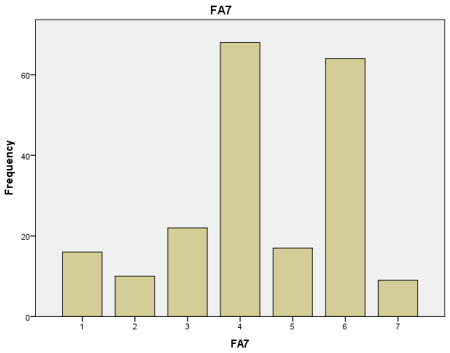
FA6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	19	9.2	9.2	9.2
	2	7	3.4	3.4	12.6
	3	27	13.1	13.1	25.7
	4	64	31.1	31.1	56.8
	5	22	10.7	10.7	67.5
	6	59	28.6	28.6	96.1
	7	8	3.9	3.9	100.0
	Total	206	100.0	100.0	



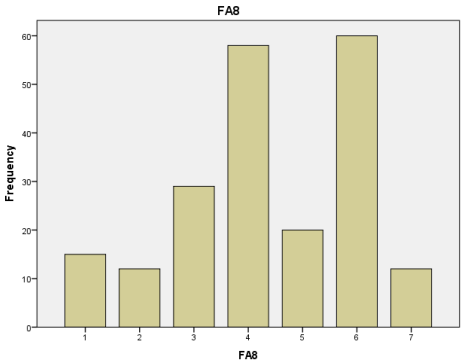
FA7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	16	7.8	7.8	7.8
	2	10	4.9	4.9	12.6
	3	22	10.7	10.7	23.3
	4	68	33.0	33.0	56.3
	5	17	8.3	8.3	64.6
	6	64	31.1	31.1	95.6
	7	9	4.4	4.4	100.0
	Total	206	100.0	100.0	



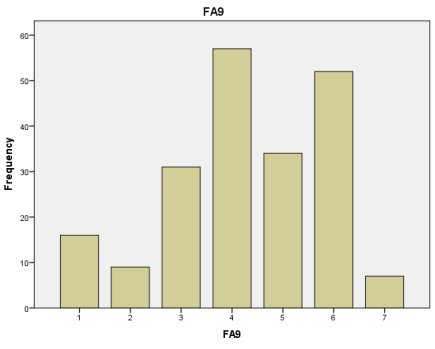
FA8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	15	7.3	7.3	7.3
	2	12	5.8	5.8	13.1
	3	29	14.1	14.1	27.2
	4	58	28.2	28.2	55.3
	5	20	9.7	9.7	65.0
	6	60	29.1	29.1	94.2
	7	12	5.8	5.8	100.0
	Total	206	100.0	100.0	



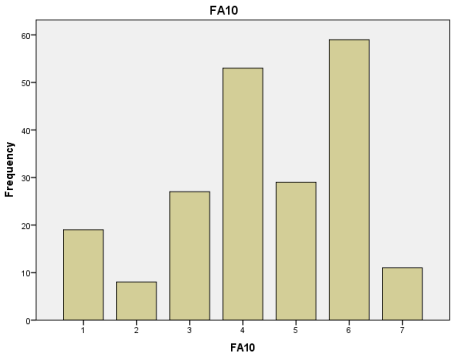
FA9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	16	7.8	7.8	7.8
	2	9	4.4	4.4	12.1
	3	31	15.0	15.0	27.2
	4	57	27.7	27.7	54.9
	5	34	16.5	16.5	71.4
	6	52	25.2	25.2	96.6
	7	7	3.4	3.4	100.0
	Total	206	100.0	100.0	



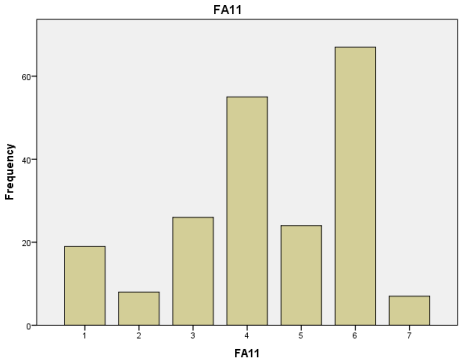
FA10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	19	9.2	9.2	9.2
	2	8	3.9	3.9	13.1
	3	27	13.1	13.1	26.2
	4	53	25.7	25.7	51.9
	5	29	14.1	14.1	66.0
	6	59	28.6	28.6	94.7
	7	11	5.3	5.3	100.0
	Total	206	100.0	100.0	



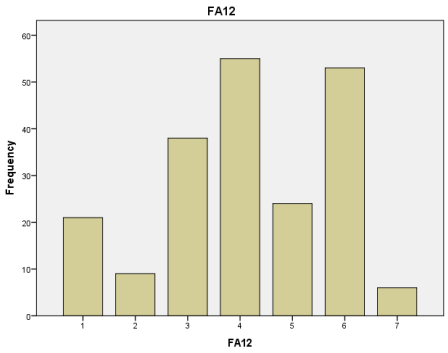
FA11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	19	9.2	9.2	9.2
	2	8	3.9	3.9	13.1
	3	26	12.6	12.6	25.7
	4	55	26.7	26.7	52.4
	5	24	11.7	11.7	64.1
	6	67	32.5	32.5	96.6
	7	7	3.4	3.4	100.0
	Total	206	100.0	100.0	



FA12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	21	10.2	10.2	10.2
	2	9	4.4	4.4	14.6
	3	38	18.4	18.4	33.0
	4	55	26.7	26.7	59.7
	5	24	11.7	11.7	71.4
	6	53	25.7	25.7	97.1
	7	6	2.9	2.9	100.0
	Total	206	100.0	100.0	



APPENDIX E: HIERARCHY CHART FOR NODES USING NVIVO

Nodes / Themes identified from Indian Companies Interviews and coded using NVivo

Name	Sources	References
business	11	
business activities	2	
business card	1	
business level	1	
business model green	5	
business model innovation	1	
business model lead	6	
business practices	1	
certain businesses	1	
existing business models	1	
future business potential	1	
generating business intelligence	1	
green business model innovation	4	
imitating business model	1	
improving business efficiency	1	
present business models	1	
solar business	1	
strong business intelligence	1	
sugar business	1	
superior business performance	1	
sustainable business model	1	
traditional business models	1	
undeveloped business ecosystem	1	
Business model	8	
applicable model	1	
barter models	1	
business model green	5	
business model innovation	1	
business model innovation (2)	6	
business model innovation	1	
green business model	1	
green business model innovation	4	
business model lead	6	
different service models	1	
existing business models	1	
food delivery models	1	

Name	Sources	References
good revenue model	1	
green business model innovation	4	
green model	1	
imitating business model	1	
marketing strategy model	1	
modelling ownership	1	
organisational models	1	
present business models	1	
revenue model	3	
sustainable business model	1	
traditional business models	1	
challenges	7	
challenges companies	4	
current sustainability challenges	1	
important challenges	6	
major challenge channels	1	
primary challenges	1	
changes	12	
behaviour change	1	
behavioural change	4	
big change	1	
bringing changes	5	
certain changes	1	
change engineering	1	
changes something	1	
changing consumers	1	
changing ideas	1	
changing market paradigms	1	
changing needs	1	
changing technology	2	
incremental changes	1	
innovation changes	3	
positive change	1	
primary change	1	
real change	1	
required changes	1	

Name	Sources	References
significant changes	4	
social change	1	
strategical changes	1	
company	10	
1st company	1	
carpet manufacturing company	1	
challenges companies	4	
company operations	1	
delivering companies products	1	
delivering company	5	
different companies	1	
encouraged company	1	
example companies	1	
example-a company	1	
green company	1	
helping companies	1	
innovative company	2	
paper company	1	
private company	1	
rewards companies	1	
telecoms companies	1	
traditional company	1	
work company	1	
cost	8	
additional cost	1	
capital cost	1	
cash collection cost	1	
commercially cost	1	
cost benefit analysis	1	
cost implication	1	
cost recovery	1	
cost reduction	1	
cost structure	5	
face costs	1	
fuel cost	1	
significant cost	1	

Name	Sources	References
technological development cost structures	1	
customer	9	
bop customer	1	
conscious customers	1	
customer care	1	
customer division	1	
customer lifetime partner	1	
customer loyalty	1	
customer needs	1	
customer relationships	5	
customer requirements	1	
customers requirement q16	1	
different customer segments	1	
good customers	1	
improving customers	1	
large customer base	1	
overall customer experience	1	
role customers	5	
target customers	1	
thousand credit card customers	1	
Govt scheme	8	
employee suggestion scheme	1	
payment schemes	5	
re-inventing revenue scheme	5	
revenue schemes	2	
rural extension scheme	1	
specific payment schemes	1	
green	9	
business model green	5	
green business model innovation	4	
green company	1	
green financing platform	1	
green model	1	
green power	1	
green quotient	1	
green technology	3	

Name	Sources	References
impact	6	
economic impact	5	
environmental impact	5	
immediate impact	1	
impacting lives	1	
negative impacts	5	
positive impacts	1	
reasonable impact	1	
social impacts	3	
technological impact	5	
Industry sector	9	
development sector study	1	
different sectors	3	
distribution sector	1	
government sector	2	
health sector	1	
management sector	1	
private sector clients	1	
private sector program	1	
renewable energy sector	1	
sector lead	4	
solar sector	1	
innovation	12	
business model innovation	1	
deeply innovative	1	
dynamic innovation networks	1	
encouraging innovation	1	
green business model innovation	4	
ideal innovation	1	
innovation capabilities	1	
innovation changes	3	
innovation effect	1	
innovation game	1	
innovation implementation	1	
innovation risk	1	
innovation strategy	6	

Name	Sources	References
innovations suggestions	1	
innovative company	2	
innovative culture	2	
innovative employee	1	
innovative features	6	
innovative idea	2	
innovative manufacturing processes	1	
innovative marketing strategies	1	
innovative offerings	1	
innovative people	1	
innovative practices	1	
innovative products	3	
innovative tasks	6	
innovative thinking	1	
integrating innovation	1	
mind innovation	1	
much innovation	1	
particular innovation	1	
pretty innovative	1	
service innovations	1	
social innovations	1	
successful innovations	7	
technology innovation	2	
wher innovation	1	
management	10	
attendant risk management	1	
branch manager	1	
conventional management	1	
environmental management	1	
human resource management	1	
integrating supply chain management	1	
interviewee manager	1	
management sector	1	
management support	1	
management transaction	1	
middle managers	1	
process management	1	

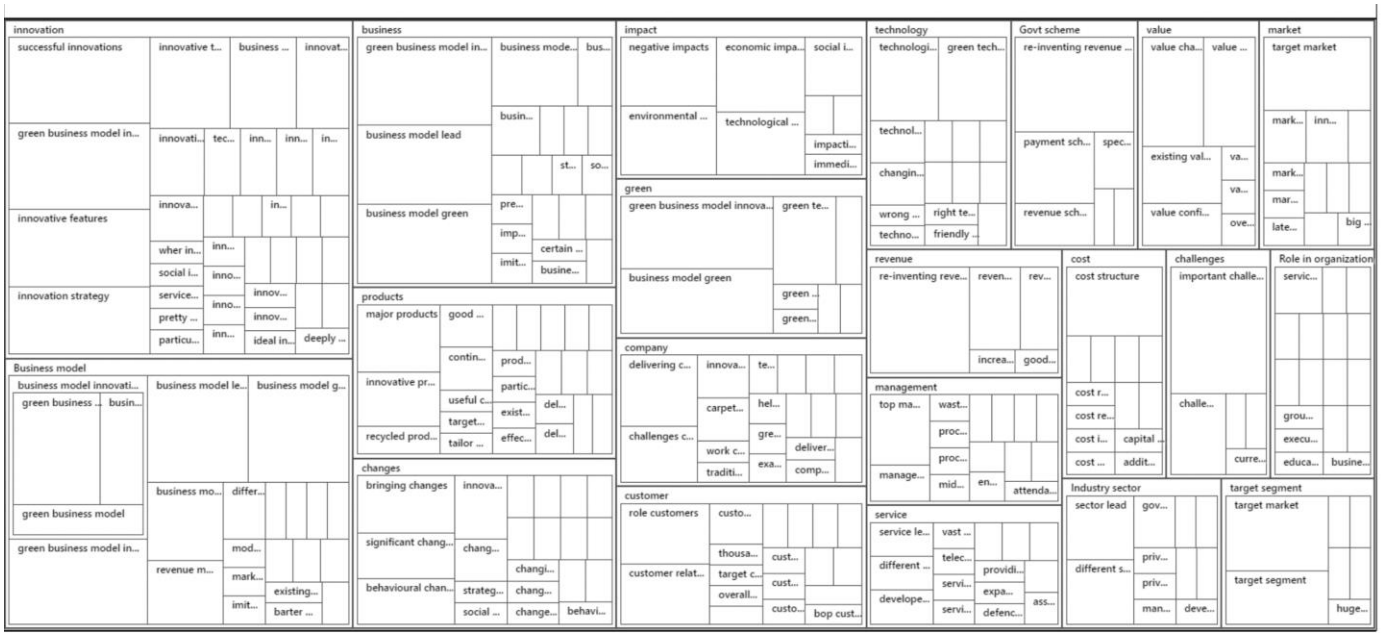
Name	Sources	References
process management hierarchy	1	
top management	4	
waste management professionals	1	
market	8	
big market	1	
bop markets	1	
changing market paradigms	1	
competitive market	1	
conventional marketing thinking	1	
innovative marketing strategies	1	
latent markets	1	
market practice	1	
marketing principles price	1	
marketing strategy model	1	
nations market	1	
target market	6	
products	11	
affordable products	1	
competing product	1	
continuous product improvement	1	
delivering companies products	1	
delivering products	1	
designing products	1	
developed products	1	
different product	1	
effective product	1	
existing products	1	
good quality products	1	
innovative products	3	
major products	5	
particular product	1	
product delivery	1	
product form	1	
product life cycles	1	
product quality	1	
production facilities	1	

Name	Sources	References
production side	1	
recycled products	1	
tailor products	1	
targeted product	1	
useful construction products	1	
revenue	7	
good revenue model	1	
increasing government revenues	1	
re-inventing revenue scheme	5	
revenue model	3	
revenue schemes	2	
Role in organization	9	
business level	1	
central level	1	
certain level	1	
education level	1	
executive level	1	
ground level	1	
house hold level	1	
household level	1	
individual consumption level	1	
junior level	1	
organisational level	1	
particular village level	1	
senior level	1	
service level benchmarks	1	
stakeholders level	1	
state level	1	
top level	1	
service	11	
associated services	1	
banking services	1	
defence services	1	
developed services	2	
different service models	1	
expanding service offering	1	

Name	Sources	References
providing service	1	
service delivery	1	
service innovations	1	
service level benchmarks	1	
service network	1	
services sale	1	
servicing carpets	1	
telecoms service provider	1	
vast ecosystem services	1	
target segment	10	
huge targets	1	
target audience	1	
target customers	1	
target market	6	
target population	1	
target segment	4	
targeted product	1	
technology	10	
changing technology	2	
chinese technology	1	
friendly technology	1	
green technology	3	
right technology	1	
sustainable technology	1	
technological development cost structures	1	
technological developments	1	
technological impact	5	
technology consulting	1	
technology group	1	
technology innovation	2	
technology side	1	
technology thing	1	
wrong technology	1	
value	7	
existing value chain	2	
overall brand value	1	

Name	Sources	References
valuable consumers	1	
valuable responses	1	
value chain	4	
value configuration	3	
value prepositions	5	

Hierarchy Chart for Nodes identified from Indian Companies Interviews



Nodes / Themes identified from South African Companies Interviews and coded using NVivo

Name	Sources	References
business	15	65
audit business partners	1	1
beneficial business agenda	1	1
business banker	1	1
business brands	1	1
business class	1	2
business decisions	1	1
business form partnerships	1	1
business model green	7	8
business model innovation	1	1
business model lead	5	9
business operation	1	1
business process	1	1
business process change	1	1
business process reengineering	1	2
business segment	1	1
business side quality	1	1
current business mission statement c	1	2
cutting business model innovation	1	1
double business turnover whilst	1	1
fund business model innovation	1	1
good business model	1	1
green business model innovation	6	14
joint business partnering	1	1
large business	1	2
negative increase business process c	1	1
non-green business models	1	1
present business model	1	1
recession time business model innov	1	2
re-inventing business model	1	2
sustainable business	1	1
traditional business model	1	1
business model	11	50
business model green	7	8
business model innovation	1	1
business model lead	5	9
company model	1	1

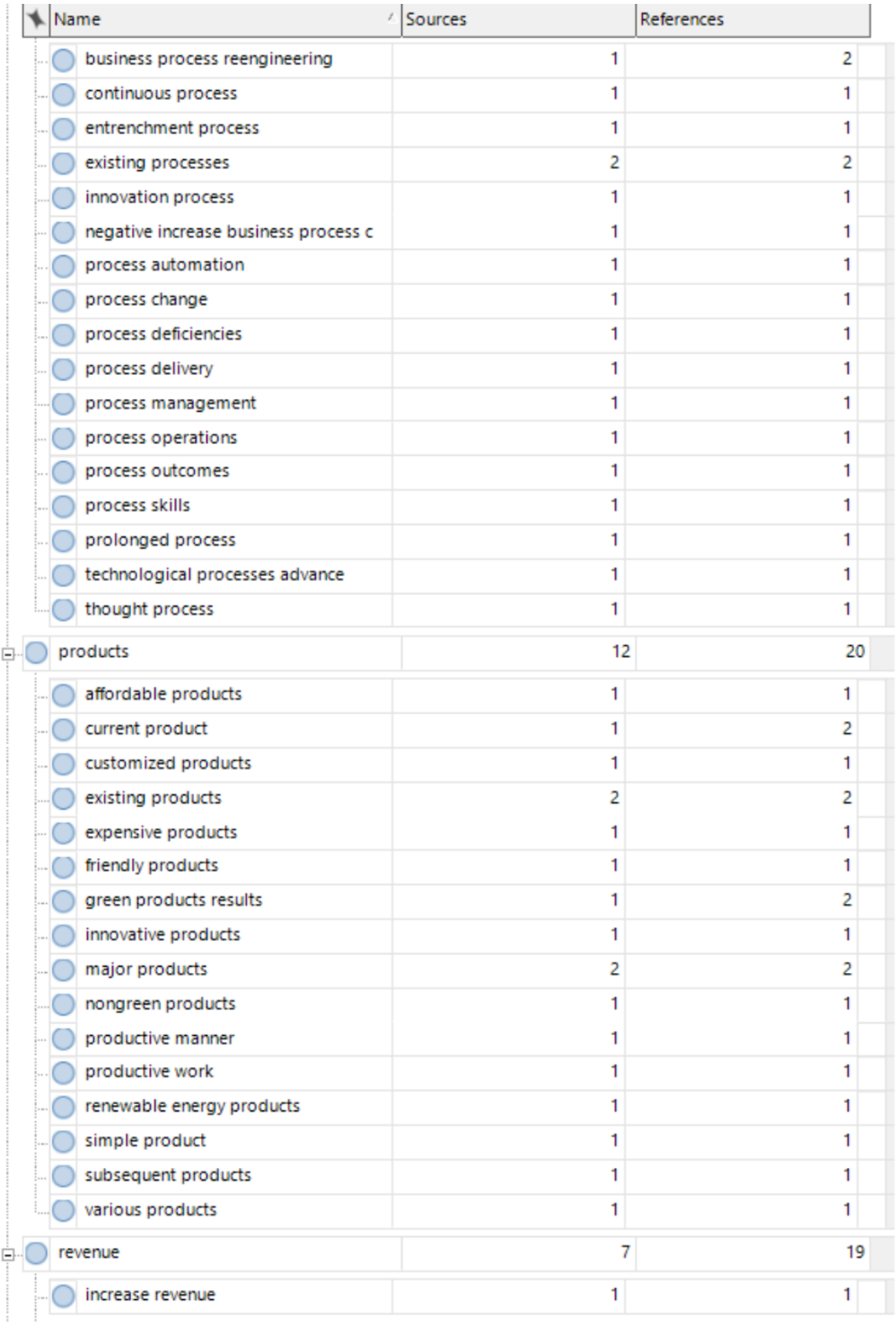
Name	Sources	References
cutting business model innovation	1	1
delivery model	1	1
fund business model innovation	1	1
good business model	1	1
green business model innovation	6	14
green model innovation	1	1
market revenue model	1	1
non-green business models	1	1
present business model	1	1
recession time business model innov	1	2
re-inventing business model	1	2
revenue model	4	4
traditional business model	1	1
change	11	19
bringing changes	2	2
business process change	1	1
change management	2	3
changing consumer habits	1	1
changing lives	1	1
changing market conditions	1	1
climate change	1	1
course change	1	1
fundamental changes	1	1
particular changes	1	1
process change	1	1
significant changes	3	3
successful change	1	1
things changes	1	1
company	12	29
automobile companies	1	1
big companies	2	3
cab company	1	1
challenges companies	2	2
company culture	1	1
company feasibility report	1	1
company model	1	1

Name	Sources	References
company resources	1	1
company throughput	1	1
delivering company	5	6
encouraged company	1	1
fertiliser companies	1	1
large mining company	1	1
next company	1	1
partnering company	1	1
positve companies	1	1
recession companies	1	1
retail companies	1	1
small company	2	2
supporting companies	1	1
customers	10	31
allowed customer service	1	1
becoming customers	1	1
bottom-of-pyramid customers	1	2
call center customers	1	1
conscious customers	1	1
current business mission statement c	1	2
customer care service	1	1
customer education channels	1	1
customer experience	1	1
customer relationships	4	4
customer satisfaction aspect	1	1
customers approval	1	1
customers expectation	1	1
customers technology	1	1
different customers	1	1
educating customers	1	1
existing customer	1	1
internal customers	1	1
repetion customer relationships	1	1
role customers	6	6
thus customers	1	1
Govt scheme	7	18

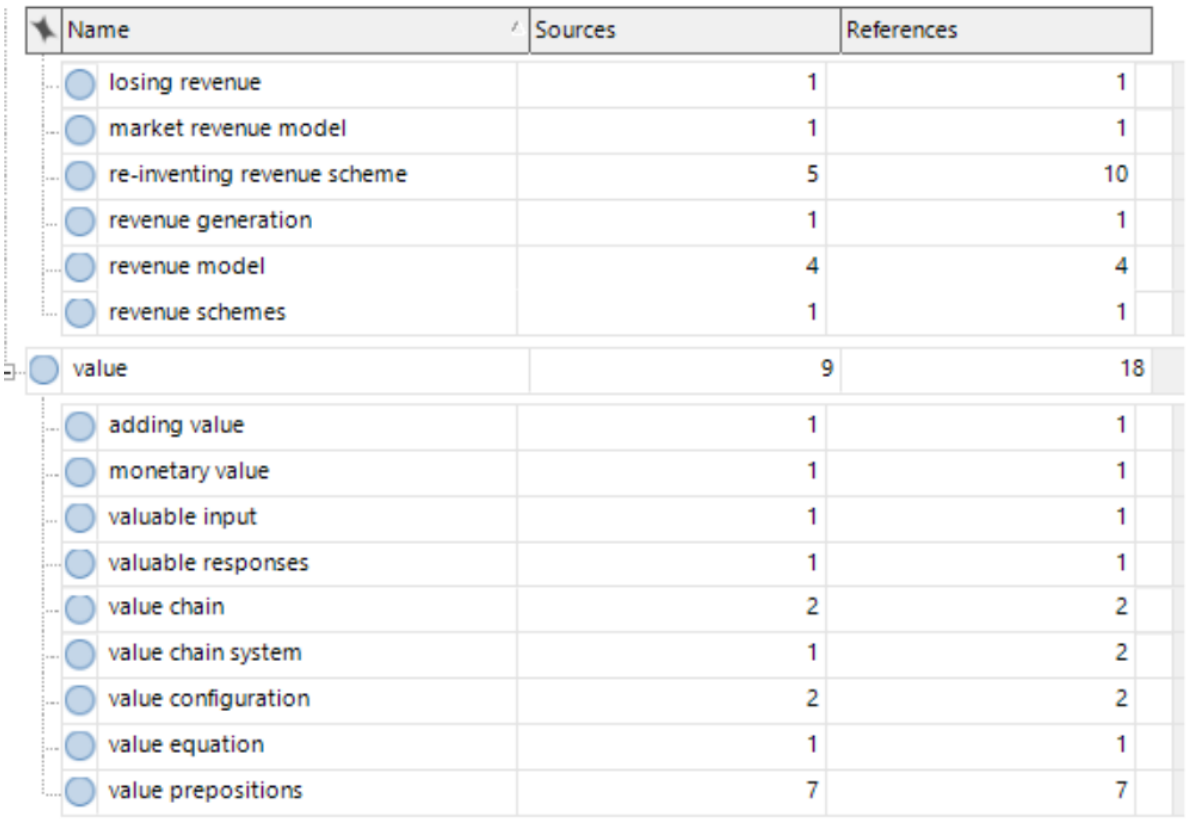
Name	Sources	References
government schemes	1	1
payment schemes	6	6
re-inventing revenue scheme	5	10
revenue schemes	1	1
green	15	69
business model green	7	8
green banking	1	1
green banking (2)	6	33
access banking services	1	1
bank cards	1	1
bank innovation strategy	1	3
bank operating	1	1
bank problems	1	1
bank wold face	1	1
banking applications	1	1
banking apps	1	1
banking hassle	1	1
banking industry	1	2
business banker	1	1
certain banking facilities	1	1
example internet banking	1	1
forcing banks	1	1
green banking	1	1
internet banking	1	1
mobile banking	2	3
motor bank	1	1
online banking	1	2
owned bank	1	1
private banker	1	1
providing banking services	1	2
public sector banks	1	1
raisha bank	1	1
researve bank	1	1
rural areas bank	1	1
green bond	1	1
green buildings	1	1

Name	Sources	References
green business model innovation	6	14
green finance	1	1
green goals	1	2
green model innovation	1	1
green partners	1	1
green peace	1	1
green policy	1	1
green products results	1	2
green technology space	1	1
greening organisation	1	1
innovation	15	105
african innovation	1	1
bank innovation strategy	1	3
business model innovation	1	1
cutting business model innovation	1	1
destructive innovation	1	1
fund business model innovation	1	1
good innovation	1	1
great innovation	1	1
green business model innovation	6	14
green model innovation	1	1
implementing innovation	1	1
innovating something	1	1
innovation department	1	1
innovation practices	2	2
innovation process	1	1
innovation strategy	6	10
innovative culture cost structure	1	1
innovative efforts	1	1
innovative features	6	6
innovative ideas	4	8
innovative products	1	1
innovative tasks	6	6
innovative twist	1	1
innovative ways	1	1
model innovation	7	20
business model innovation	1	1

Name	Sources	References
cutting business model innovatio	1	1
fund business model innovation	1	1
green business model innovation	6	14
green model innovation	1	1
recession time business model in	1	2
particular innovation	1	1
promoting innovation strategy	1	1
recession time business model innov	1	2
solar energy innovation	1	2
successful innovations	6	7
technological innovation	2	4
thinking innovation	1	1
whole innovation	1	1
market	11	27
booming markets	1	2
changing market conditions	1	1
competitive markets	1	1
good market share	1	1
large market segment	1	1
low income market	1	1
market consolidation	1	1
market perception	1	1
market pull	1	1
market researchers	1	1
market revenue model	1	1
marketing side	1	1
marketing skill	1	2
mass market	1	1
normal market	1	1
rural markets	1	1
senior marketing	1	1
target market	6	7
traditional market	1	1
process	8	21
business process	1	1
business process change	1	1

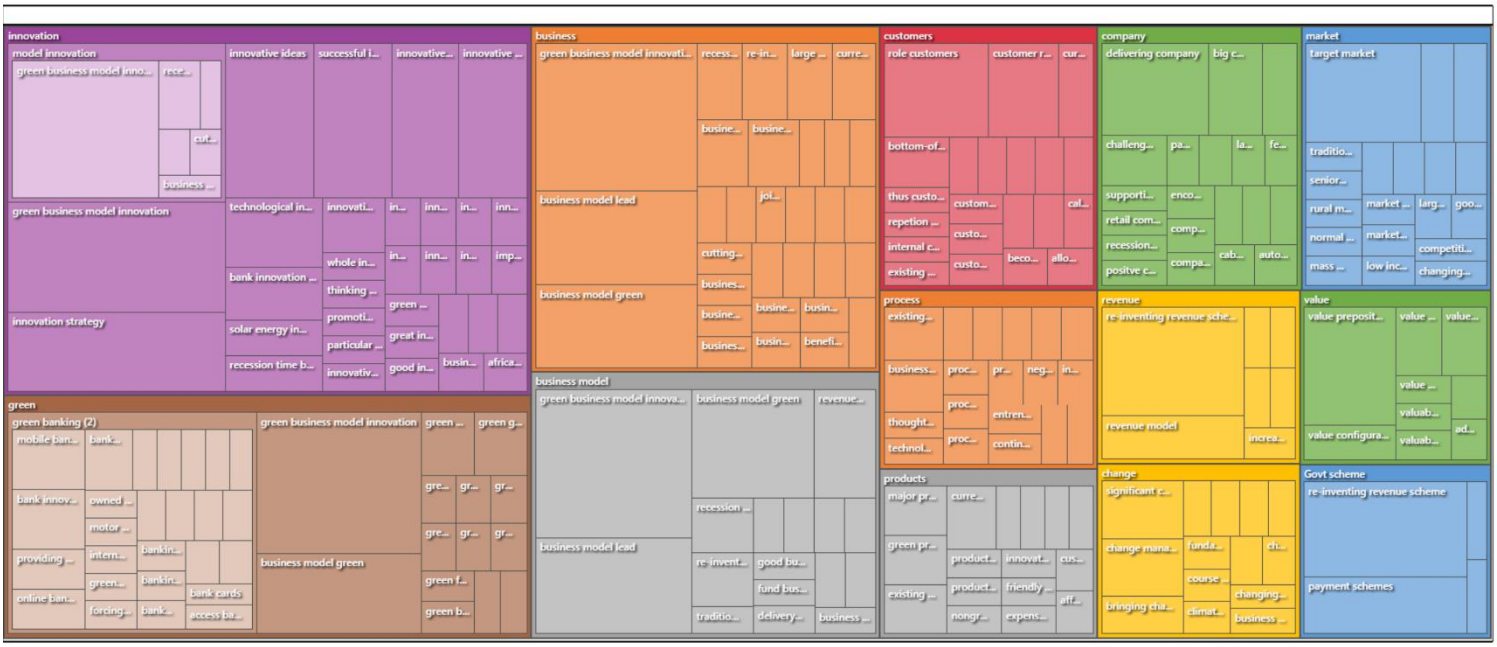


Name	Sources	References
business process reengineering	1	2
continuous process	1	1
entrenchment process	1	1
existing processes	2	2
innovation process	1	1
negative increase business process c	1	1
process automation	1	1
process change	1	1
process deficiencies	1	1
process delivery	1	1
process management	1	1
process operations	1	1
process outcomes	1	1
process skills	1	1
prolonged process	1	1
technological processes advance	1	1
thought process	1	1
products	12	20
affordable products	1	1
current product	1	2
customized products	1	1
existing products	2	2
expensive products	1	1
friendly products	1	1
green products results	1	2
innovative products	1	1
major products	2	2
nongreen products	1	1
productive manner	1	1
productive work	1	1
renewable energy products	1	1
simple product	1	1
subsequent products	1	1
various products	1	1
revenue	7	19
increase revenue	1	1



Name	Sources	References
losing revenue	1	1
market revenue model	1	1
re-inventing revenue scheme	5	10
revenue generation	1	1
revenue model	4	4
revenue schemes	1	1
value	9	18
adding value	1	1
monetary value	1	1
valuable input	1	1
valuable responses	1	1
value chain	2	2
value chain system	1	2
value configuration	2	2
value equation	1	1
value prepositions	7	7

Hierarchy Chart for Nodes identified from South African Companies Interviews



APPENDIX F: ETHICS CERTIFICATE

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Gujral

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H15/03/03**
PROJECT TITLE	Business model Innovation for sustainable development: green technologies and BOP (Bottom of Pyramid) in emerging countries: South Africa and India
INVESTIGATOR(S)	Ms M Gujral
SCHOOL/DEPARTMENT	SEBS/
DATE CONSIDERED	20 March 2015
DECISION OF THE COMMITTEE	Approved unconditionally
EXPIRY DATE	01 September 2018

DATE 02 September 2015 **CHAIRPERSON** J. Knight
(Professor J Knight)

cc: Supervisor : Dr R Chinomona

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

Meenakshi Gujral
Signature

07 / 09 / 2015
Date

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

APPENDIX G: LANGUAGE PRACTIONER DECLARATION

LANGUAGE PRACTITIONER DECLARATION

School of Economic and Business Sciences

University of the Witwatersrand

I, Ravi Beldi, am the holder of the following qualifications: Charted Accountant and part of Editing & Proofreading SETS, India. I certify that I am the language editor for Meenakshi Gujral, a candidate for the degree of in Marketing at the Faculty of Commerce, Law and Management, University of the Witwatersrand, Johannesburg, South Africa.

Her thesis is entitled: Business Model Innovation for Sustainable Development: Green Technologies and BOP (Bottom of Pyramid) in Emerging Countries: South Africa and India.

I hereby certify that I have edited the language usage and referencing in her thesis document in its entirety and believe that it is ready for examination.

LANGUAGE PRACTITIONER — 18 December 2016 Date

STUDENT — 18th Dec 2016 Date