Business Model Reinvention for Enabling Disruptive Innovation

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A dissertation submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, Johannesburg in fulfillment of the Degree of Doctor of Philosophy.
Johannesburg
May, 2011

ABSTRACT

Over the last two decades, extensive research has been undertaken to understand incumbent firms' adaptation behavior to disruptive innovation, considering technological change as the most important focus of analysis. Recently, there is an emerging literature that views disruptive innovation as a business model problem in which a technological innovation is deployed. In this literature, disruptive innovation is understood to be primarily a function of conflict between an incumbent's traditional and an entrant's new business model. This raises two major questions.

First, although the original theory of disruptive innovation evolved from technological studies, this theory persists to explain all types of disruptive innovation over time (Markides, 2006: 19). Furthermore, disruptive innovation has always been studied from an incumbent firm perspective. With the need to shift the research focus from a technology to a business model, we also need a new framework to understand disruptive innovation taking the business model as the unit of analysis taking both the entrant's and incumbent's perspectives. Building on business model innovation studies (Govindarajan and Gupta, 2001; Normann, 2001; Hamel, 2000) and the established technology based disruptive innovation theory (Christensen and Raynor, 2003; Christensen, 1997), this study offers a systematic business model framework to comprehend disruptive phenomenon from both an incumbent's and an entrant's perspectives.

Second, disruptive innovation studies predominantly focus on high-tech industries. Increasingly many low-tech industries are being affected by disruptive non-technological market-driven business model innovations. Considering that disruptive innovation theory is principally

technology based, a review of the literature suggests that we know little about the differences between high-tech and low-tech market-driven disruptive innovations in terms of their evolutions, competitive and disruptive effects.

From the strategic management literature point of view, the contribution of this study becomes even more relevant when the two questions are examined across economic regions. Although there is ample evidence that shows disruptive innovations are not always restricted to developed economies, little is known about how incumbents in developing economies adapt their organizations to disruptive business model innovations. This study takes South Africa as a development economy case-study. The empirical setting of the current study includes four South African industries: the mobile and IT industry (high-tech), banking, insurance and airlines (low-tech) industries.

In addressing the two key question of the study, the dissertation presents the empirical analysis at the first-order (firm-level study) and second-order (high-tech vs. low-etch study) levels. The first-order study argues that an innovation creates and grows a niche market through radical product design, different core competencies and/or a different revenue model long before it becomes disruptive innovation. It proposes a framework that attempts to model the evolution of this trajectory from an entrant's perspective. From the entrant's perspective, a potentially disruptive business model innovation is a process that evolves over time in successive adaptations to endogenous and exogenous innovation drivers that shape the evolution and path of the new business model. An innovation becomes disruptive only when the new business model fully or partially affects an incumbent's established business model and market.

Taking the viewpoint of an incumbent firm, the first-order study further offers a framework that seeks to provide a causality model to comprehend the root cause of disruptive innovation and its impact on the incumbent's traditional business model. One of the major causes of disruptive innovation is the incumbent's entrepreneurial dilemma. This means that an incumbent's success or failure is partly contingent on the senior corporate management's entrepreneurship readiness that is manifested in terms of taking risk initiative, willingness and ability to take appropriate strategic approaches to enable disruptive innovation. By articulating the causes of disruptive innovation, it suggests four key strategic approaches an incumbent should follow to enable disruptive innovation. While the study finds common patterns for the causes and approaches among incumbents across the four industries at a firm-level, some of the hypotheses of this study could not be proven at an aggregated system level. Disruptive innovation is a relative phenomenon: Some innovations that are disruptive to some firms or industries may not be disruptive to other firms or industries. Therefore, the study further re-examines the aggregated firm-level outcomes by disaggregating the data into dichotomous technology versus market-driven disruptive innovations. By conducting a second-order analysis at the innovation category level, this study adds considerably to extant innovation literature by establishing that a low-technology *market-driven* disruptive business model innovation entails different business model evolutionary processes, different disruptive effects and different managerial implications compared to high-tech disruptive innovation.

Declaration

I hereby declare that this dissertation is my own unaided work except where due recognition has been given. It is submitted for the degree of Doctor of Philosophy in the University of the Witwatersrand, Johannesburg. It has not been submitted for any other degree in any other university.

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6th May, 2011

Johannesburg

To my kids, Filmon and Suzan, who gave me a reason to complete my PhD.

ACKNOWLEDGMENT

My deepest appreciation goes to my parents, Russom Habtay and Letengus Habtemariam, for their ever lasting support, prayers and blessings. I thank Professor Giampaolo Garzarelli for his willingness to act as a supervisor. I extend my gratitude to Professor Gregory John Lee for his valuable assistance on the statistical methods and useful comments that helped me to improve the thesis, to Professor Kalu Ojah for his insightful comments on the theoretical chapters, to Professor Robert Vivian, Professor Roger Sinclair and Volker Schoer for providing industry contacts for interviews and data collection, and to my research assistants, Natasha Fundanellasz, Claire Sebastiao and Nikita Brocco for their hard works in carrying out the survey, arranging and conducting interviews, follow-ups, proof-reading and editing my thesis. Finally, my sincere appreciation goes to the School of Economic and Business Sciences (SEBS), Carnegie - Wits Transformation Office, and NRF for granting funds and leave to complete this dissertation.

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ABBREVIATIONS AND MAJOR SYMBOLS

AM	Asymmetric Motivation
B2B	Business to Business
B2C	Business to Consumer
BM. SEP	Business Model Separation
CAPEX	Capital Expenditure
CI	Continuous Innovation
COMP	Competition
CONFL	Conflict
CONST	Constraint
DI	Disruptive Innovation
DV	Dependent Variable
FSC	Financial Sector Charter
FSM	Financial Sophistication Measure
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
H	Hypothesis
IG	Innovation's Growth
INV	Involvement
IP	Incumbent's Performance
ISP	Internet Service Provider
IV	Independent Variable
LCC	Low-Cost Carrier
LSM	Living Standard Measure
LV	Latent Variable
NGN	Next Generation Networks is a general term used to describe some major architectural innovations in the telecommunications that will be utilized over the coming 5 – 10 years.
M	Moderator
MV	Moderating Variable
MNO	Mobile Network Operator

MPLS	Multi Protocol Label Switching is a data-carrying mechanism that belongs to the family of packet-switched networks
OPEX	Operating Expenditure
ORG. SEP.	Organizational Separation
PROC FACTOR	SAS 9.2 Procedure Code for Exploratory Factor Analysis
PROC REG	SAS 9.2 Procedure Code for Regression Analysis
RA	Relative Advantage
RBV	Resource Based View of the Firm
SMS	Short Message System
VC	Value Chain
VoIP	Voice over Internet Protocol
USSD	Unstructured Supplementary Service Data
WAP	Wireless Application Protocol
WiMAX	Worldwide Interoperability for Microwave Access
3G	3G is the latest GPRS technology.
r^2	Squared Multiple Correlation
β	Standardized Coefficient
$\chi 2$	Chi-square

CHAPTER ONE: INTRODUCTION

1.1 Introduction

Business environments constantly change, sometimes continuously and sometimes discontinuously. The persistent nature of this problem continues to generate extensive research streams. Some scholars argue that although complex and multiple dimensions of uncertainty interact to create an environment that is virtually impossible to predict, discontinuous change is a rare phenomenon. This type of change tends to be neutralized as industry incumbents adapt it. With some isolated exceptions, change takes place incrementally: its impacts on industry structure appear to be slow on average (Campbell and Park, 2004, Treacy, 2004; Porter, 2001; 1996; Grant, 1998; Courtney, Kikland & Viguenrie, 1997).

Others maintain that a wide range of industries are at a 'tipping point', where compounding and gradual effects of change cause an 'inflection point'. In other words, many industries are in a transition state from an old to a new structure (Davenport, Leibold & Voelpel, 2006; Tapscott, Ticoll & Lowy, 2001; Clark and Clegg, 2000; Prahalad and Oosterveld, 1999; Hamel, 2000; 1998; Evans and Wurster, 1997; Grove, 1996)

Discontinuous innovation is defined as an innovation that causes market and/or technological discontinuities (Macher and Richman, 2004: 90). Discontinuities often arise from many sources including radical and disruptive technological innovations. Radical innovation refers to a different set of scientific and engineering principles which displaces a previously established dominant design of a technology (Dewar and Dutton, 1986: 1422). However, although this type of innovation may cause technological discontinuities, it is arguably presumed to be less disruptive to industry incumbents because its imminent threat of obsolescence to existing dominant design tends to be obvious to incumbents' managers from the outset (Henderson and Clark, 1990: 18).

This thesis focuses on a particularly challenging discontinuous innovation that incumbents' managers tend to find difficult to recognize or anticipate. This type of discontinuous innovation is called "disruptive innovation" and that is defined as an innovation that introduces new products or services that initially emerge in a niche, low-end market, but over time displaces market incumbents by successively moving up-market through performance improvements. Disruptive innovation is defined in comparison to sustaining innovation. Sustaining innovation, whether incremental or radical, is one that does not disrupt incumbents business models (Christensen, 1997: 8; Christensen and Raynor, 2003: 34).

A consistently recurring theme throughout the studies of disruptive innovation is that almost all established organizations across a wide range of industries succeed in managing sustaining innovations, but fail to effectively adapt their organization when faced with disruptive innovations. However, new entrants often succeed in disruptive innovation (Anthony, Eyring, & Gibson, 2006; Henderson, 2006; Gilbert, 2003; Christensen and Raynor, 2003; Christensen, 1997).

To a large extent, technological change has always been considered a major cause of disruptive innovation. Recently, there is an emerging view that considers change in a business model, as opposed to a technology alone, to be a major cause of disruptive innovation. Disruptive innovation is now defined as a function of a conflict between a pioneer's disruptive and incumbent's traditional business models (Christensen, 2006: 43; Markides, 2006: 19; Chesbrough and Rosenbloom, 2002: 533). Many scholars have provided useful frameworks and approaches to assist industry incumbents to deal with disruptive innovation (Markides and Charitou, 2004; O'Reilly and Tushman, 2004; Christensen and Raynor, 2003; Chesbrough, 2003).

However, a scrutiny of the literature reveals that many of these studies focus on disruptive problems facing industry incumbents. With the emerging view that defines disruptive innovation as a function of a conflict of business models, relatively few studies provide insights into the two sides of the disruptive innovation problem, i.e., how entrants introduce a potentially disruptive business model innovation and how industry incumbents reinvent their business models to enable disruptive innovation. Therefore, the purpose of this thesis is to introduce an integrated framework for business model innovation (proactive) and business model reinvention (reactive) strategic processes to enable disruptive innovation.

The notion of "enabling" is this thesis refers to expropriation, stimulation and to exploitation by reinventing a second business model for an innovation that has already been created internally by an incumbent or externally by disruptors and grown in a niche market (see Voelpel, Liebold, Tekie & von Kgrogh, 2005; Govindarajan and Gupta, 2001). In this thesis, the terms incumbents and established companies are used alternatively to refer to companies that have been operating traditional business models that existed before the introduction of disruptive innovation.

Conversely, the terms start-ups, entrants or insurgents are used alternatively to refer to new companies that have introduced potential disruptive innovation.

Firstly, this chapter reviews the relevance of the thesis from a theoretical perspective; secondly, it provides its rationale from the perspective of a strategic management practice in developing economies. Thirdly, it identifies gaps in the strategic management literature, and presents the thesis's questions and objectives. Fourthly, it introduces the research methodology and design. Finally, it outlines the structure of the thesis.

1.2 Relevance of the Study from a Theory Perspective

The foundation of disruptive innovation theory, as a simultaneous destructive and creative production process, is commonly traced back to the seminal work of Joseph Schumpeter (1942). In his breakthrough study of 'gales of creative destruction', Schumpeter (1942: 83) observed that waves of discontinuous technological innovations destroy old industries while creating new ones. Owing to the Schumpeterian theory of 'creative destruction', disruptive innovation provides specific technological characteristics through which an innovation evolves over time to displace market incumbents. Typically, disruptive innovation emerges initially in small, low-end markets, with inferior quality relative to established technology. Over time, it displaces the market incumbents by successively moving up-market through performance improvements (Christensen, 1997: 8; Christensen and Raynor, 2003: 34).

Most recent elaborations of this theory show that disruption occurs at the intersection point between new and existing (old) markets, when a fundamentally different (new) business model transgresses an incumbent's established business model. Theoretically, a particular incumbent's business model originates from its early strategic choice made on how it intends to compete in its chosen industry and market. This choice sets a departure point for a particular evolutionary path (history) which shapes the structure and direction of the incumbent's business model.

In this evolutionary process, the fit that has evolved over a period of time between different capabilities of the incumbent's business model, including its processes, resources, values and profit models make it rather difficult for the incumbent to respond to another disruptive business model that is destroying its market. Consequently, for an established firm the question of how to reinvent a business model to enable disruptive innovation, while its traditional business model is still profitable, becomes a key issue of survival in the long run (Christensen and Raynor, 2003: 34; Normann, 2001: 82; Leonard-Barton, 1992: 111).

The emerging scholarly perspective that views disruptive innovation as a business model problem, not only a technology problem, seems to trigger two possible research gaps. First, this new understanding suggests a shift of research focus and unit of analysis from a technology to a business model. Although the original disruptive innovation theory was developed from successive technological studies, few studies have tried to explain disruptive innovation using the concept of a business model. A business model approach considers all aspects of business activities for possible disruptive innovation, not only a technology (Markides and Charitou, 2004; Christensen and Raynor, 2003).

From an insurgent's perspective, few researchers have invoked a business model concept to guide managers in pursuing innovation processes through systematic conceptual frameworks. However, there seems to be little effort to link these approaches with disruptive innovation theory. Business model innovation is a necessary first step that paves the way for a potential disruption. Yet, innovation of a commercially viable business model *per se* does not necessarily lead to disruptive innovation on its own (see Voelpel et. al., 2005; Govindarajan and Gupta, 2001; Amit and Zott, 2001).

By integrating the business model innovation approaches into the disruptive innovation theory, a new framework is needed to describe how a potentially disruptive business model innovation arises, becomes a problem to industry incumbents and how incumbents reinvent their business models to deal with disruptive innovation. The framework should identify the enabling or disabling processes through which a potentially disruptive business model originates from a niche market, improves over time, enters into a mainstream market, and succeeds or fails to dislocate incumbents' markets. It should further describe the enabling and disabling forces that determine success or failure of incumbents in reinventing a second business model to enable disruptive innovation.

Second, although the original theory of disruptive innovation evolved over time from studies on high-tech industries, the same theory has been used to explain all categories of disruptive innovations over time. While there are many examples of disruptive innovations that arise due to market-driven business model innovations in low-tech, it is little known whether the original disruptive innovation can be replicated to predict this type of innovation. In low-tech industries, market-driven business model innovation often emerges at a later stage when a market matures and competition through a business model becomes critical (Markides, 2006: 19; Moore, 2004: 88).

A careful scrutiny of the literature reveals that most studies of disruptive innovation focus on high-tech industries. In response to academic criticism on the theoretical replication of disruptive innovation theory (Markides, 2006; Tellis, 2006; Danneels, 2004), Christensen (2006: 48) recently improves his original theory by adding the concept of relativity. He states that "disruptive innovation is a relative, not an absolute phenomenon". Said differently, a similar innovation that may constitute disruptive to a particular incumbent's business model in a given industry or context may be sustaining to another incumbent's business model in another industry or context. This suggests that a study of disruptive innovation is not complete without describing the relativity of disruptive innovation and explaining contextual factors responsible for variations across different innovations and industries. Therefore, there is a need to investigate the relativity of disruptive innovation theory empirically. As a second contribution, this thesis seeks to investigate this relatively by testing the disruptive innovation theory across high-tech and low-tech industries in the South African context (Christensen, 2006; Markides, 2006).

1.3 Relevance of the Study from a South African Practice Perspective

From a strategic management literature point of view, the question of how organizations should reinvent their business models to enable disruptive innovation becomes even more relevant when it is examined across economic regions. Although there is ample evidence that shows disruptive business model innovations are not always restricted to developed economies, little is known about how innovators and managers in emerging economies replicate or adapt disruptive business model innovations, given the distinguishing features of these different economies (Davenport et al., 2006; Prahalad, 2006). The variations in factor endowments and access to critical resources between developed and developing economies could probably mean that managers face different challenges in their strategic endeavors to enable disruptive business model innovation. Chesbrough (1999) provides some examples of differences among countries within developed economies, but not for developed vs. developing economies.

With a rapidly emerging economy, and being a first-follower of the first world in adapting innovations, South Africa one logical choice for studying this problem. The importance of this point can be illustrated by comparing the global change drivers with domestic situations, and thus their implications for business model innovations in South Africa[1].

Technological innovation: Advances in information and computer technology (ICT) substantially decrease transaction costs, and thus drive innovation of new business models, new organizational arrangements, new structures and new products (Clark and Clegg, 2000; Evans and Wurster, 1997). South Africa is characterized by a mixture of developed and developing economies. While the country is adapting technological innovations to create cheaper, easy to use and convenient products for its educated and affluent customers, the majority of the population lacks the means and access to benefit from such innovations.

[1] For detailed discussion on drivers of the 'innovation economy' see Chesbrough, (2003); Foster and Kaplan (2001); Tapscott et al. al., (2000); Clarke and Clegg (2000); Prahalad and Oosterveld (1999).

Access to capital and knowledge: Generally, knowledge is considered a key source of wealth in the 21st century. In developed economies, the rising power and mobility of knowledge workers, coupled with the rise in private venture capitalists have increasingly threatened established firms, which were previously able to raise entry barriers by utilizing financial strengths and patents (Chesbrough, 2003: 38). In South Africa, however, it appears that while small start-ups struggle to access venture capital, some diversifying entrants seem to leverage their financial and physical resources to introduce new business models into other industries[2].

Prosumerism: The shift in customer orientation from passive buyers to (pro) active co-creators is characterized by the term 'prosumerism' (Gibbert, Leibold & Probst, 2002: 464). The advance of information technology is increasingly transforming customers from passive consumers to pro-active participators in co-production. This shift is generally considered as a key driver for agile companies to reinvent their business models in a way that can engage customers to take part in producing their own value. In South Africa, while this seems to be happening at the high-end market, at the lower-end, poverty; unemployment; and accessibility are major challenges (or opportunities) for innovation.

Globalization, deregulation and privatization: These three factors have intensified competition by blurring national and industry boundaries, and forcing companies to be more innovative than ever. Some of these were predominantly domestic, fragmented and protected by regulation (Clark and Clegg, 2000; Prahalad and Oosterveld, 1999). In South Africa, although the reintroduction of the country into the global economy in 1994 created many opportunities,

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[2]Lagace, Martha (2006). How South Africa Challenges Our Thinking on FDI, interview with Eric Werker on November 6, 2006, Harvard Business School, Working Knowledge retrieved on 4 Feb, 2007 from http://www.hbs.org

regulation is still used to limit international cooperation and competition (Dorsey and Jacob, 2005: 1; Porteous and Hazelhurst, 2004: 2).

1.3.1 The Impacts of Driving Forces on Disruptive Business Model Innovation

Broadly viewed, South African managers take three approaches to business model innovation in response to various domestic and global change impacts when examined over three major eras. The classification of these eras is necessary for generalization purposes. In reality, an archetype business model of one era overlaps with another era.

The first archetype business model reflected Henry Ford's industrial era or mass production model and Frederick Taylor's philosophy of scientific management and specialization of labor. It was characterized by vertical integration: with command-and-control hierarchical structure, centralized communication and cost control, and top-down strategic planning. And it was tuned towards the objective of achieving scale and scope of production through mass production of relatively standardized products and services. This type of business model worked well before the country's reintroduction to the global economy in early 1990s, when the business environment was relatively predictable and immune from fast changing global influences.

Towards the second half of the 1990s, social and political changes, coupled with accelerating global technological innovations, allowed South African organizations to gain efficiency through process innovations. The process innovations that are prevalent in many South African corporations can be expressed by concepts such as 'just-in-time' (JIT); total quality management (TQM); business process engineering (BPR); and supply-chain management. These approaches are generally referred to as 'continuous innovations', which are aimed to improve established business models without major changes in structural components and designs (Quinn, 1997; Dawson and Palmer, 1995; Hammer and Champy, 1993; Cusamano, 1985).

Beginning in the early years of 2000, the rapidly evolving market structure and global influences of disruptive business model innovations forced large corporations to rethink hard about their traditional business models. Calling for total transformation of business organizations, Normann (2001: 82) contends that incremental improvement often becomes a trap from the inside of which organizations fail to notice that the rules of the game are changing quicker than the company, or that the company fails to see the rules of the game have been entirely disrupted.

South Africa's traditional corporations first seemed to receive such warning with mixed reactions. While some incumbents ignored all the disruptive impacts of new business models, others attempted to respond without changing their business models. For example, in the early 2000s full-service airlines operators responded to the newly introduced disruptive low-cost carriers (LCC) by cutting prices or increasing marketing expenditures.

Between 2005 and 2010, it can be observed that a number of large, medium and small enterprises are undertaking structural innovations across a number of industries (Davenport et. al., 2006; Grulke and Silber, 2004). See Table 1.1 for industry examples of recently introduced potentially disruptive business models in South Africa. The various business model innovations taking place in the country can be identified by a range of academic terms found in the literature, including 'virtual corporation' (David and Malone, 1992), 'business ecosystem' (Iansiti and Levien, 2004; Moore, 1993), 'outsourcing', 'business-web' (Tapscott et. al., 2000), 'networked incubators'

(Hansen, Chesbrough, Nohria & Sull, 2001) and 'open-innovation' (Chesbrough, 2003). In view of the country's unique contextual factors discussed above, little is known about how these approaches are being introduced by entrants and being adapted or reinvented by industry incumbents.

Table 1.1: Industry Examples of Potentially Disruptive Business Models in South Africa

Industry	Value propositions emphasized by traditional business models	Value propositions emphasized by new business models	Pioneering companies
Banking	Extensive, nationwide branch network and personal service	Reaching previously un-banked customers through mass retailers' distribution channels, mobile banking, 24-hour access, convenience, low fees	Wizzit, MTNBanking, Gobanking, PostNet, Capitec Bank
Insurance	Personal, face-to-face advice through an extensive agent network	Disintermediation, convenience and low commission rates	Outsurance, 1Lifedirect Dial Direct
Airlines	Hub-and-spoke system, premium service, meals, baggage, checking	Disintermediation, low price, no frills	Kulula.com, 1time.com, Mango
Retailing	Low-end discount stores based on economies of scale and scope, location, wide range of choices	High-end specialty stores based on lifestyle and trends	Woolworth
Telecommunication	Mobile cellular network	VoIP over 3G mobile network, mobile social networking	Vodacom, MTN

1.4 The Research Gap and Focus

Based on the above reviews of strategic management theory and practice, this thesis identifies the following primary and secondary research gaps:

Primary research gap:

With the emerging academic understanding that disruptive innovation is a function of conflict between an insurgent's disruptive and incumbent's traditional business model, a careful scrutiny of the literature reveals that little is known about how entrants introduce a potentially disruptive business model innovation, and how established organizations reinvent their business models to enable disruptive innovation.

Secondary research gap:

Recently, although there is an emerging view that considers change in a business model, as opposed to just a technology alone, to be a major cause of disruptive innovation, the disruptive innovation theory continues to treat all categories of disruptive innovations in the same way. The literature reveals that it is little known whether the same theory can be replicated to explain technology-push disruptive innovations and market-driven disruptive business model innovations in the same way (Markides, 2006: 19).

The above two research questions become more relevant to both theory and practice particularly when the extant studies on disruptive innovation are examined across economic regions. In general, existing innovation research, to a considerable degree, focuses on challenges of disruptive innovations facing high-tech industries in developed economies (Christensen, 2006; Henderson, 2006; O'Reilly and Tushman, 2004; Gilbert, 2003; Tushman and Anderson, 1986).

Very few comprehensive studies exist that provide insight into how companies introduce potentially disruptive innovation or reinvent their business models to enable disruptive innovations in developing economies. Examples in developing economies such as the South African mobile, airlines, banking and insurance industries show that disruptive innovations are no longer restricted to developed economies. Thus, South Africa provides a good case to investigate this study in a developing economy setting (see Davenport et. al., 2006; Grulke and Silber, 2004; Prahalad, 2006).

Not corresponding with this development, however, strategic management research has inadequately progressed to provide managers in developing economies appropriate and systematic conceptual frameworks to deal with the increasing occurrence of disruptive innovations in their industries. Taking into consideration the differences in business infrastructure, factor endowments and access to resources between developed and developing economies, there is a need to investigate through which disruptive business model innovation emerges in developing economies.

1.5 Research Question

The above research gaps and inadequacies highlight the need for an integrated framework for business model reinvention for enabling disruptive innovation. Therefore, the primary research question of this thesis is:

- How should companies reinvent their business models to enable internally or externally induced disruptive innovations?

The secondary question is:

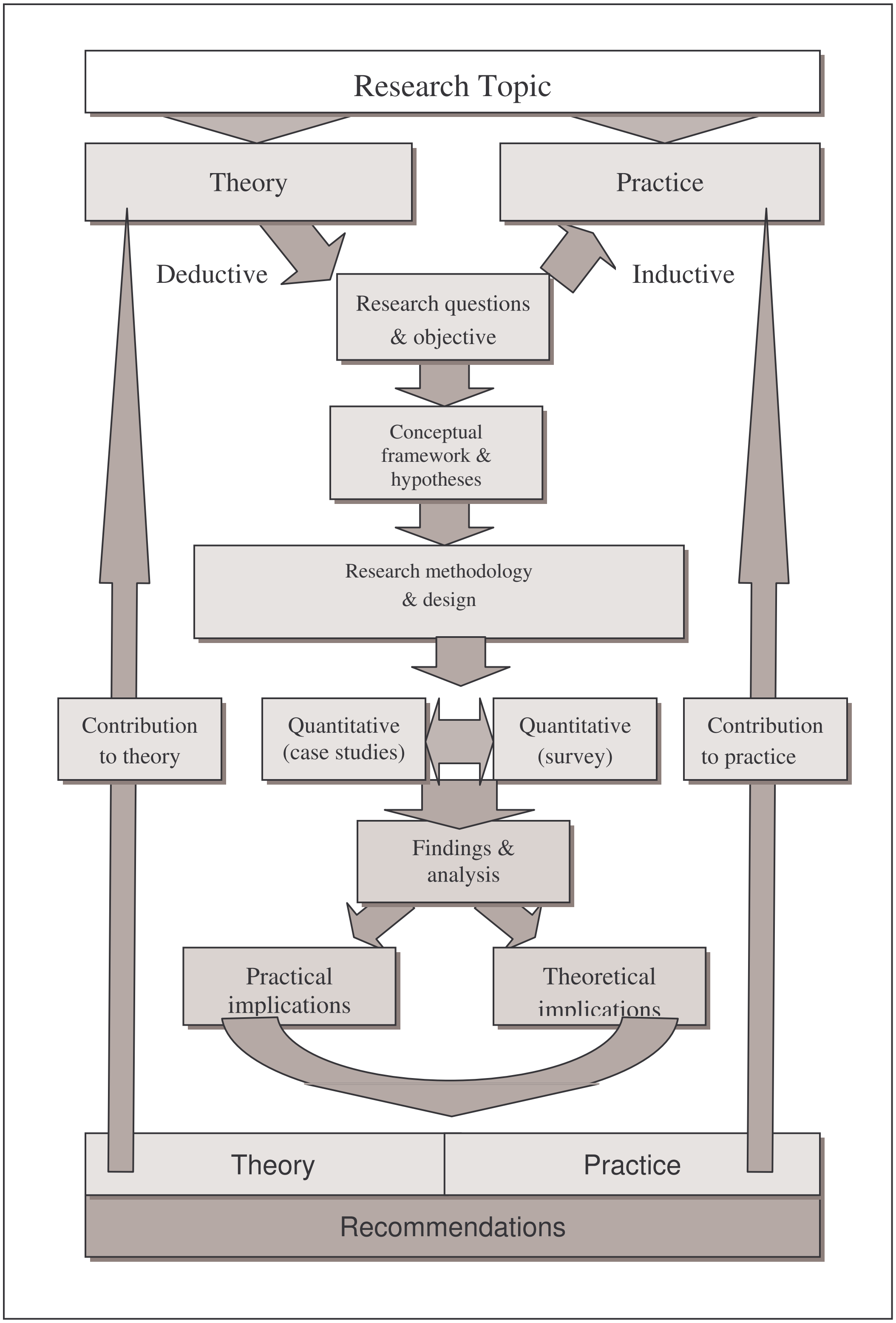
- What are the differences between technological and non-technological market-driven firms in terms of creating and developing disruptive business model innovation, and strategic approaches to reinvent their business models to enable disruptive innovation?

1.6 Research Methodology

The multi-dimensional, complex and dynamic natures of the notions of disruptive innovation and a business model require a research approach including deductive, inductive, qualitative and quantitative methods. As shown in Figure 1 below and will be discussed in detail in Chapter 4, this study utilizes all these methods with the purpose of addressing the primary and secondary research questions.

Using inductive and deductive reasoning, Chapter 3 develops a conceptual framework to inform the empirical research to investigate the research questions (Christensen, 2006: 40). In the initial stage, the deductive approach is used to examine the established disruptive innovation theory in view of current disruptive innovation phenomena in South Africa with the aim of discovering research gaps. The inductive approach is then used to explore relatively unknown disruptive business innovation behaviour in South Africa and to build an integrated framework for business model reinvention to enable disruptive innovation. Although the concepts of a business model and disruptive innovation are well established in the literature of strategic management, disruptive innovation is traditionally linked to technological discontinuities. The question of how organizations enable disruptive innovation by reinventing their business models, particularly in a developing economy setting, is an under-researched phenomenon. In this study, the process of data collection, analyses, conclusions and formulation of the theoretical framework follows an inductive method.

Figure 1: The Research Outline



The primary and secondary research questions are addressed at two levels of analysis. At the first level of analysis to address the first research question, this thesis's conceptual framework proposes two parts consisting of evolutionary and disruptive phases of disruptive innovation. The evolutionary part presents seven hypotheses to test a proactive introduction, emergence and successful evolution of an insurgent's potentially disruptive business model innovation. The disruptive part conceptualizes another seven hypotheses to investigate the disruptive impact of an innovation, and incumbent's reactive business model reinvention processes to deal with disruptive innovation. To address the second research question at the second-order of analysis, the study investigates the relativity of disruptive innovation theory or framework across two innovation categories namely, between disruptive technology and disruptive market-driven business model innovations by subjecting each innovation group to the same ten hypotheses and statistical unit.

The empirical investigation is carried out through both qualitative and quantitative research methods. The qualitative method is conducted by developing five case studies of disruptive innovation phenomena in South Africa. Disruptive innovation is an uncommon phenomenon, and the rarity logically makes a case study method the preferred approach to study the disruptive innovation phenomenon (Voelpel et. al., 2005; Macher and Richman, 2004; Chesbrough and Rosenbloom, 2002; Hamel, 2000; Tripsas and Giovanini, 2000). 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). Qualitative data is compiled using a triangulation method, which involves employing a variety of sources, including face-to-face in-depth interviews with top level executives, company and industry archives, the Internet and published sources. Chapter 5 discusses the case studies.

The case study analysis is enhanced further by quantitative methods to provide a more comprehensive understanding of the study's results. While the case study method investigates the process of disruptive innovation at a firm-level, some scholars have used survey-based quantitative method to indentify common patterns at a system-level (see Adner, 2002; Markides and Charitou, 2004). Thus, the purpose of survey-based quantitative method is to identify common patterns first on the aggregate level of analysis (system-level) that can be generalized across industries, and second to identify differences between technology and non-technological market-driven innovations. Chapter 6 and 7 present the quantitative results for the first-order and second-order studies respectively. The quantitative aspect of the methodology is a cross-sectional study, because the population of concern is studied during a specific period in time. The present study adopts the quantitative analytical instruments used and recommended by many innovation researchers (see Shimp, 2007: 117; Markides and Charitou, 2004: 33; Rogers, 2003: 10; Rafi and Kampas, 2002: 117; Leanord-Barton, 1985: 916; Arndt, 1967: 293).

In summary, the chosen research methodology includes quantitative and qualitative, inductive and deductive, exploratory and cross-sectional methods. Chapter four discusses in detail these methods, their relevance to the conceptual framework in terms of data collection, sample design, result analysis and the quality measures used in producing valid and reliable conclusions.

1.7 Structure of the Thesis

Besides this first, introductory chapter, the thesis is composed of seven chapters presented below.

Chapter 2 presents the literature review concerning disruptive innovation and a business model. The first section reviews established theories and concepts of disruptive innovation, and revisits the relevance of extant strategic management approaches that consider technology as the key cause of disruptive innovation. The second section analyzes various theoretical and empirical works on business models, representing diverse academic disciplines. By identifying key components of a business model that are commonly agreed upon across these disciplines, a definition of the term is established in order to lay the foundation for a conceptual framework in the next chapter.

Chapter 3 presents the conceptual framework. The framework is developed by scrutinizing existing research streams concerning the approaches for enabling disruptive innovation and business model reinvention frameworks. Building on these two streams, and further refining and integrating their relevant aspects, this chapter introduces a conceptual framework for "business model reinvention to enable disruptive innovation". Chapter 4 explains the data and methodology used in this study. It details how the analysis of both quantitative and qualitative data is undertaken and integrated in this endeavour to meet the objectives of the study. In addition, it describes the quality measures adopted by this study.

Chapter 5 presents five case studies representing four South African industries including mobile telephony, banking, airlines and insurance. The five case studies are used to explore common or different characteristics, themes and categories for generalization across similar contexts (Yin, 1994). Chapter 6 discusses the quantitative empirical analysis for the aggregated data at a first-order level. This means that by aggregating all survey data gathered from four industries, the chapter carries out a system-level analysis with the objective to find common patterns of disruptive innovation processes that can be replicated across the whole population of the study.

Chapter 7 discusses the differences between technological and non-technological disruptive innovations by disaggregating the sample into these two groups. Chapter 8 summarizes the key findings of both case studies and quantitative analysis, and presents the study's overall conclusions and theoretical implications. Finally, the chapter puts forward key recommendations for further research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Changes in business environment can be characterized by both a continuous and/or discontinuous change. Discontinuity may originate from complex and multiple variables of uncertainties such as economic, social, political, technological and legal factors, and the interplay between them that create an environment that is virtually impossible to predict. Discontinuities may also arise from radical technological and/or disruptive business model innovations (Markides and Charitou, 2004; Prahalad and Oosterveld, 1999; Grove, 1996; Tushman and Anderson, 1986).

Some organizations may anticipate some discontinuous changes, such as the introduction of the mobile phone technology into the South African market in 1994, after a cell phone had already become a household product in developed countries. In other instances, some discontinuities may not be easily foreseen. They may emerge initially small, but gradually building up, and at one dramatic moment they may lead to disruption of established industry structure and business models. The latter is referred to as a disruptive change (Christensen and Raynor, 2003: 34; Evans and Wurster, 1997: 14; Grove, 1996: 33).

Over the last two decades, extensive research has been carried out to comprehend business organizations' adaptation behaviors to disruptive change. A relatively consistent hypothesis recurring throughout the literature on this topic is that almost all established organizations across a wide range of industries succeed in managing continuous change, but fail to adapt their organization effectively when faced with disruptive change. This phenomenon, which is referred to as "the tyranny of success" or "the incumbent curse", has always been considered a technology problem (Anthony et. al., 2006; Henderson, 2006; O'Reilly and Tushman, 2004; Jay and Ralph, 2004; Chandy and Tellis, 2000; Gilbert, 2003; Hill and Rothaermel, 2003; Foster and Kaplan, 2001; Tushman and Anderson, 1986).

Recently, there is an emerging body of knowledge that shifts the research focus from mere technology to the business model when analyzing the impact of disruptive change on established companies. This emerging sphere of analysis focuses on the impact of discontinuous technology on the evolutionary nature of an incumbent's business model. It shows how the fit between processes, resources and values, within an established business model that has evolved over time causes the incumbent to struggle in the face of disruptive change. Consequently, the challenge facing many incumbents is how best to reinvent their business model to deal with disruptive change (Christensen, 2006; Christensen and Raynor, 2003; Christensen and Overdorf, 2000).

Many scholars have suggested different theories and frameworks to assist managers of incumbent firms in their creative endeavors to deal with disruptive change (see O'Reilly and Tushman, 2004; Markides and Geroski, 2005; Christensen and Raynor, 2003; Chesbrough, 2003; Hamel and Valikangas, 2003; Hansen et. al., 2000; Beinhocker, 1999). A careful scrutiny of the literature reveals that while these frameworks provide important non-business model insights into how companies should "enable" disruptive innovation, relatively few studies provide insights into how companies should "innovate" and/or "reinvent" a business model to enable disruptive innovation. A business model approach considers all aspects of business activities for enabling possible disruptive innovation, as opposed to a technology solution alone (see Voelpel et. al., 2005; Govindarajan and Gupta, 2001; Hamel, 2000).

The purpose of this chapter is to examine extant theories, concepts and models of disruptive innovation and a business model that deal with the present thesis' research question: How should firms "innovate" and/or "reinvent" a business model to enable disruptive innovation? This chapter is organized in to two parts. The first part scrutinizes disruptive innovation theory, reviews its antecedents and examines the recent shift of the literature from disruptive technology to disruptive business model innovation. The second part analyses the concept of a business model and reviews its theoretical foundations. This chapter closes by underlining the research gaps in the extant innovation literature.

2.2 Disruptive Innovation Theory

In order to conduct an appropriate investigation of the literature based on this study's research question, it is important to be clear about the relevant key terms that are used in the context of this thesis namely: innovation, technology, discontinuous innovation, radical innovation, disruptive innovation and a business model. Innovation can be defined by contrasting the term with creativity. In the Oxford English language dictionary, innovation is defined as "the action or process of innovating: a new method, idea, product, etc...", but creativity means "the use of imagination or original ideas to create something new"[3].

[3] The Oxford Dictionary of English, 2003: 893 & 406.

Creativity may result in something new, but it does not necessarily mean that it adds value to the organization in a commercial sense (Hill and Rothaermel, 2003: 258). The innovation concept is very broad that is used across many natural and social sciences. One of the more relevant and comprehensive business definitions is proposed by Myers and Marquis (1969: 12):

> *Innovation is not a single action but a total process of interrelated sub processes. It is not just the conception of a new idea, nor the invention of a new device, nor the development of a new market. The process is al these things acting in an integrated fashion.*

Drucker (1985: 19) argues that innovation can be subject to a systematic study as a part of a management discipline. This study embraces this view. An innovation is a deliberate management process, through which firms create, develop and exploit a new product or a business model. A review of business innovation literature shows various terminology and nomenclature of innovation. Strategic management scholars broadly categorize business innovations into two categories. The terms “incremental innovation” (Gatignon, Tushman, Smith & Anderson, 2004; Foster and Kaplan, 2001; Ettlie, 1983), “sustaining innovation” (Christensen and Raynor, 2003; Christensen, 1997) and “continuous innovation” (Robertson, 1967) are used to refer broadly to continuity of improvement along an established trajectory.

In contrast to the above, the concepts of “discontinuous innovation” (Macher and Richman, 2004; Tushman and Anderson, 1986; Robertson 1967), “structural innovation” (Moore, 2004, Tapscott et. al., 2000), “architectural innovation” (Gulanic and Eisenhardt, 2001; Henderson and Clark, 1990), “strategic innovation” (Charitou and Markides, 2003; Govindarajan and Gupta, 2001), “transformational innovation” (Denning, 2005, Foster and Kaplan, 2001), “radical innovation” (Macher and Richman, 2004; Hill and Rothaermel, 2003; Chandy and Tellis, 2000) and “disruptive innovation” (Daneels, 2004; Christensen and Raynor, 2003; Gilbert, 2003; Christensen, 1997) are used to refer in general to innovations of discontinuous or Schumpeterian nature.

Discontinuous innovation can be defined as an innovation that cuts the linkages of a technology or market from what existed previously (Macher and Richman, 2004: 90). Discontinuous innovation may come in the form of radical or disruptive innovations. Radical innovation is defined as a fundamentally different set of scientific and engineering principles that introduces a new technology generation which displaces a previously established dominant design of existing technology of a similar nature (Dewar and Dutton, 1986: 1422). Of particular interest to this study is the disruptive one which creates a serious dilemma to mangers of incumbent firms. Many connotations are associated with the term “disruptive” in English language, including confusion, disorder, interruption, failure and radical. The foundation of literature on the meaning of “disruptive”, as a simultaneous destructive and creative innovation process, seems to be rooted in Schumpeter’s seminal work of gales of creative destruction. Schumpeter (1942: 83) observed that waves of discontinuous technological innovations destroy old industries, and create new ones in their place. Building on this, Christensen (1997: 8) pioneered the term “disruptive technology”. Disruptive innovation is defined as an innovation that introduces new products, processes or business models which initially emerge in small low-end markets, but over time displaces industry incumbents by successively moving up-market through performance improvements (Christensen, 1997: 8; Christensen and Raynor, 2003: 34).

2.2.1 Foundations of Disruptive Innovation Theory

Table 2.1 shows that the extant disruptive innovation theory is firmly rooted in business innovation literature that has progressed through successive streams of research work that have explored the evolution of technological change and its impact, as a central force, in shaping business environments. These studies use a plethora of innovation terminologies and categorizations to articulate various phenomena associated with continuous and discontinuous changes[4]. Taking into consideration this study's research question, this chapter reviews only those major scholarly works that are concerned with incumbents versus new entrants' seemingly intriguing behaviors in dealing with discontinuous innovation as shown in Table 2.1.

Table 2.1: Antecedents of Disruptive Innovation Theory

Authors	Categorization	Generalization of association	Research gaps/anomalies
Dewar and Dutton (1986); Ettlie et. al., (1984); Burns and Stalker (1966)	Incremental vs. radical innovations	Incumbents are likely to perform well with incremental innovations, but radical innovations tend to create great difficulties.	Some firms managed to enable radical innovation. The incremental vs. radical categorization does not fully capture the reasons why incumbent struggle in the face of discontinuities (Tushman and Anderson, 1986)
Tushman and Anderson (1986)	Competence-enhancing discontinuities vs. competence-destroying discontinuities	Incumbents tend to do well with competence-enhancing discontinuities, whereas new entrants outperform them with competence-destroying discontinuities.	Some incumbents stumbled with seemingly incremental changes. The categorization of competence-enhancing discontinuities vs. competence-destroying discontinuities does not fully explain why incumbents fail (Henderson and Clark, 1990).
Henderson and Clark (1990)	Modular vs. architectural innovation	Incumbents are more predisposed to adapt modular innovations with less hurdle, but flounder a great deal with architectural innovation.	Incumbents tend to do well with both incremental and radical innovations. The earlier categorizations are less adequate on their own to explain disruptive phenomena (Christensen, 1996).
Christensen (1997) Christensen and Raynor (2003)	Sustaining vs. disruptive innovation	Whereas incumbents will always succeed with sustaining innovation, new entrants are likely to outperform incumbents with disruptive innovation.	Disruptive innovation is a function of conflict between new (disruptive) and traditional business models, not only a technology problem (Christensen and Raynor, 2003; Markides, 2006).

[4] For the nomenclature of innovations, see Christensen (2006: 4); Moore (2004: 88); Foster and Kaplan (2001: 106-114); Tapscott et. al., (2000: 14); Henderson and Clark (1990: 12); Robertson (1967: 15).

Incremental vs. Radical Innovation

The terms of “incremental” and “radical” innovations were commonly used in the early studies about the topic of incumbents’ misfortune in dealing with discontinuous innovation. Incremental innovation does not depart from previous technology significantly, and it helps industry incumbents to sustain their competitive advantage in established markets. But radical innovation refers to a different set of scientific and engineering principles which displaces previously established dominant design of technology and that introduces new products, or creates entirely new markets and possible applications (Dewar and Dutton, 1986: 1422, Ryle, 1994: 45).

The main purpose of early studies on this issue was to assess the impact of a radical product innovation on competitive performance of established firms in the market (see Dewar and Dutton, 1986; Dess and Beard, 1984; Burns and Stalker, 1966). When a radical technology emerges, it creates a new product class, which triggers initially a period of technological ferment, followed by emergence of a dominant design that creates a platform for successive incremental innovations. During the period characterized by industry upheaval, companies tend to innovate at a higher rate of variation in a competitive struggle to define the design until a certain design combination is adopted by customers. The industry, in turn, adopts this standard which then becomes a dominant design. A dominant design stabilizes product-class and ends the period of technological upheaval (Dewar and Dutton, 1986: Dosi, 1982; Abernathy and Clark, 1985; Burns and Stalker, 1966).

Scholars have suggested several reasons to explain why radical innovation tends to create problems for incumbent firms. These include the early mover advantage, irreversible commitment to prior investment and inertia. The assumption of the first mover advantage hypothesizes that early entrants are likely to benefit from early entry into an initially uncertain market and the learning experience for developing a dominant design. Later followers may lag behind in acquiring the technical competence for developing radical innovation; this tends to be more likely where industry incumbents have already made substantial financial, physical and managerial commitments to their previously established technological competence. This in turn may cause inertia that is likely to lock-in innovative behaviours to the incumbent's bureaucratic and formalized rules, which typically place new entrants in a better position to succeed with radical innovation relative to established companies (Rothwell, 1986; Dewar and Dutton, 1986; Dess and Beard, 1984; Hannan and Freeman 1984; Ettlie et. al., 1984; Cooper and Schendel, 1976; Daft, 1982; Hage, 1980; Burns and Stalker, 1966; Terrien and Mills 1955).

Competence-Enhancing Discontinuities vs. Competence-Destroying Discontinuities

Tushman and Anderson (1986) re-examined the simple "incremental – radical" innovation dichotomy and its generalization. Contrary to previously established statement of association, they found that some industry incumbents succeeded with seemingly radical innovations. Following this, Tushman and Anderson (1986) categorize innovations in a way that innovations introduced by new entrants, and which increase industry upheaval and uncertainties, are called "competence-destroying discontinuities". But innovations launched by industry incumbents that augment incumbents' competitiveness are referred to as "competence-enhancing discontinuities".

Tushman and Anderson (1986: 442) argue that the impacts of competence-enhancing discontinuities on incumbents tend to be less serious since these improve the existing technology along its existing performance trajectory, without departing significantly from previous dominant design. Although some innovations of this nature may displace older generation of technologies, they do no destroy the old product development capabilities of the firm. In other words, the established competence will still be relevant to operate the new technology. For example, in airlines manufacturing industry, the introduction of fan jets was considerably different from the previous technology that used to propel the velocity of jets, yet aircraft makers leveraged their existing capabilities to adapt to the new technology.

In contrast, competence-destroying discontinuities entail new capabilities (skills, abilities, and knowledge) that did not exist in the incumbent's technical knowledge. Because competence-destroying discontinuities displace the previously dominant design, they fundamentally shift the competence base required to perform the core technology of new products from previously existing dominant designs. For example, the introduction of diesel locomotives demanded fundamentally different competence from the typical skills and knowledge required for the manufacture of the steam-engine. The uncertainties and turbulence induced by competence-destroying discontinuities is considered to be the basis for a successful entry of new companies that have developed necessary capabilities to appropriate the new market's potential (Tushman and Anderson, 1986: 461; Richardson, 1972: 883).

Modular vs. Architectural Innovation

Henderson and Clark (1990) further questioned the above generalization and found that some companies struggled a great deal to adapt to a seemingly incremental change in innovation relative to existing technology. This observation redefined earlier categorization by new terms: modular versus architectural innovations.

Modular innovation changes the dominant design concept of a technology, without changing the relationships between the components of a product's architecture. For example, although the introduction of digital telephone disrupted the core design concept of the analog technology based telephone, it did not change the product's architecture. More specifically, although the technology transition from analog to digital was relatively radical, the previous parts and their relationships, including the cable, telephone sets, and the network server and how they all fit together as a system, remained unchanged. Industry incumbents are said to be generally capable of handling modular innovations within their existing business model (Baldwin, 2008).

But architectural innovation alters the relationships in which the components of a product are connected together, although it may not change the existing dominant design concept. Thus, architectural knowledge is the know-how about how all individual parts of a product fit together to function as a system. An interesting generalization stemming from this finding is that incumbents tend to be cognizant to the emergence of modular innovation - whether it is incremental or radical (which displaces a dominant established design) - because it does disrupt the existing models of learning. However, because architectural innovation disrupts the architectural product development process (hence the established models of learning) of the incumbent, it is likely to cause failure. Henderson and Clark (1990: 27) argue that the lock-in effect of the incumbent's evolutionary learning process in a previous architectural design can cause the firm to overlook a seemingly incremental innovation that changes the architect of the existing product system.

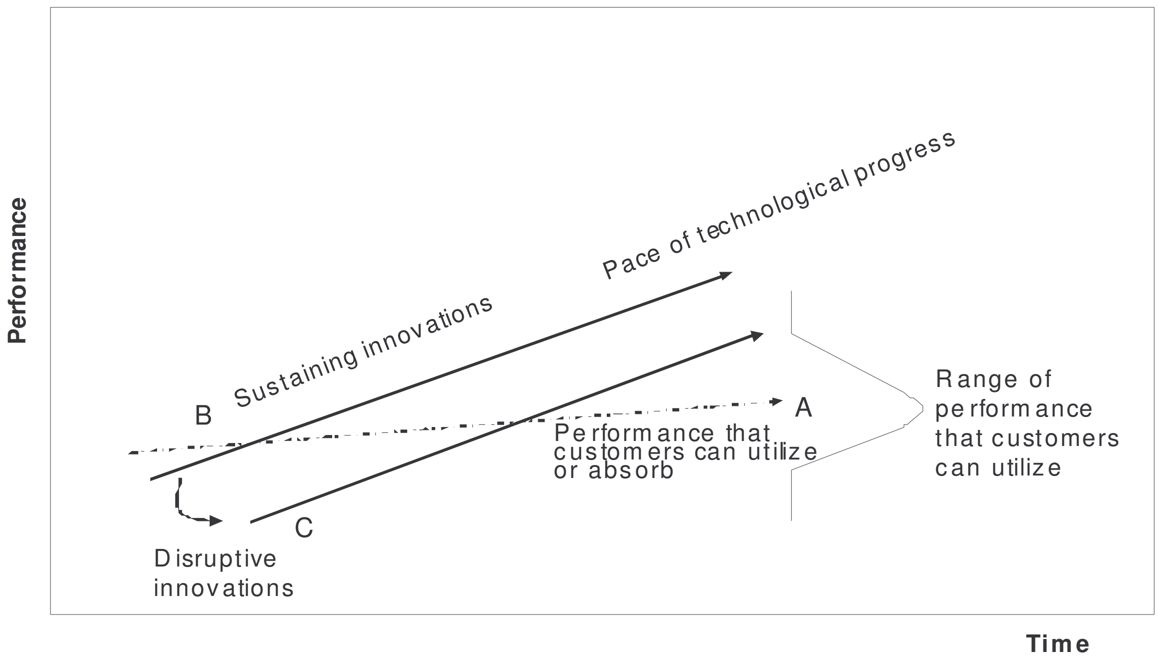
2.2.2 The Disruptive Innovation Model

Expanding on earlier theories, Christensen (1997) explored the characteristics of a special type of discontinuous innovation that causes incumbent companies to fail. According to Christensen (1997), innovations that enhance the incumbent's current market, whether incremental or radical, are called "sustaining innovation". But innovations that disrupt its established market are called "disruptive innovation".

Christensen's (1997) original theory of disruptive innovation has generated extensive research over the last two decades. A widely established generalization among many scholars is that almost all incumbents across a wide range of industries succeed in managing sustaining innovation, but fail to adapt their business model appropriately when faced with disruptive innovation. In contrast, new entrants generally do well with disruptive innovation (Anthony, Eyring & Gibson, 2006; Henderson, 2006; Christensen; 2006; Gilbert, 2003; Adner and Zemsky, 2003; Adner, 2002; Gilbert and Bower, 2002; Christensen and Overdorf, 2000; Christensen, 1997).

Figure 2.1 provides the disruptive innovation model that seeks to predict how disruption takes place in incumbents' market. The "Disruptive Innovation Model" has three components (a) the market focus (performance and consumption curve) (b) sustaining innovation and (c) disruptive innovation. The vertical and horizontal dimensions of the model indicate performance improvement and time of innovation diffusion in a particular market.

Figure 2.1: The Disruptive Innovation Model



Source: Christensen and Raynor (2003: 32)

(a) The market focus

The starting point of analysis of the disruptive innovation model is the incumbent's strategic market focus as depicted by line A (dotted line slightly upward sloping) and the Bell curve. This dotted line represents the performance of an existing technology in a particular incumbent's market. The vertically oriented Bell curve shows the distribution of customers around a median of users. On the upper extreme of the curve, there are demanding customers who might not yet be satisfied with an existing product's performance at a point in time. At the lower extreme of the curve, there are some customers who may not use or need all the features of existing technology (product). In between these two groups, the dotted arrow depicts a "good enough" technology performance that meets an average customer's needs.

(b) Sustaining innovation

Line B represents "sustaining innovation" which evolves along an already established technological trajectory. This targets the incumbent's existing market base with the aim to improve existing products in ways that existing customers will appreciate. Innovations along this established trajectory can range from "incremental to radical innovations". While incremental innovations are considered less of a problem to the incumbent firm, the model predicts that, regardless of the difficulties in adapting their business model, established companies often succeed in outperforming rivals with regard to radical innovations. This theory assumes that because radical innovation typically attracts the high-end market and the incumbent's revenue model, incumbents will find means to embrace the technology. This sets a basic point of departure between the concept of disruptive and radical innovations (Christensen and Raynor, 2003: 33).

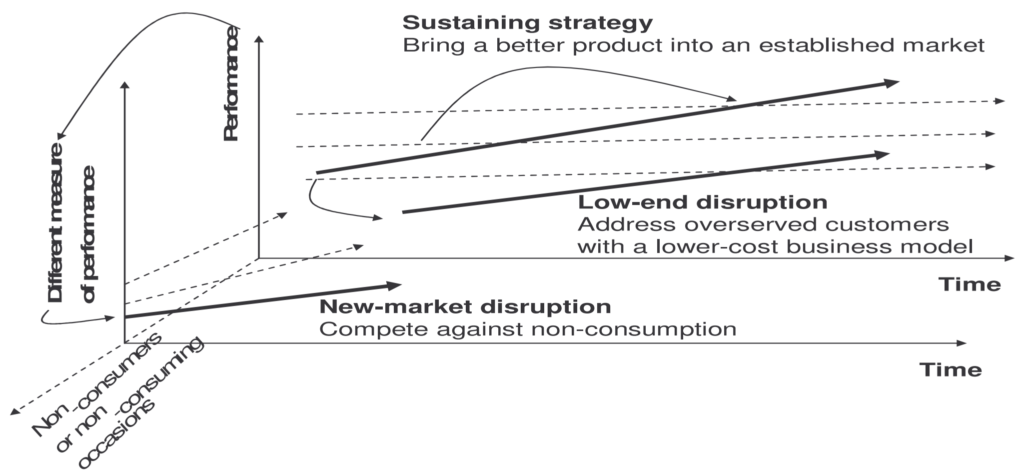
(c) Disruptive innovation

The third element of the model depicted by line C is "disruptive innovation". The model suggests that the pace of technological progress of sustaining innovation exceeds the ability of customers to use a technology at any point in the Bell curve. This is because the urge to maximize profits from the incumbent's customer base, especially from the high-end "not-yet satisfied" customers, will motivate companies to improve their existing technology continuously or create radical products. This will likely cause a successive higher rate of sustaining innovation in product lines or features that will "overshoot" the market in due course. This market phenomenon is considered as one of the demand side drivers of disruptive innovation.

Disruptive innovation emerges through the introduction of new, cheaper, convenient and simple to use products that will meet initially the basic requirements of customers at the low-end, small margin market. During the introduction period, the disruptive product does not meet the incumbent's customers' expectations compared relative to existing products. Over time, through a new performance trajectory (line C), this product will ultimately meet the incumbent's customers expectations in a "good enough" manner. Eventually, a market disruption occurs when the incumbent's customers switch from existing product to disruptive ones (Gilbert, 2003: 32; Charitou and Markides, 2003: 56; Christensen and Raynor, 2003: 32-45; Rafi and Kampas, 2002: 116; Christensen, 1997: xv).

Figure 2.2 below further classifies disruptive innovation in to two: "low-end" and "new market" disruptions. "Low-end disruptions" originate in the incumbent's established value network, where disruptors attack incumbents by introducing a low-cost business model that initially appeal to the low-end segments of the existing market at the time of introduction. New-market disruption creates a new value network. This means that it creates a new market by focusing on fundamentally different customers who were not part of the incumbent's market. As indicated in the figure, it has a different performance trajectory that requires a distinct measure relative to the existing market.

Figure 2.2: Low and New Market Disruption



Source: Christensen and Raynor (2003: 44).

In both circumstances, the disruptive innovation model identifies four key characteristics of technological innovation that are likely to cause disruptive innovation (Christensen and Raynor, 2003: 32-45; Rafi and Kampas, 2002: 116; Christensen, 1997).

- First, the innovation is typically simpler, cheaper, and convenient to use relative to existing products.
- Second, it targets low-end or new customers (non-consumers) who were not part of the incumbent's consumption trajectory of "sustaining innovations" due to lack of financial and/or technical abilities.
- Third, the quality is relatively inferior when measured by the performance dimension of the incumbent's current customers.

- Four, over time the disruptive technology improves its performance on the dimensions the mainstream market values and begins to displace previously existing products of similar nature.

2.3 From Disruptive Technology to Disruptive Business Model

Recently, scholars have revisited the original disruptive innovation theory and concluded that disruptive innovation is a function of conflict between disruptive and traditional business models, not only a technology problem. The revisited disruptive innovation theory predicts that the embedded relationships of the components and learning processes that have evolved over a relatively long period of time within the incumbent's business model make it difficult for the firm to respond to disruptive innovation. Beyond technology and market target differences, fundamental differences in some of the key components of a business model, including strategic market focus, capabilities, firm's economic size and revenue model are said to be the major reasons why incumbents waver in face of disruptive innovation (Christensen, 2006; Charitou and Markides, 2003: Christensen and Raynor, 2003; Chesbrough and Rosenbloom, 2002; Christensen and Overdorf, 2000).

Strategic market focus: While the emphasis on the firm's customer orientation is useful in sustaining innovation, the same emphasis is likely to influence the incumbent to screen out a potential disruptive innovation which does not appeal to its current customers (Christensen, 2006: 51; Day and Schoemakers, 2005: 135; Chesbrough and Rosenbloom, 2002: 536; Day, 1999: 5; Leonard and Rayport, 1997: 102).

Capabilities and inertia: Capabilities can be defined as the company's dynamic ability to identify, integrate, develop and configure own and others' competence to innovate (Teece, Pisano & Shuen, 1997: 606; Richardson, 1972: 882). Capabilities that determine what a firm can and cannot do comprise processes, resources and values (Christensen and Overdorf, 2000: 68). A particular incumbent's capabilities evolve over time, reinforcing each other in causal and dynamic relationships around the center of the firm's strategic market choice. The relationship that has evolved over time between the incumbent's processes, resources and values will possibly create problems in its effort to deal with disruptive change. This is likely to be so because disruptive innovation often requires capabilities that are somewhat in conflict with the firm's current target market (Christensen, 2006: 43; Christensen and Raynor, 2003: 211; Christensen and Overdorf, 2000: 71).

Firm's economic size and revenue model: Christensen and Raynor's (2003: 32-45) concept of "asymmetric motivation" explains why the difference in size and revenue model could be one of the major causes of disruptive innovation. It suggests that small, low-end, and low-margin markets are likely not to be attractive to large established companies' profit model. Contrary to this scenario, small start-ups have typically thinner cost structure that will enable them to generate profits from this type of market. The underlying cause of asymmetric motivation is nothing but a fundamental difference between two models of transaction costs of producing and distributing goods or services (Coase, 1937). This difference often results from configuring a direct, shorter or open (distributed) value chain compared to traditional industry value chain. As a result of this conflict of interest, the absence of competition from large companies gives small start-up innovators time and incentives to move up-market gradually through a different performance improvement trajectory. To address incumbents difficulties arising from disruptive innovation, many scholars have suggested different models and approaches.

2.3.1 Extant Approaches to deal with Disruptive Innovation

The review of the literature shows that the topic of disruptive innovation has been one of the most important issues for strategic management research in the last two decades. The major studies that deal with discontinuous innovation in general (not only with disruptive innovation) are summarized in Table 2.2 and subsequently reviewed briefly in order.

Separation Strategy

The widely accepted view in addressing the question of enabling disruptive innovation is to create a disruptive business model through an autonomous organization. According to this view, because of fundamental conflicts in terms of strategic market focus, capabilities, revenue model and firm size, established firms that attempt to manage disruptive technology within their already existing business model are likely to fail. Incumbents should therefore create an entirely separated company with complete freedom to develop its own new processes, resources and culture (Christensen and Raynor, 2003; Gilbert, 2003, Adner, 2002).

The "Ambidextrous Organization"

Being cognizant of the above criticism, O'Reilly and Tushman (2004) argue that non of the established firms which launch independent or unsupported ventures succeed in enabling radical innovation. Rather, most 'ambidextrous organizations' are relatively more successful in launching radical products or services. An ambidextrous organization is an organization which initiates a radical technology through a structurally independent venture, having its own processes, structure, and culture, but that is integrated at the senior executive level.

Table 2.2: Extant Approaches for Disruptive Innovation

Principal Authors	Approaches	Enabling strategies	Focus
Christensen and Raynor (2003); Christensen and Overdorf (2000)	Separation strategy	Create an autonomous organization	Disruptive technology
O'Reilly and Tushman (2004)	Ambidextrous Organization	Create an autonomous organization but integrate it at senior executive level	Radical product innovation
Markides and Charitou (2004)	Contingency Approach	Separation or integration is contingent to a particular incumbent's context	Market driven business model innovation
Markides and Geroski (2005)	Feeder networks	Incumbents should let independent small entrepreneurs take the first initiative, and then they should appropriate at a later stage	Radical product innovation
Hansen et. al. (2000)	Network incubators	Incubate independent small internet entrepreneurs though minority equity shares	Internet e-business models
Chesbrough (2003)	Open innovation	Each company should focus on core competencies in a distributed business model	Technological innovation
Beinhocker (1999) Hamel & Valikangas (2003)	Complex Adaptive Systems based theory	A population of diverse experimental strategies to shape one's future environment	Proactive strategy, unknown future

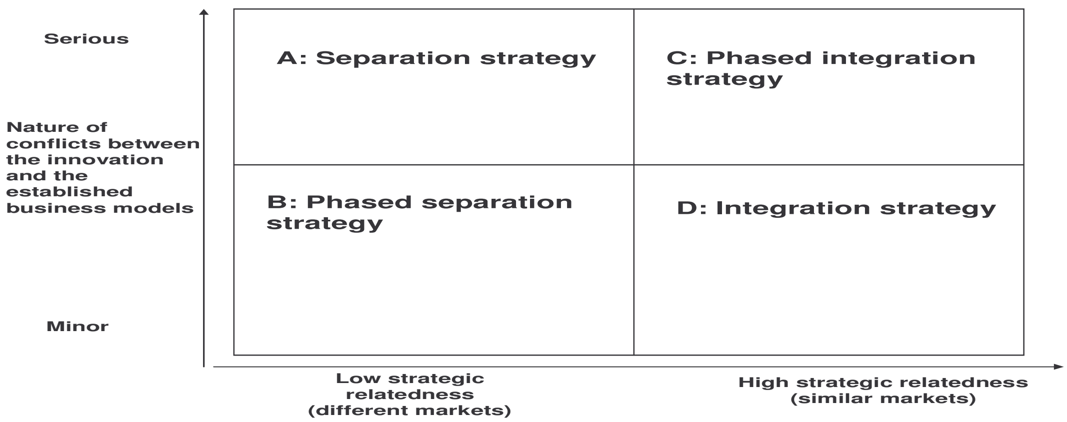
This approach is likely to succeed only if the top management is willing to cannibalize its existing culture and values. "Willingness to cannibalize" refers in this context to deliberately destroying an attitudinal trait of the top executives which is embedded in the existing culture, shared values and beliefs (Chandy and Tellis, 1998: 475). The 'ambidextrous organization' approach suggests that on the one hand, tight integration at the executive level allows the fledging ventures to share important resources from the traditional units including cash, talent, expertise, customers etc… On the other hand, the organizational separation guarantees that the new venture's distinct processes, structure, and culture are not overwhelmed by the dominant traits of the parent company (O'Reilly and Tushman, 2004: 77).

The Contingency Approach

Markides and Charitou (2004) argue that there is no a "one-fit-all" strategy to enable disruptive innovation across all situations. The question of whether to separate or integrate a disruptive business model basically depends on two key variables: (1) the degree of strategic differences or similarities between the new and the old markets and (2) the seriousness of conflicts between the disparate business models in a particular situation. Figure 2.3 provides four strategic options indicated by the letters of A, B, C and D that an incumbent may choose depending on its particular situation (Markides and Charitou, 2004).

- A: The 'separation strategy' tends to be appropriate when the new market is not only strategically different from the existing market, but also when the disruptive and the current business models entail serious tradeoffs and conflicts. For example, Nestle followed this strategy when it launched Nespresso, a coffee bar concept business that targeted up-market young professionals. Nespresso is different in terms of a business model and market from Nestle which sells instant coffee to the mass market through retailers.

Figure 2.3: Different Strategies for Managing Dual Business Models



Source: Markides and Charitou (2004: 24).

- B: A firm should adopt a 'phased separation strategy' when the new market is strategically different from the established one, but the two business models have minor conflicts. When there is little conflict between the two business models, the incumbent may find it better to first develop the new business inside in order to leverage the capabilities of the existing business. After some time the new unit can be developed into an independent one. For example, Tesco, the UK's biggest retailer developed its online business Tesco Direct first inside before it become an independent subsidiary. Eventually the separation strategy was important because the online market had evolved differently from the location based market.
- C: A 'phased integration strategy' would be appropriate when the two markets are strategically similar but the two models have a high degree of conflicts. A case in point for such circumstance is the Danish bank Lan & Spar. When the bank launched its Direct Bank, it was separated from its branch based bank for three years, until it decided to merge the two. In the beginning, this was necessary to avoid cannibalization of the

established business by the new company. For example, the interest margin for Direct bank was 7% lower than the branch bank. Therefore, the transition had to be planned carefully after three years Direct Bank operated independently. Although the new bank targeted the low-end market, it was integrated with the branch bank through IT systems, common organizational values and culture, and reporting structures.

- D: The ‘integration strategy’ is preferred when the new market is similar to the existing market and minor conflicts exist between the old and the new business models. For example, Edward Jones, one of the leading US brokerage firms integrated the online business to improve the efficiency of its branch business.

In summarizing their view, Markides and Charitou (2004: 32) argue that at a glance some business models may appear disruptive to all incumbents (as in case of online banking business models). Nevertheless, the question whether to integrate or separate a new business model depends on the context of a particular established company.

Collaborative Frameworks: Feeder Networks, Network Incubators and Open Innovation

Some authors argue that some incumbents would normally be hesitant to get their radical innovation to the market first, if they perceive a possible cannibalization of their current offerings. It is suggested that established firms should perhaps adopt an opportunistic approach of wait-and-see until others take the first initiatives, and then appropriate the radical innovation when the market is clarified at a later stage, and thus capitalizing on their marketing and resources powers (Naull and Vandenboscb, 1996: 345; Ali, 1994: 50; Conner, 1988: 10). Building on this view, Markides and Geroski (2005) argue that instead of launching the innovation through an own autonomous organization, established companies are likely to be better off by creating a “feeder network” to incubate and support small independent companies that would introduce the innovation, and develop a poised strategy to appropriate the new market’s growth later on.

Favouring a more collaborative approach, Hansen et. al., (2000) suggest a “network incubator” framework that prescribes a minority equity stake for the incumbent in return for its network infrastructure and resources support for the innovator. This kind of partnership would ensure the independence of small start-up innovators at all times. The network-incubator structure combines the best of the two opposite worlds: the scale and scope of large established corporations and the entrepreneurial drive of small venture-capitalists. The network-incubator model generally limits its research and generalization to e-businesses.

The collaborative approach to innovation is perhaps better articulated through Chesbrough’s (2003) model of ‘open innovation’. In this model, business organizations can generate ideas from inside sources but develop and commercialize them by using external pathways. Alternatively, they can generate ideas from outside their boundaries, but develop the ideas internally for commercialization through their own market channels. In this view, the boundary between the organization and its environment is viewed to be permeable, allowing innovation to move easily between the two. The open innovation model suggest that in the innovation economy where knowledge and physical resources are said to be relatively abundant, established companies should not limit the boundaries of their innovation development processes and market channels only to their own products. In a highly competitive environment, the quickest way to exploit opportunities is to specialize on one of three basic processes of innovation: generating, funding or commercializing innovation (Chesbrough, 2003: 37).

While most of the above frameworks seem to be reactive in nature (i.e., they attempt to provide normative models to assist organizations to adapt, or to introduce innovation to a somewhat clear enough market), other scholars have suggested models based on complex adaptive systems theory (CAS). CAS theories suggest that companies are able to leap-frog their rivals by shaping their own environments.

Complex Adaptive System (CAS) Based Theory

The CAS theory is rooted in the Darwinian evolutionary theory which hypothesizes that genetic variety, within and across species, in nature is fundamental to species survival. Some species that varied slightly from others in such a way that would provide them fitness to adapt the changed conditions would prevail in the face of a changing environment (Stacey, 1996: 34). The Darwinian theory takes a gradualist mode towards change – “natura non facit saltum” (nature does not perform leaps), which provides the rationale for favoring the incrementalism view in contemporary business strategy literature.

However, the application of CAS theory in business science is used to explain an evolutionary change that is occasionally punctuated by discontinuous change. Adopting this view, the pioneers of CAS theory in business science argue that in today’s environment, where disruptive change is a norm rather than an exception in many industries and countries, firms should create, develop and experiment with a portfolio of innovations to explore unknown future. This approach will ensure to create at least one or two innovations that have developed necessary capabilities to deal unknown future, while some, if not most, will probably fail (Anderson, 1999; Beinhocker, 1999; Hamel and Valikangas, 2003; Marshal, 1920).

In practice, the CAS approach to business innovation has two major limitations. The first is the high risk associated with exploring an unknown future. Some scholars argue that the reason why many new-to-the-world innovations fail is the lack of opportunities (markets do not exist), rather than a shortage of experimentations. The second is that the cost of running multiple experimentations can exceed even the most optimistic success with any of the innovations (Denning, 2005: 6; Campbell and Park, 2004: 27; Markides and Geroski, 2003: 2; Treacy, 2004: 29).

Unresolved issues about approaches for enabling disruptive innovation

The review of the above models and others that provide seemingly conflicting views appear to suggest that the question of dealing with discontinuous change is a far more complex challenge than it is currently perceived to be. But even so, the frameworks discussed above provide important insights into how companies should manage discontinuous innovation from different perspectives. When these frameworks are scrutinized closely, taking into account the question of this study - how companies should innovate and/or reinvent a business model to enable disruptive innovation - some issues remain unclear.

Most of the above mentioned works seem to be focused more on technology problem. Because of the use of many innovation terms (for example, disruptive technology, radical production innovation, architectural innovation, etc….) and the lack of criteria in the literature for distinguishing various types of discontinuous innovations (see Daneels, 2004: 247; Winjberg, 2004: 1470; Chesbrough, 2001: 33), it would be less appropriate to associate the studies with the business model problems of disruptive innovation.

Most importantly, a careful examination of extant literature reveals that we seem to know little about how pioneering companies introduce a disruptive business model and how traditional companies reinvent their business models to deal with disruptive innovation. A search in the literature shows that few studies have used a business model concept to guide managers in pursuing business model innovation through deliberate strategic process (see Voelpel et. al., 2005; Govindarajan and Gupta, 2001; Amit and Zott, 2001). But the disruptive innovation theories and approaches have not been associated with business model innovation studies to provide an integrated theoretical model or framework that describes both business model "innovation" and/or business model "reinvention" to enable disruptive innovation. While the concept of innovation implies a proactive action of introducing an imminent or a potentially disruptive innovation, the concept of "reinvention" underlines a reactive action for enabling disruptive innovation after an innovation has proven to be disruptive.

2.4 A Business Model Approach to Innovation

Before discussing the established business model innovation frameworks, it is important to define the concept of a business model and review its theoretical foundations. In business strategy, a business model is defined as a holistic and systemic entrepreneurial concept which describes how a firm: (a) articulates value proposition(s) for a specific target market; (b) identifies a particular customer segment for that value proposition; (c) structures its internal value chain to create and deliver that value to customers; (d) finds an economically viable position within the value network (external linkages); (e) identifies, accesses and coordinates own and others strategically important capabilities and resources (residing across a particular value chain and value network structure) to create and deliver that value for customers in sustainable manner; and (f) defines the revenue generating mechanisms, and develops a core strategy to compete in its defined industry and market (Voelpel et. al., 2005: 40; Shafer et. al., 2005: 201; Hedman and Kalling, 2003: 56; Chesbrough and Rosenbloom, 2003: 533; Hamel, 2000: 66).

2.4.1 Theoretical Foundations of the Concept of a Business Model

The concept of a business model and its key components as defined above is rooted in historical and existing strategic management theories as discussed in chronological order as shown in Table 2.3. By following the logic of constructive criticism of these earlier theories, this section identifies both their key deficiencies in dealing with disruptive innovation by themselves and their relevance to the business model definition.

The planning school

The first models of strategic management, known as "the planning school", typically consist of formalized processes of analysis of external opportunities or threats, identification of alternative courses of action, and strategy formulation. The first systematic definition of strategy in the discipline of business strategy seems to have come possibly from Chandler (1962).

Table 2.3: Theoretical Foundations of a Business Model Concept

School of thought	Principal Authors	Approaches	Deficiencies dealing with disruptive change	Relevance to a business model concept (definition)
1960s Planning	Chandler (1962), Ansoff (1965), Andrews (1971)	Strategic planning SWOT	Too general and predictive	Analyze SWOT of market and a company
1970s Balancing, leveraging	Abell & Hammond (1979)	BCG PIMS	Lack of guidance in strategizing for competitive advantage	Analyze, Manage portfolio Correlate quality with market share
1980s Positioning	Porter (1985)	Strategic positioning	Static, lack of capability analysis within firms	Analyze the 'five forces' to create a strategic position and then to configure a value chain
1990s RBV	Barney (1991) Gulati et. al. (2000)	Firm-specific unique resources Network-specific resources	Static, atomistic, lack of process and learning orientation	Identify, access, develop and configure own and others resources and capabilities
1990s Learning	Senge (1991) Mintzberg (1994) Hammer & Champy, (1993)	Learning Emergent strategy Process innovation	Evolutionary process driven, not useful for dealing with disruptive changes	Learn, create, improve, and adapt, but also warns that evolutionary learning process can create inertia

Chandler (1962: 13) defined strategy as "the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals." Expanding Chandler's (1962) work, Ansoff (1965: 18) viewed strategy as a deliberate plan to exploit external opportunities and threats and defined strategy as follows: "Strategic decisions are primarily concerned with external rather than internal problems of the firm, and specifically with the selection of the product-mix that the firm will produce and the markets to which it will sell". Andrews (1971: 28) further classified strategy in the context of corporate and business unit strategies. Corporate strategy defines the industry and market a firm wants to compete in, while a business unit strategy is a subset of a corporate strategy and deals with a particular business division's choice of product/market scope. During the industrial era, when the business environment was said to be relatively stable or predictably changing, the strength, weakness, opportunities and threats (SWOT) framework and strategic planning were relevant for developing the vertically integrated business models of that time (Clark and Clegg, 2000: 242).

The balancing school

The strategic planning and SWOT models were too general and too inflexible to guide firms in dealing with the growing and diversified business models of the corporation (Collis and Montgomery, 1995: 118; Mintzberg, 1994: 107). To hedge against an unforeseen future and increase their wealth through diversification, large corporation were diversifying into many businesses. The growth-share matrix, otherwise known as the Boston Matrix, introduced by the Boston Consulting Group (BCG) and Profit Impact of Market Strategy (PIMS) were two of the well known frameworks that were useful for managing a portfolio of business models. These models are useful for assessing each business units performance by measuring the market shares and the correlation of product quality to market competitiveness. Based on this analysis, a corporation could allocate resources to diversified business units through 'balancing' (leveraging) models (Abell and Hammond, 1979).

These frameworks were, however, merely indicators for resource allocation and synergy between diversified business models. They do not provide guidance for strategizing to defend or build market position in the future (Leibold et. al., 2002: 70; Clark and Clegg, 2001: 205).

The strategic positioning school

To address this research gap, Porter (1985) built on the industrial organization school and developed his competitive strategy model, which remains one of the most influential approaches in the field of strategic management. Porter (1980) argues that the external industrial "five forces", including substitute products, the power of customers, the power of suppliers, intensity of competition among rivals and the strength of entry barriers determine a firm's competitiveness in a given industry. He proposed that by analysing the industry's forces a firm can choose to compete through one of three generic strategies: 'differentiation', 'low-cost' and 'focus'. The last one has been dropped in his later works as both 'differentiation' and 'focus' could have the same meaning.

Porter's work was further developed via the value chain concept, which focuses on the activities and functions of the firm, the underlying factors that drive cost, and differentiation advantages. A value chain is a tool used to systematically analyze a series of activities a particular firm performs in the creation and delivery of a product or service, including sourcing inputs, production, distribution and marketing. The value chain concept entails that the controlling and grouping of activities allow firms to utilize either cost or differentiation potential through the reaping of scale advantages or the creation of firm-specific configuration (Porter, 1985: 33).

According to Porter (1985), a firm should first identify sources of strategy content (strategic positioning) in the industry and then program its internal value chain configuration towards this desired strategic position. The strategic position also defines the firm's place within the external value network. A value network links the focal firm's value chain with its suppliers, customers, or others who complement and amplify the firm's own resources (Hamel, 2000: 88). This strategic positioning view provides important insights into how a firm develops a business model by first developing a unique strategic position in its industry, then configuring the internal value chain and locating its place in external value network to fit this strategic position. For example, in order to create a value proposition for a particular target market, a company must first define a 'strategic choice' through the analysis of the industrial "five forces" (Hedman and Kalling, 2003: 53; Shafer et. al., 2005: 203).

Porter's competitive strategy theory focuses on one aspect of a business model – that is the source of competitive advantage emanating from the firm's external positioning in its competitive environment. But it pays little attention to sources of differential advantage that stem from internal firm-specific valuable and inimitable capabilities and resources.

The RBV theory

Perhaps, it is in response to the above shortcoming that the Resource Based View (RBV) approach emerged as a dominant paradigm during the late 1980s and 1990s in strategic management. The RBV is an umbrella term for various approaches that commonly view that the differences among firms' specific internal resources as key determinants of competitive advantage. The RBV theory seeks to identify resources and capabilities within a firm's business model that are (a) inimitable, (b) not readily substitutable, (c) superior to competitors, (d) scarce among competitors, and that (e) enable to leverage core competencies in related businesses (Clarke and Clegg, 2000: 231; Teece et. al., 1997: 511; Collis and Montgomery, 1995: 118).

Expanding the RBV analysis from a firm to a value network perspective, network and strategic alliance scholars argue that inimitable and sustainable resources can also emanate from 'network structure', 'network membership' and 'tie modality'. A firm's co-specialized 'network structural pattern' determines a firm's performance and differential advantage. Resources embedded in a firm's network structure may provide a firm with valuable strategic information which enables the firm to act appropriately and quicker than rivals. A focal firm's 'network membership' is often idiosyncratic and even more inimitable than 'network structure', allowing members to gain differential advantage over non-members who may be 'locked out' from accessing information and opportunities within the network (Iansiti and Levien, 2004: 72; Gulati et. al., 2000: 203; Teece, 1986: 293).

The concept of 'modality tie' refers to institutionalized rules and norms that govern relationships in inter-firm interactions. This tie, whether cooperative or opportunistic, strong or weak, multiplex or single, impacts on a focal firm's strategic behavior and performance. The nature of relationships between firms is often influenced by structural network characteristics, including the position of a focal firm in the network, reputation and its history (Gulati et. al., 2000: 208).

Learning theory

In rapidly changing business environments, the strategic positioning and RBV prescriptive models are said to be inadequate to explain how firms adapt their changing business environments. The 'learning school' argues that inability to predict the future means that strategy models of static content analysis have to give way to frameworks that inform organizational learning processes for continuous innovation (Campbell and Alexander, 1997; Nonaka and

Takeuchi, 1995; Mintzberg, 1994; Senge, 1991). Approaches that emphasize continuous innovation of a business model, such as ‘just-in-time’ (JIT)), total quality management (TQM) business process engineering (BPR) supply-chain management (Quinn, 1997) can be categorized as part of the learning and process theories (Dawson and Palmer, 1995; Hammer and Champy, 1993; Cusamano, 1985).

The examination of traditional models shows that the concept of a business model has a solid foundation in the strategic management literature. The relevance of traditional models in dealing with disruptive innovation can be summarized as follows: The strategic positioning and the RBV approaches provide frameworks for identifying static internal and external sources of competitive advantage by analyzing ex-post successful business models. However, they do not provide insights into how an incumbent firm should strategize to deal with disruptively changing business environments (Camillus, 1997: 1; Sanchez, 1997: 939).

While the learning and continuous innovation approaches are useful for guiding firms in dealing with continuously changing business environments, they also help us to understand why incumbents fail to deal with disruptive changes. Organizational theorists use the theory of inertia to explain a cognitive “lock-in” in organizations that arises due to continuous learning processes (see e.g. Blau and Schoenherr, 1971; Kasarda, 1974; Terrien and Mills, 1955). As a firm evolves and matures through the process of retaining successful culture and values and discouraging those that do not confirm with its strategic choice, it develops a “dominant logic” or “mental models”. These can act as its liabilities by filtering out ideas that could be useful for developing a potentially disruptive business model; simply because the ideas do not conform to its current successful business model (see e.g. Weick, 1976: 2; Henderson and Clark, 1990: 27; Prahalad and Bettis, 1986: 485).

The implication of traditional models to business model innovation and reinvention for the purpose of enabling disruptive innovation is that managers should continuously question their firms' current business model. In other words, they should challenge the firm's own strategic position, its current internal and external strategically important capabilities, and most importantly their own conventions (cognitive constraints) about how they compete in their industries. An emerging body of knowledge suggests that it is possible for managers to reinvent a business model through systematic use of the business model concept itself (Govindarajan and Gupta, 2001; Kim and Mauborgne, 2005; 1999; Hamel, 2000; Holmstrom, Hoover J.r., Louhiluoto & Vasara, 2000). The following section discusses the formal introduction of a business model concept into the business strategy literature and its usefulness as a framework for enabling innovation.

2.4.2 The Concept of a Business Model as Locus of Innovation

The literature review presents a plethora of business model definitions. To have a relevant definition for developing a conceptual framework, this study analyzes major works on the topic of the business model (see Table 2.4). Although one may not easily grasp a consistent definition across these works, a close scrutiny of these reveals some basic underlying similarities underpinning the core concept and six major common components that are applicable to a wide range of contexts.

Table 2.4: Various Definitions of a Business Model

Author	Discipline	Various definitions of a business model
Knoczal (1975: 47)	IT	A mathematical description of characteristics of a real (business) system, that defines the relationships existing in the real system.
Timmers (1998: 4)	e-business	An 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 revenues.
Amit & Zott (2001: 511)	e-business	A business model depicts the content, structure, and governance of transactions designed to create value through the exploitation of business opportunities.
Rappa (2001)	e-business	In the most basic sense, a business model is the method of doing business by which a company can sustain itself -- that is, generate revenue. The business model spells out how a company makes money by specifying where it is positioned in the value chain.
Afuah & Tucci (2001: 54)	e-business	The components of a business model include customer value (distinctive offering or low cost), scope (customer and products/services), price, revenue sources, connected activities, implementation (required resources), capabilities (required skills), and sustainability.
Tapscott et. al., (2000: 17)	e-business	A (business model) 'business-web' (b-web) is a distinct system of suppliers, distributors, commerce services providers, infrastructure providers, and customers that use the Internet for their primary business communications and transactions… in which each participant focuses on a limited set of core competencies, the things that it does best.
Hamel (2000: 66-70)	Business strategy	A business concept and a business model are the same – a business model is simply a business concept that has been put into practice. A business concept comprises four major components: core strategy, strategic resources, customer interface, and value network.
Govindarajan & Gupta (2001: 3)	Business strategy	The business model results from answering three questions (1) who are my target customers? (2) what value do I want to deliver to them? (3) how will I create it?. The answers to these questions operate as a system – the individual answers must be self reinforcing and internally consistent.
Magretta (2002: 87)	Business strategy	A business model answers four fundamental questions: 'Who is the customer? What does the customer value? How do we make money in this business? And what is the underlying economic logic that explains how we can deliver value to the customer at an appropriate cost?
Hedman & Kalling (2003: 52)	Information system	A generic business model includes (a) customers, (2) competitors, (3) offering, (4) activities and organization,(5) resources, and (6) supply of factor and production, and (7) a longitudinal process component to cover the dynamics of the business model over time and the cognitive and cultural constraints that managers have to cope with.
Chesbrough & Rosenbloom (2003: 533)	Technological Innovation & strategy	The functions of a business model are to articulate value proposition, identify market segment, define the structure of the value chain, estimate the cost structure and profit potential of producing the offering, describe the position of the firm within the value network, and formulate the competitive strategy by which the innovating firm will gain and hold advantage over rivals.
Shafer et. al., (2005: 202)	Business strategy	A business model is a presentation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network.
Voelpel et. al., (2005: 40)	Business strategy	The particular business concept (or way of doing business) as reflected by the enterprise's core value proposition(s) for customers; its configured value network(s) to provide that value, consisting of own strategic capabilities as well as other (e.g. outsourced/alliance) value networks and capabilities; and its leadership and governance enabling capabilities to continually sustain and reinvent itself to satisfy the multiple objectives of its various stakeholders (including shareholders).

A review of the literature shows that the first systematic discussion of the concept of a business model in peer reviewed journals seems to come from the field of information technology, probably with the advent of the personal computer and spreadsheet (see Dottore 1977; Knoczal, 1975). In the late 1990s and early 2000s, with the proliferation of Internet businesses, the term business model gained momentum in e-business research and Internet start-ups (e.g. Hoque, 2002; Dubosson-Torbay, Osterwaldeer & and Pigneur, 2002.; Afuah and Tucci, 2001; Rappa, 2001; Amit and Zott, 2001; Timmers, 1998).

Since the beginning of the new millennium and onwards, the concept has been one of the top topics which has elicited intense discussions in the field of strategic management, signifying its application not only in e-businesses but across a wide range of industries (Davenport et. al., 2006; Voelpel et. al., 2005; Vlaar et. al., 2005; Shafer et. al., 2005; Hedman and Kalling, 2003; Chesbrough and Rosenbloom, 2002; Govindarajan and Gupta, 2001; Hamel, 2000).

The analysis of Table 2.5 shows that many researchers have used a business model concept for different purposes, including (a) to architect or to design a business system; (b) to show logical relationships among different parts of a system; (c) to implement a business plan; (d) as a framework of efficiency; and (e) more importantly as a locus of innovation. These purposes match with Eriksson and Penker's (2000: 7) scheme of five uses of a business model framework:

- to better understand the key mechanisms of an existing business for control purposes (logical relationships)
- to act as a basis for improving the current business structure and operations (efficiency)
- to design a structure of a new business (architecture, implementation)

- to identify outsourcing opportunities (innovation and restructuring)
- to experiment with a new business concept or to imitate or study a concept used by a competitive company, e.g. benchmarking on the model level (innovation)

Table 2.5: Purposes of Extant Business Model Research

*Field of study/industry	*IT	** EB	EB	EB	EB	EB	*** S	S	S	*** *TI	S	*** ** IS	S	S	S	S	
Purposes	Knoczal (1975)	Timmers (1998)	Tapscott et. al., (2000)	Amit & Zott (2001)	Afuah & Tucci (2001)	Dubosson_Torbay et. al. (2002)	Hoque (2002)	Hamel (2000)	Govindarajan & Gupta (2001)	Chesbrough & Rosenbloom (2002)	Magretta (2002)	Hedman & Kalling (2003)	Mitchell & Coles (2004)	Shafer et. al. (2005)	Vlaar et. al. (2005)	Voelpel et. al. (2005)	Score
Logical relationships	+							+	+	+	+			+	+	+	8
Architecture	+	+		+				+		+	+			+	+	+	9
Implementation	+				+												2
Efficiency	+	+		+				+			+			+	+		7
Innovation			+	+			+	+	+	+					+	+	8

*IT = Information technology, **EB = e-business, ***S = Strategy, ****TI = Technology innovation, *****IS = Information system.

Of particular importance to the current thesis are the works that have used the business model concept as a locus of innovation. A review of the literature shows that very few academics have used the business model concept as a framework of innovation. Building on these studies, the present study will use a business model concept as a conceptual framework for reinvention of a business model (see Chapter 3). The logic for using this concept is as follows. If the current business model is arguably said to be an incumbent's source of rigidity in the face of disruptive innovation, a new business model can then possibly emerge by questioning each component of a firm's current business model (Govindarajan and Gupta, 2001; Kim and Mauborgne, 2005; 1999; Hamel, 2000; Holmstrom et. al., 2000). More specifically, Govindarajan and Gupta (2001) argue that a new business model may emerge by asking the following three questions as reported in Table 2.6.

Table 2.6: Key Dimensions for Business Model Reinvention

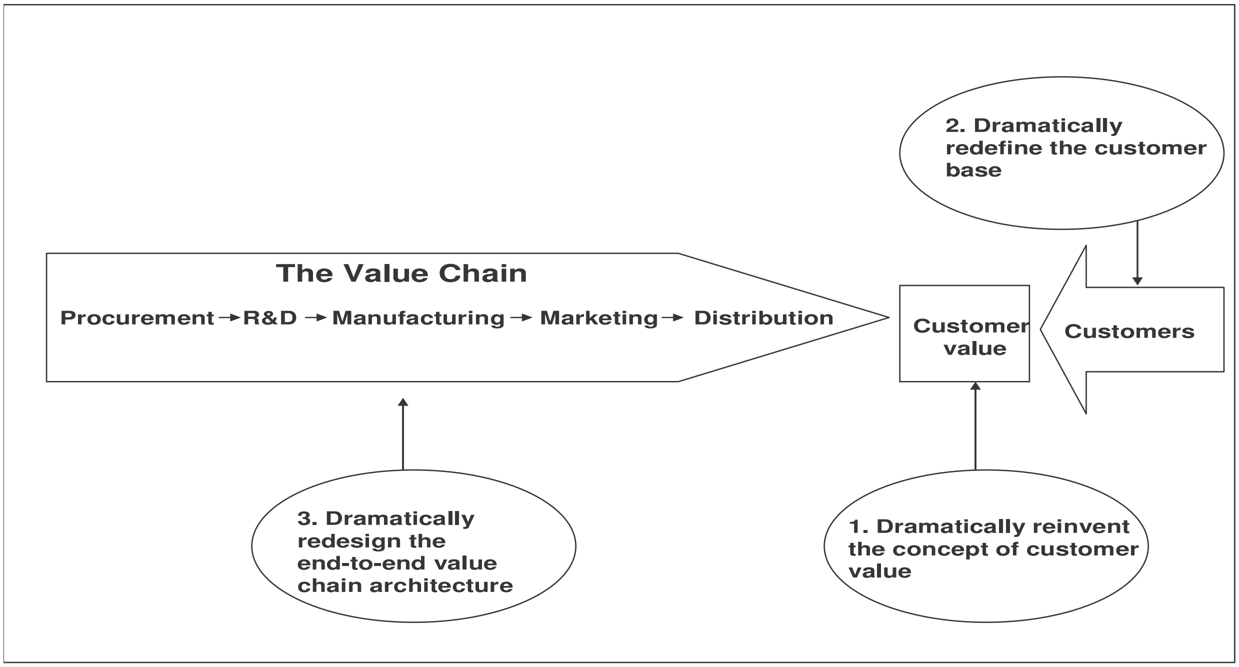
Key questions	Answers
1) Who is the firm's customer?	Reinvent the customer base
2) What does the customer value?	Reinvent the value proposition(s)
3) How does the firm create that value?	Redesign the value chain or the value network

Source: Govindarajan and Gupta (2001: 3)

Figure 2.4 shows that a business model reinvention may begin by a dramatic redefinition of a firm's customer base or by its reinventing value proposition(s). Alternatively, a radical redesign of value-chain or value-network may create a new business model (Voelpel et. al., 2005: 27; Govindarajan and Gupta, 2001: 4; Holmstrom et. al., 2000: 85). The assumption of a cause and effect relationship of major components of a business model means that any substantial change in one of the three key components will reinforce changes in all other components, if a business model is to function as a dynamic system (Govindarajan and Gupta, 2001: 4).

Among a number of related works, Govindarajan and Gupta's (2001) framework in particular offers a systematic approach for pursuing business model innovation by looking across the conventionally defined boundaries of a firm's target market and industry. Contrary to the Porterian and RBV static models that look systematically within defined boundaries of the firm, this approach provides insights for questioning the firm's current customer value, its target market and its value chain and value network configurations, and to reinvent them by looking across the defined boundaries (e.g. Kim and Mauborgne, 1999).

Figure 2.4: The Three Arenas Framework for Business Model Reinvention



Source: Govindarajan and Gupta (2001: 4).

2.5 Research Gaps in Extant Strategic Management Literature

The above literature review shows that the topic of disruptive innovation has been extensively studied virtually from all facets of business environments, including technical competence, capabilities, culture, market and industry linkages. In particular, recent studies have comprehensively explored the dual problems facing organizations, i.e., the challenge of simultaneously sustaining an existing business model and enabling disruptive business model innovation. They have proposed many insightful normative frameworks to guide organizations in their creative endeavors for mastering this challenge. Whilst this stream of studies focuses on "enabling" disruptive innovation, an emerging body of research has provided useful conceptual frameworks for assisting organizations in pursuing business model innovation in systematic ways. This thesis identifies two research gaps in existing management innovation literature: a dearth of research to understand how incumbent firm reinvent their business models to enable disruptive innovation, and lack of knowledge on the differences between technology and non-technology disruptive innovations.

2.5.1 A Framework for Business Model Reinvention to Enable Disruptive Innovation

The review of extant strategic management literature reveals that the two fields, namely disruptive innovation and business model innovation studies have not been linked systematically to provide an integrated framework for business model innovation and reinvention to enable disruptive innovation. When the (principally technology based) disruptive innovation studies are examined in light of this thesis's research question, they mainly focus on how an incumbent firm should deal with disruptive innovation when disruptive innovation has already taken place. Therefore, these studies seem to be more reactive and appear to be silent on the evolution of (potentially disruptive) business model innovation before it becomes disruptive. Similarly, when the emerging business model innovation studies are scrutinized, to a large extent they focus on the evolution of business model innovation. These studies do not seem to link business model innovation approaches with problems facing established companies to deal with disruptive innovation. By drawing the two fields of studies together, this thesis proposes to develop an integrated framework for business model reinvention to enable disruptive innovation.

2.5.2 Technology and Market-Driven Business Model Innovations

Many scholars have cited examples of low-tech disruptive *market-driven business model* innovations. Some of these examples are the introduction of Dell's "built-to-order" direct model in the computer industry, South West's low-cost carrier in the airlines industry and direct models in the insurance and banking industries that offer 24-hour access, convenience and low premium compared to traditional offerings (see e.g. Markides, 2006: 19 Govindarajan and Gupta, 2001: 6). However, the same theory of disruptive innovation that evolved from successive technological studies persists to explain all types of disruptive innovations. We seem to know little whether these low-tech disruptive innovations entail different evolutionary processes, competitive and disruptive effects in comparison to high-tech disruptive product innovations.

To understand this secondary question, it is important to define and distinguish the two concepts. Broadly, technology can also be defined as a scientific method or process that converts inputs including, knowledge, labor, material, capital, energy and information into outputs. Taking this definition, technology may refer to process innovation, which typically involves a change in the scientific method to make processes for established value propositions more effective or efficient, or to create a new product. This definition is comprehensive and may include all types of innovation. Narrowly, technology can be defined as "electronic or digital products and systems considered as a group". Taking the latter constricted view, the present study defines technological innovation as a core product innovation (Moore, 2004: 88; Hill and Rothaermel, 2003: 258; Tushman and Anderson, 1986: 440).

A business model is a *sine qua non* for all profit-making organization to commercialize all types of innovations, whether product, process or non-technological innovations. Some product or process innovations do not necessarily involve change in business models. Some other product or process innovations completely change the business model. In this study, innovations that change fundamentally both the core product and a business model can be defined as *technology-push* *business model innovation* or simply as "*technological innovation*". Stated differently, a business model naturally evolves as a result of, and around a technological product innovation. Some examples of technological disruptive innovations are as follows: The introduction of minicomputers was disruptive to mainframe computers. The introduction of personal computers was disruptive to the previously existing technology of minicomputers.

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Innovations that do *not* change the established core product compared to previously established core product or service, but that fundamentally change a business model, can be referred to as low-tech *market-driven business model innovation*, or simply as *business model innovation*. In other words, a less-technological business model innovation results from market innovation that reframes the established value propositions in an existing industry. An innovator firm creates a market as a result of, and around a business model innovation. Market-driven business model innovation often emerges at a latter stage when a radical or disruptive technological innovation matures and competition through business model becomes critical (Moore, 2004: 88).

The question of differences between *technology-push* and low-tech *market-driven* innovations is discussed in view of the relative concept of disruptive innovation. Christensen (2006: 48) recently improves his original theory by adding the concept of relativity. He states that "disruptive innovation is a relative, not an absolute phenomenon". Stated differently, a similar innovation that may constitute disruptive to a particular incumbents' business model in a given context may be sustaining to another incumbent's business model in another context. This recent addition suggests that a study of disruptive innovation is not complete without describing the relativity of disruptive innovation and explaining contextual factors responsible for variations. A careful scrutiny of the literature reveals that few studies have attempted to discuss the concept of relativity in disruptive innovation theoretically. Therefore, there is a need to investigate this concept empirically particularly within the different innovation categories within South African industries (Christensen, 2006; Markides, 2006).

The primary and second research questions become even more relevant when viewed from a developing economies setting. The disruptive innovation literature confines its empirical studies, to a large extent, on high-tech industries in developed economies. Although, some studies show that disruptive innovations are increasingly shaping markets and industries' structures in developing economies, it is unclear how these phenomena vary from disruptive innovation circumstances observed in developed countries (see Davenport et. al., 2006; Grulke and Silber, 2004). The variations in factor endowments and access to critical resources between developed and developing economies could probably mean that managers in developing economies face different challenges in their strategic endeavors to enable disruptive business model innovation. This is possible because even industry incumbents in different countries within developed economies have exhibited different behaviors in dealing with disruptive innovation (Chesbrough, 1999).

2.6 Summary

This chapter examined extant theories, concepts and frameworks of disruptive innovation and a business model in order to identify research gaps in current strategic management literature. The introductory part presented definitions of key concepts used in this study in order to provide clarity on their meanings in the analysis of the literature. Defining these concepts are critical for proper operationalization of proxies in empirical investigations of this thesis.

The first part of the chapter examined the disruptive innovation theory and its theoretical basis. It shows that the theory has evolved through successions of studies that have explored the evolution of technological change and its impact, as a central force, in shaping the future of business organizations over the last fifty years. The early works framed the question of industry incumbents' problem in dealing with disruptive change in terms of technology alone.

The latest development in this field shifted the focus of analysis to the incumbent's current business model and its evolutionary nature, as opposed to a focus on technology alone. The evolved relationships of major components, evolutionary learning processes and cognitive models embedded within the incumbent's business model are said to be the major cause for the incumbents' failure in the face of disruptive innovation. And such outcome is more likely when the incumbent's business model has been successful in the past. Consequently, for established companies, the issue of reinventing their business models becomes a strategic challenge for survival in the long run, while their traditional business models are still profitable. To address this challenge of "dualism", many scholars have suggested different frameworks for assisting industry incumbents to enable disruptive innovation, while sustaining their current business model. A careful study of these frameworks reveals that while they provide important managerial insights and guidance for managing discontinuous innovation, they seem to disregard the question of business model reinvention.

The second part of this chapter examined the concept of a business model. Although the concept of a business model is relatively a recent introduction to the field of strategic management, it has a solid theoretical foundation in the literature. Its antecedents, the strategic positioning and RBV theories, can inform an organization about its relatively static internal and external sources of competitive advantage that reside within its business model. These models may be useful for strategizing towards the future when the environment is believed to be predictably changing. The learning and continuous innovation approaches are useful for providing guidance to firms about dealing with continuously changing business environments. However, they are inadequate for assisting managers of incumbent firms in the face of disruptive changes.

Possibly in an effort to address the shortcoming of traditional strategy theories, an emerging body of knowledge has invoked a business model concept as an appropriate framework for pursuing innovation. A careful examination reveals that business model innovation studies have not been systematically linked to disruptive innovation studies. By reviewing the two fields of studies this chapter has highlighted two research gaps.

The first question is concerned with how organizations should innovate and reinvent a business model to enable disruptive innovation. The second question hypothesizes that technological and market-driven business model innovations are two distinct disruptive innovation phenomena that require different approaches. The following chapter will present a conceptual framework for carrying out empirical investigation to answer these research questions.

CHAPTER THREE: CONCEPTUAL FRAMEWORK

3.1 Introduction

The purpose of this chapter is to develop a conceptual framework for guiding the empirical investigation to address the present research questions. This chapter is organized in three major parts. The first part provides a more comprehensive definition of a business model and outlines its six key components. The second part presents a conceptual framework that integrates the concepts of a business model and disruptive innovation. The third part distinguishes the difference between *technological* and *market-driven* business model innovations.

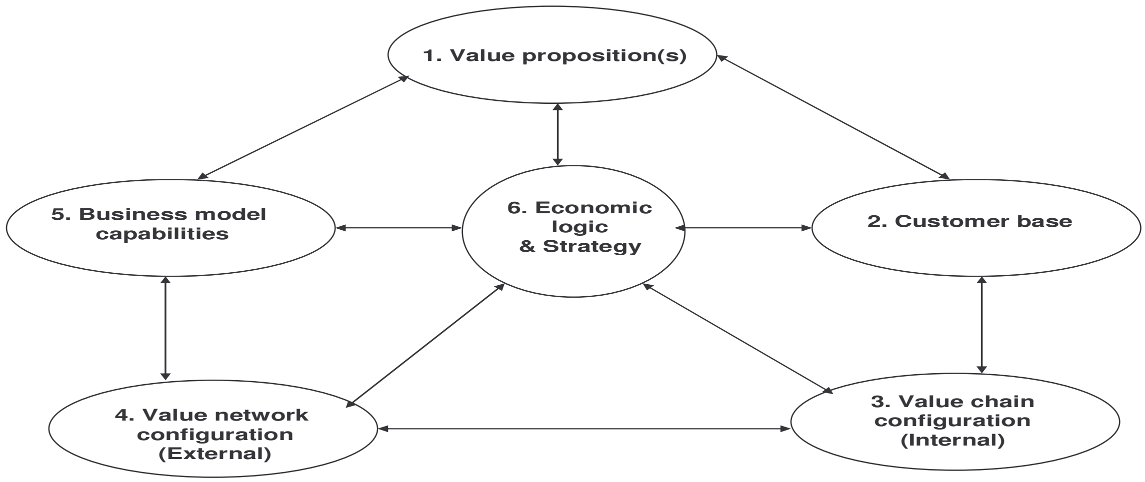
This chapter proposes two conceptual models, namely an entrant's evolutionary and an incumbent's enabling model for disruptive innovation. From an entrant point of view, the evolutionary model articulates seven hypotheses that are assumed to determine a successful introduction and emergence of potentially disruptive business model innovation. This section culminates by arguing that although a business model innovation is realized when an innovator firm succeeds in creating and growing a potentially disruptive niche market, this does not, on its own, lead to disruptive innovation. Building on existing theories and integrating emerging insights from the South African case studies, the study develops a second conceptual model that deals with disruptive innovation process from an incumbent firm perspective. It puts forward another seven hypotheses that are thought to determine the disruptive impact of innovation on an incumbent's traditional business model, and how an incumbent firm should reinvent their business models to enable (or disable) disruptive innovation.

3.2 A Conceptual Framework for Enabling Disruptive Innovation

This study conceptualizes its framework based on two established assumptions. First, disruptive innovation introduces a fundamentally different business model to that of the incumbent. Second, the incumbent's existing business model will be the cause of its problem in the face of a disruptive innovation. These assumptions suggest that disruptive innovation is a function of conflicts between an incumbent's and entrant's business models (Christensen, 2006: 43).

According to the business strategy literature, a business model is defined as a holistic and systemic entrepreneurial business concept which describes how a firm: (a) articulates latent value proposition(s); (b) identifies a particular customer segment(s) for that value proposition; (c) designs internal value chain; (d) configures external value network structure; (e) identifies, accesses and coordinates own and others capabilities and resources (residing across a particular value chain and a value network structure) to create and deliver that value, and (f) generates revenue (economic logic) and develops a core strategy necessary for capturing and sustaining the value it creates. The systematic categorization of these components into six major constructs captures the most fundamental elements of a business organization. The systemic and holistic terms refer to a conceptual representation of the aggregation of all major components of a business underpinned by a core economic logic (Voelpel et. al., 2005: 40; Shafer et. al., 2005: 201; Hedman and Kalling, 2003: 56; Chesbrough and Rosenbloom, 2003: 533; Hamel, 2000: 66).

Figure 3.1: Dynamic Relationships of a Business Model's Components



As shown in Figure 3:1, a business model conceptualizes how a business functions as a system. The figure shows that the components have a dynamic relationship with each other that co-evolve around a core economic logic, which must be sustained by a firm's core strategy (Magretta, 2002: 87). The following section discusses each of the components and their linkages from an incumbent's existing business model perspective.

(a) Customer value proposition

The most basic point to start in creating a business is to discover a viable customer value. Value is defined as "the amount customers are willing to pay in return for a firm's offerings" (Porter, 1985: 38). The concept of value proposition refers to the total customer benefits offered by a particular company for a specific customer base relative to competitive offerings. The total customer value is derived from the functional, experiential or emotional benefits of a product or service. These benefits can be created from several interrelated elements including, price, quality, ease of use, brand recognition, complementary offerings, convenience of transaction mechanisms (efficiency) in obtaining the product (Walker, Boyd, Mullins & Larreche, 2006: 75).

A clearly defined value proposition constitutes the foundation upon which a business model of a firm is built. When the value proposition is synchronized with the needs of a particular target market, it articulates the company's strategic focus. Generally, there are two types of strategic focus; differentiation (higher quality) or low-cost strategy (lower price). A firm's business model evolves from an early choice made between these strategies. A continuous strategic focus assists the company to sustain its competitive advantage in its established market. It allows the firm to achieve "fit" between its business model, strategy and its external environment. From an incumbent perspective, the notions of focus and fit suggest that it is often difficult, if not impossible, for a firm to integrate an essentially different value proposition in the same business model (Porter, 1996: 63).

(b) Customer base

The second vital component of a business model is a firm's particular target market for which its specific value proposition is designed. Generally, a market segment can be categorized as high-end or low-end depending on the price sensitivity of customers in a particular market. A firm may choose to serve either market segment based on whether it adopts differentiation or low-cost strategy. Once a firm's value proposition is established in its specific target market, a firm maintains an ongoing relationship between the company and its customer base through marketing approaches such as a customer relationship management (CRM) process (Shimp, 2007: 472).

The application of advanced information and computer technology (ICT) devices, such as enterprise resource planning (ERP) and data-mining technology are useful for identifying needs, targeting customers with relatively high accuracy, customizing offerings, and providing efficient customer support services. These attributes create a good interface between the firm's value propositions and its customer base. But such a relationship that evolves from a chosen strategic focus often confines the firm to its previously defined market base. Because of conflicts in value propositions (higher quality vs. lower price, for instance), a firm is typically less able to serve a characteristically different target market (high-end vs. low-end, for example) within the same business model (Gilbert, 2003: 32).

(c) Value chain

Once a firm develops a customer value concept for a particular customer base, it configures a value chain to create and deliver that value to the final user. A value chain is a systematic conceptual tool that is used to analyze a linear flow of activities that a particular firm performs in the creation and delivery of a product or service. A value chain comprises primary and support activities. The primary activities are those processes that are directly concerned with the creation and delivery of a product to the customer. These include supply chains, production, distribution, marketing, sales and services (Porter, 1985: 38).

Although support activities are not directly involved in the creation and delivery of a product, they enhance the efficiency and effectiveness of value creation activities. Support activities include procurement, human resources management, technology development and process infrastructure. A value chain assists a firm to asses the cost of each activity in creating value in accordance with the firm's chosen strategy. For example, a firm that adopts a differentiation strategy configures a value system and performs activities that increase quality of the product from a user perspective. On the other hand, a firm that follows cost-leadership strategy designs systems that lower the cost for the buyer. A firm generates value (profit) when its revenue exceeds the total cost of performing all activities in the value chain (Porter, 1985: 38).

When a firm is successful in configuring a profitable value chain, the "fit" and consistency that evolve between individual activities may continue to be sources of differential advantage in the traditional market. The advances in ICT and the Internet make possible the effective application of processes and practices such as just-in-time' (JIT), total quality management (TQM), and business process engineering (BPE) (see Quinn, 1997; Dawson and Palmer, 1995; Hammer and Champy, 1993; Cusamano, 1985).

The dynamic and interdependent linkages of value proposition, target market and value chain, as presented so far, means that a fundamental change in one element is often difficult, if not impossible, without changing all of the other three components – that is changing the business model as a whole (see Markides and Charitou, 2004; Teece et. al., 1997).

(d) Value network

A business model approach to business strategy suggests that the creation and delivery of products or services depends not only on a single firm's value chain, but also on its external value network. A value network links the focal firm's value chain with its suppliers, customers, or others who complement and add value to the firm's core product or services (Hamel, 2000: 88).

Strategy scholars use different concepts such as the 'value system', 'clusters', 'ecosystem', 'strategic network', and 'socio-cultural business system' to describe the boundaries and pathways of a focal firm's business model in its network, as well as to map the logical relationships among different actors in that network. These various relational concepts help us to define a focal firm's value network structure, showing the firm's vertical relationships such as those between suppliers, producers, distributors and customers; or its horizontal relationships among competitors linked by strategic alliances (Iansiti and Levien, 2004; Moore, 1993; Gulati et. al., 2000; Leibold, Probst & Gibbert, 2002; Porter, 1985).

A firm's value network also comprises complementary actors that add value to the firm's core product or service or other agents who influence its value creation and value-capture potential. For example, an airline and a hotel may form a partnership to complement their services, and a government, regulatory agencies, investors and stakeholders can influence a firm's value creation and capture potential.

A firm's value-capture potential may depend on the nature of its external relationships. A firm's may have specialized and generalized relationships with its external partners. A firm's special relationships can be built through exclusive contracts, for example, with few suppliers of strategically important inputs, exclusively trained distributors and its most loyal corporate clients. Other relationships can be of a general nature, such as arms-length relationships with suppliers of generic materials (Teece, 1986: 291).

When the firm's core linkages in its ecosystem or network are reasonably specialized, predictably changing and healthy, they raise entry barriers and provide a stable platform for a member firm to continue improving its business model. Conversely, these historical linkages and interdependences imply that a firm's existing value network can restrict its business model to existing relationships, making it difficult for the firm to adapt to disruptive innovation that emanates outside of its network boundaries (see Chakravorti, 2004: 65; Gulati et. al., 2000: 207).

(e) Capabilities

The firm's value chain and value network structure are made up of capabilities. Otherwise stated, capabilities reside within the firm's value chain and outside within its partners and complementors' value chains. Capabilities refer to the firm's ability to identify, access, integrate, build, and reconfigure, internal and external competencies and resources to sustain a firm's existing business model. Capabilities comprise core-competencies, processes, values and resources (Sanchez, 1997: 943; Richardson, 1972: 883; Teece et. al., 1997: 517).

Core-competencies: A firm's critical knowledge, experience and skills that make its final products or services unique relative to the firm's competitors' products or services are referred to as core-competencies (Teece et. al., 1997: 517).

Processes: A process refers to distinctive routine activities which are performed in coherent and consistent ways. Processes, for example, can be the ways by which production is planned and made, and the ways by which procurement, market research, investment decisions, budgeting, and resource allocation are planned and executed (Christensen and Raynor, 2003: 183; Teece et. al., 1997: 517).

Values: Values include culture, standards, 'mental models' and 'dominant logics' which members of a firm use as a frame of reference in making judgments and decisions in their strategic and technical activities. A mental model is an abstract representation of processes within one's head. A dominant logic represents the frame of mind that employees use to prioritize their activities. This includes feelings and belief systems which one may not even be conscious of. When the corporate values are explicitly or implicitly clear and broadly disseminated, they ensure the internal coherence and consistency of the dynamics in a firm's business model (Von Krogh and Nonaka, 2000: 6; Prahalad, and Bettis, 1986: 485).

Resources: Resources include both tangible assets like finance, technology, product designs, equipment and machinery, building, and labor; and intangibles such as brand, information and specific knowledge about the firm's customers (Christensen and Overdorf, 2000: 73).

When resources, core competencies, processes and values are intertwined within a particular business model, they may become firm-specific capabilities that are difficult, if not impossible, to emulate. Because each firm's capabilities evolve in idiosyncratic ways contingent upon its own context and history, the capabilities determine what a firm can or cannot do. When a firm's environment is said to change fairly predictably, and that the firm has been successful in the past, its capabilities may feed each other dynamically to create more success in the future. Conversely, when a firm's environment is said to be discontinuously changing, its current capabilities may become sources of its maladaptive rigidities (Foster and Kaplan 2001: 61; Normann, 2001: 82; Leonard-Barton, 1995: 111).

(f) Economic logic and strategy

The ultimate measure of any business undertaking is, of course, economic value creation. A company may create value for its customers and itself by offering competitively better or cheaper value propositions, identifying a profitable customer segment, assembling value chain and value network. However, if it lacks a strategic position and firm-specific strategically important capabilities, its economic logic may be deficient. The most important issue for a firm is, therefore, to capture and sustain corresponding economic returns relative to the value it creates (Shafer et. al. 2005: 205; Porter, 2001: 65).

By analyzing competitive forces, a company can carve out a strategic position to compete within those forces. A firm should also identify resources and capabilities within its business model that are (a) inimitable, (b) not readily substitutable, (c) superior to competitors, (d) scarce among competitors, and that (e) enables it to leverage core competencies in related businesses (Collis and Montgomery, 1995; Prahalad and Hamel, 1990).

The economic logic requires management to address and evaluate the potential and consistency of the six components of a business model for value creation, capture and sustainability. To operate a profitable business, all the components must function as a dynamic system in an internally consistent manner, and dynamically revolving around the firm's core economic logic.

This suggests that an existing business model (the usual way of doing business) can influence managers to pay less attention to other business opportunities that do not confirm with the economic logic. For example, a firm that adopts a differentiation strategy may not find a low-end opportunity attractive. Alternatively, a firm that exploits economies of scale and low-cost production to serve a large mass market may not find a small low-end niche-market financially attractive (Christensen and Raynor, 2003: 32-45).

In chapter two, it was discussed that serious differences in terms of strategic market focus, value chain, value network, capabilities and revenue model can cause incumbents to falter in the face of disruptive innovation. Then an important question for an established organization is how to reinvent a business model to deal with disruptive innovation while its traditional business model is still profitable (O'Reilly and Tushman, 2004; Hamel and Valikangas, 2003; Beinhocker, 1999). A logical approach to address this question for the incumbent seems to take an entrant's (disruptor) perspective of the equation.

Table 3.1: The Fundamental Questions Put by a Business Model Concept

Fundamental questions	Key components
1. What does the customer need?	Value proposition(s)
2. Who is the firm's customer?	Customer base
3. Where and how does the firm create that value?	Value chain
4. Who are the firm's partners (suppliers/distributors)?	Value network
5. How does the firm create and capture that value?	Capabilities and resources
6. What does the firm gain and how does it sustain the value for itself?	Economic logic, strategy

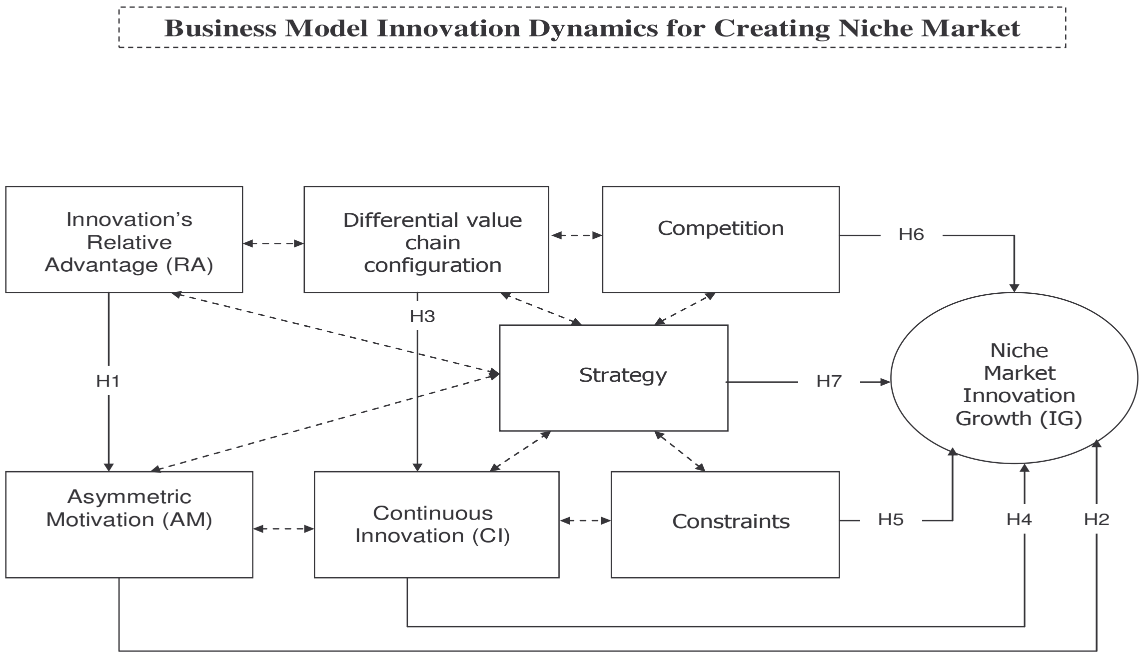
As shown in Table 3.1, the systematic categorization of a business model's components into six major constructs highlights the basic questions that are necessary for creating and developing a business model (for additional insights see Shafer et. al., 2005; Hedman and Kalling, 2003; Chesbrough and Rosenbloom, 2002; Magretta, 2002).

Building on the above logical sequence of questions, and integrating the concept of a business model with the theory of disruptive innovation, this study develops two conceptual frameworks for entrant's business model innovation and incumbent's business model reinvention for enabling disruptive innovation. The conceptual frameworks can be described in a nutshell as evolutionary and disruptive stages of markets as graphically depicted in Figure 3.2. Firstly, from an entrant's perspective in the evolutionary phase it assumes that a potentially disruptive business model innovation originates and builds momentum in a *niche market*. Secondly, from an incumbent's perspective in the disruptive phase, beyond creation of a niche market, disruption occurs if a new business model succeeds to enter into an incumbent's established *mainstream market*. Theoretically, an innovator firm transforms from a niche player into a disruptive firm, as it successfully adapts to endogenous and exogenous dynamics. The first evolutionary phase puts forward seven logically linked hypotheses that are assumed necessary for creation of a successful niche market. The second disruptive phase proposes other seven hypotheses that are conceptualized to determine an incumbent's reinvention processes to enable or disable disruptive innovation.

3.3 Niche Market Innovation

Figure 3.2 shows a conceptual framework of the evolutionary process from an entrant's perspective. The first hypothesis (H1) assumes that a process of a potentially disruptive business model innovation may begin, first, by introducing a product or service with a different set of value propositions and performance attributes that are perceived inferior and unattractive on the dimensions the mainstream customers value compared to the existing offering.

Figure 3:2: Entrant's Perspective: A Conceptual Model of Business Model Innovation Dynamics for Creating a Potentially Disruptive Niche Market



Second, the paradoxical nature of disruptive innovation suggests that a potentially disruptive innovation must create *asymmetric motivation* during an innovation's introduction life-cycle (Christensen et. al., 2004: 13).

From an entrant's perspective, H1 hypothesizes that the innovation's relative advantage (RA) is negatively related to "asymmetric motivation" (AM). "Asymmetric motivation" refers to the differential economic incentives, where a small start-up disruptor may find a low-margin, low-end small market profitable, whereas the start-up entrance may motivate a large established incumbent to flee that relatively low-margin market in order to concentrate on the more profitable established market. H2 therefore hypothesizes that AM is positively related to a potentially disruptive niche market innovation growth (IG) (Christensen et. al., 2004: 13).

The third hypothesis (H3) suggests that a fundamental end-to-end reconfiguration of a value chain is positively related to continuous innovation (CI). The extent to which a fundamentally different value chain configuration enables continuous innovation determines an innovator's potential to create a disparate and disruptive trajectory that moves up market the new business model over time before the innovation encroaches the established market. Thus, H4 assumes that continuous innovation (CI) is positively related to a potentially disruptive niche market innovation growth (IG) (Govindarajan and Gupta, 2001: 3).

In chapter two, a distinction was made between the concepts of creativity and innovation. It was highlighted that creativity may result in something new, but it does not necessarily mean that it adds value to the organization in a commercial sense (Hill and Rothaermel, 2003: 258; Drucker, 1985: 19). Similarly, the discovery of the three independent components namely, new value propositions, customer base and value chain are endogenous innovation drivers which are necessary conditions but not sufficient for business model innovation (Voelpel et. al., 2005: 27; Govindarajan and Gupta, 2001: 3).

Business model innovation depends on an innovating firm's ability to overcome exogenous enabling or disabling forces by developing a strategy. Thus, H5, H6 and H7 put forward assumptions for assessing the dual innovator's challenges of overcoming constraints and competitive pressures on one hand, and building firm-specific strategic capabilities for capturing value and growth on the other hand (Drucker, 1985: 19). H5 hypothesizes that constraint is negatively related to IG. H6 assumes that competition is positively related to IG (Porter, 1985: 38; Walker et. al., 2006: 180), and H7 hypothesizes strategy is positively related to IG. A firm's strategy determines whether an innovating firm can or cannot exploit opportunities and resources to enable innovation (Teece et. al., 1997: 519; Collis and Montgomery, 1995: 120). The model conceptualizes that the seven variables, namely RA, AM, differential value chain, continuous innovation, constraint, competition and strategy are interdependent that evolve in cause and effect dynamics adapting to endogenous and exogenous, enabling and/or disabling forces. When they evolve positively overtime reinforcing each other coherently around a center of a sound economic logic, they create a potentially disruptive innovation. The dynamic relationships are depicted by dotted arrows in Figure 3.2 (Collis and Montgomery, 1995: 120; Teece et. al., 1997: 519; Govindarajan and Gupta, 2001: 3). The next section discusses each hypothesis in depth building on established theory.

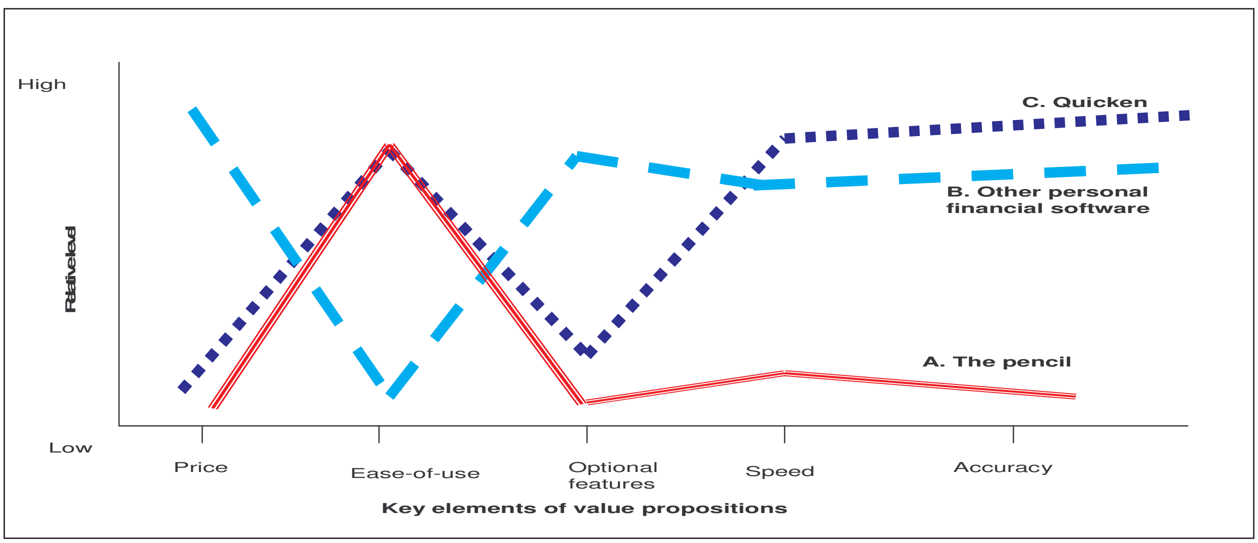
3.3.1 Relative Advantage (RA) and Asymmetric Motivation (AM)

An innovator firm begins by discovering a new value proposition. Value creation depends on the *relative advantage* (RA) of an innovation in terms of price, ease of use, technology newness, quality and brand recognition benefits (Agarwal and Prasad, 1997; Chau, 1996; Rogers, 1995; Davis, 1989). Kim and Maubourgne (2005; 1999) propose the concept of a value curve (see Figure 3.3) to provide insight into how managers can reinvent value propositions by looking systematically across the value elements including, price, quality, ease of use, brand recognition, complementary offerings, convenience of transaction mechanisms (efficiency in buying) or introducing new technology. A case to illustrate reinvention of value proposition is Intuits innovation of Quicken personal finance software.

Case example: Intuit[5]

The introduction of personal finance software was essentially a disruptive innovation to manual-based accounting services. Every household conducts financial calculations for making budgets and paying bills. In 1984, there were 42 various types of personal finance software, but they had little impact on the households' manual accounting businesses. People continued to rely on the pencil for their accounting needs.

Figure 3.3: Reinventing Value Propositions



Source: Kim and Mauborgne (1999: 85).

Intuit, a financial accounting software company, reinvented the traditional value propositions by looking systematically into why users still choose the pencil over the existing financial software. The company discovered that the pencil had two significant advantages over computerized

[5] Kim and Mauborgne (1999: 85).

financial software: it was substantially cheaper and conveniently simple to use. The software packages were highly expensive, selling at an average price of USD$300. In addition, they were designed for the few, affluent and educated up-market households. For the mass market, their accounting terminologies and features were intimidating, making it difficult for the people to understand and use them.

As Figure 3.3 shows, by looking across the substitutes between the pencil and the software, and thinking about how customers make trade-offs across these substitutes, Intuit created a new software, Quicken, which brought together the best of these two worlds – the strong advantages the pencil has over the package (low price and ease-of-use) and the essential advantages that the package has over the pencil (speed and accuracy). By removing all other attributes such as the accounting jargon and sophisticated features, Intuit created a user friendly interface that is similar to the familiar checkbook. The result was Quicken, a package that has become more accurate and faster than the pencil, yet just as easy to use as a pencil (Kim and Mauborgne, 1999: 86).

As the Intuit case illustrates, an innovator may create a new customer value by changing some elements of the value proposition dramatically and removing others altogether. For example, a company which aims to create a much cheaper product or service may have to trade-off down quality and brand attributes. Conceptually speaking from a disruptive innovation point of view, there are two important assumptions for disruptive value propositions:

First, traditional marketing and innovation theories assume that the concept of relative advantage (RA) is positively related to sustaining innovation; the higher the RA, the higher the incumbent's motivation to retaliate (Leonard and Rayport, 1997: 102; von Hippel, 2005: 20). Disruptive innovation theory assumes that the urge to maximize profits from "customers not-yet satisfied" in an established market will drive companies to improve their products better in ways that existing customers will value. When an innovation's relative advantage is perceived as a better value compared to established product by existing customers, the theory predicts that, regardless of the difficulties in adapting their business models, established companies almost often succeed in outperforming rivals with regard to sustaining innovations (Christensen and Raynor, 2003: 33).

Second, disruptive innovation theory implies that RA is negatively related to disruptive innovation (Day, 1999: 5; Day and Schoemakers, 2005: 135). A potentially disruptive innovation introduces products or services that initially do not meet the mainstream customers' expectations. Therefore the innovation is not comparable with existing value propositions using the incumbent's customer orientation and RA metrics. From the potential disruptor's perspective, the innovation should appeal to the low-end or new customers. Disruptive innovation requires that during the introduction stage, the overall RA of the innovation should not be significant enough to cannibalize the incumbent's profitable stronghold market. Cannibalization refers to decline of the flow of income from established product's market (Gilbert et. al., 1984: 238; Reinganum, 1983: 741).

Stated differently, from the entrant's perspective, a potentially disruptive innovation must have relatively higher relative advantage (RA) in some of the attributes of value propositions, for instance, lower in price and easier to use compared to an incumbents' previously established value propositions of similar offerings for the low-end market or new market. Still the quality, brand recognition or technology of the new business model must be relatively inferior compared to the previously established profitable products in the main market. Assuming that an incumbent would react to any incursion by entrants into its established market, the key for success in creating a potentially disruptive market seems to be contingent on an entrant's finding a niche market that is not likely to be attractive to industry incumbents' revenue models. A historical example of a company that introduced a disruptive business model by identifying a previously un-served market segment is Southwest Airlines.

Case example: Southwest[6]

In the USA, Southwest introduced a low-cost, no-frills business model to price sensitive customers at the low-end market in the 1970s. At the time of its introduction, Southwest's niche market was too small in terms of size and profit potential to attract attention from traditional premium airlines such as United, American and Delta. Most importantly, their mainstream passengers saw Southwest's flying services an inferior relative to the conventional premium services. However, overtime passengers began to see value in Southwest's cheaper, convenient and simpler value propositions. Consequently, Southwest Airlines disrupted a significant portion of the industry incumbents' market. By May 2003, Southwest achieved the largest market share in the US airlines industry (Vlarr et. al., 2005: 160; Porter, 1996: 63).

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[6] Vlarr et. al., (2005: 160); Porter (1996: 63).

From an entrant's point of view, the paradoxical concept of a potentially disruptive innovation implies that an innovation with relatively lower or negative RA compared to established product's value propositions, when measured by the mainstream customers, may create asymmetric motivation (AM). Theoretically, the value propositions of a potentially disruptive business model should take roots in a low-end price-sensitive and/or a small niche market or previously un-served market. When the innovation is likely to be perceived as inferior by the mainstream market, but attracts a low-end, low-margin market, it is less likely to provoke aggressive counter attacks from large established firms, consequently, creating "asymmetric motivation" (Gilbert, 2003: 32). Christensen and Raynor's (2003: 44) disruptive innovation model theorizes that the absence of incumbents' aggressive counter-attack and a lack of motive to be concerned about the entrant at the early stage of the innovation provide a potential disruptor with necessary impetus to experiment and improve its performance in a niche market.

Hypothesis 1: All else assumed constant, an innovation's Relative Advantage (RA) is negatively related to "Asymmetric Motivation" (AM) during the introduction period of innovation life-cycle.

Hypothesis 2: Therefore, AM is positively related to potentially disruptive niche market innovation growth (IG).

3.3.2 Differential Value Chain and Continuous Innovation

The most salient cause of asymmetric motivation is a fundamental difference of economic transaction costs of producing and distributing of good or service between an innovator and an incumbent (Coase, 1937). This difference often results from configuring a direct, shorter or open (distributed) value chain compared to traditional industry value chain. While the deconstruction of traditional value chain allows entrants to configure low-cost structure, incumbents already committed irreversibly to existing high capital and operating cost structure will continue to pursue the high margin market. As a result of their CAPEX and OPEX model, they will be less motivated to cannibalize the flow of income from the current (high or medium margin) market, in the face of emerging or latent (a low-margin) disruptive innovation (Adner, 2002; Chesbrough, 2006; Gilbert et. al., 1984; Reinganum, 1983).

One of the major sources of innovation of a potentially disruptive business model is deconstruction of traditional value chains (and value networks). The advance of ICT threatens to undermine integrated value chains across many industries, thus forcing incumbents to rethink their business models in radical ways. The use of ICT and the Internet allows innovators to cut-out intermediaries, to gain substantial reduction in costs, and increase efficiency and speed. Furthermore, it enables a company to convert previously physical products into digital solution systems (Lovelock and Writz, 2007: 108; Holmstrom et. al., 2000: 64; Evans and Wurster, 1997: 18). Dell Computer's direct business model is an apt case of a disruptive innovation that resulted from the deconstruction of a traditionally integrated value chain in the computer industry (Govindarajan and Gupta, 2001).

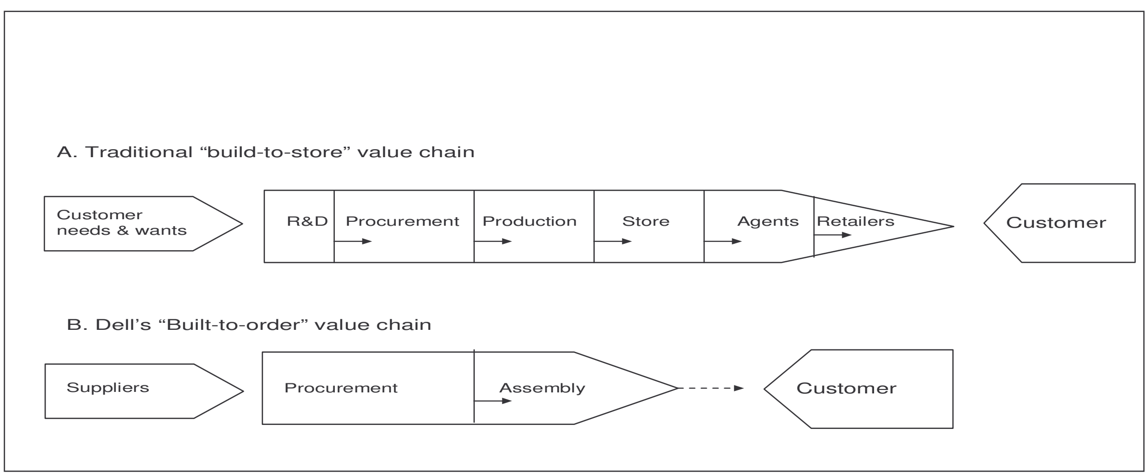
Case example: Dell[7]

The traditional value chain in the personal computer industry was characterized as "build-to-stock". It means that computer makers designed and made computers with standard components based on demand forecasts. The finished products were first stored in manufacturers' warehouses

[7] Govindarajan and Gupta (2001: 5).

and then shipped to distributors and retailers who had to display the goods on their retail outlets for sale. These intermediaries typically added a 20% – 30% markup on the manufacturer's price, in return for providing several customers services including a wide range of choices by representing multiple brands, the opportunity for customers to personally try the products before purchase, and accessible locations. In 1984, Michael Dell reinvented the value chain that dramatically changed the rules of the game in the computer industry in several ways, as Figure 3.4 shows. First, Dell introduced a supply chain that cut-out all intermediaries and shipped directly to end users. Second, it received customized orders for hardware and software over the phone or via the Internet. Third, it designed an integrated supply chain that linked its suppliers closely to its assembly factories and the order-intake system. Fourth, it outsourced all components and performed only assembly tasks.

Figure 3.4: Example of Value Chain Reinvention



Michael Dell's insights for the "build-to-order" value chain came from two observed trends. First, he realized that customers were becoming increasingly knowledgeable about computers and no longer required technical assistance from the sales force. Second, Microsoft had transformed the computer industry by enabling all PC manufacturers to make standard components (monitor, key-board, memory, disk drive, software, and so on) and thus permitting mass customization in system configuration. Compared to industry incumbents, Dell's business model was dramatically efficient. It enabled the company to gain speed by focusing only on its core competencies. It was found that the computer industry incumbents such as IBM and Compaq could not easily imitate Dell's business model due to an ecosystem "lock-in" effect – i.e, due to specialized network linkages with their partners. The risk of these incumbents being alienated by their suppliers and distributors was real (Govindarajan and Gupta, 2001: 5).

When defining the concept of a business model earlier, it was noted that an existing value network linkages requires entrants to seek different ways to circumvent barriers. According to Christensen and Raynor (2003: 44), a potentially disruptive value network may emerge in the low-end section of the existing value network that might be perceived by incumbents as the least desirable. Another course of action is that a potentially disruptive business model can create an entirely new value network to serve a fundamentally different customer segment that was not part of the incumbent's value network. A third possibility that seems to have received little attention is the use of an existing value network by diversifying entrants to introduce disruptive innovation into another industry (Danneels, 2004: 253).

Business model innovation is the result of continuous and evolutionary innovation, rather than a well-though out plans. Continuous innovation is the function of a fundamentally different value chain which must possess three innovation capabilities. Firstly, a potentially disruptive value chain should yield a lower cost advantage to create and deliver cheaper and easier-to-use products. Secondly, the extent to which the new value chain's inherent capabilities enable the innovating firm to generate consumer insight, and thirdly, the extent to which it enables the innovator to take its innovation to market faster than the competition are critical factors for creating latent disruptive niche market (Govindarajan and Gupta, 2001: 5; Holmstrom et. al., 2000: 64; Evans and Wurster, 1997: 18). Based on the literature review and case studies, this study hypothesizes the following:

> ***Hypothesis 3: The configuration of fundamentally different value chain is positively related to continuous innovation (CI).***
>
> ***Hypothesis 4: CI is therefore positively related to potentially disruptive niche market innovation growth (IG).***

3.3.3 The Constraint Factors

While the above two hypotheses are set to test business model creation framework, internal and external constraints can have a disabling effect on business model innovation. The extent to which an innovating firm can obtain (a) access to generic resources, (b) customer accessibility to innovation (c) customer affordability to innovation (d) the nature of national policies and laws on innovation, and (e) technical and compatibility issues with existing technology or complementary assets can determine a firm's ability to scale-up its innovation (Chesbrough, 1999; Teece, 1986).

Generic resources are general resources such as capital (finance), technology, equipment and machinery, buildings, skilled labor, general infrastructure, standard best practices, and contractual supply and distribution channels. Existing research suggests that independent small start-up innovators, particularly those that are located in innovation clusters, may be generally capable of scaling up their innovation through the support of external capital ventures and investors (Chesbrough, 2003; Porter and Stren, 2001). This may be true in developed economies but it needs further consideration in developing economies. We assume that in oligopoly-type market structures prevalent in South Africa, large established corporations would most likely have control over key resources. Thus, from an entrant's perspective, a small start-up may struggle to scale-up its innovation.

Hypothesis 5: Constraint is negatively related to a potentially disruptive niche market innovation growth (IG).

3.3.4 The Competition Factor

In disruptive innovation theory, an innovation moves upward from initially poor performance to better performance in the mainstream market through an improvement performance trajectory. One of the factors that provide motivation for a disruptor to improve its product is said to be the absence of retaliation from industry incumbents (Gilbert, 2003; Charitou and Markides, 2003; Christensen and Raynor, 2003). This factor is well documented in the literature and will be discussed later. Competition is intuitively another key driver that incubates imminent disruptive innovation in a niche market (Porter, 1985).

The Product Life Cycle (PLC) theory posits that growth of a new market attracts new entrants who expand the market further through competitive innovation (Walker et. al., 2006: 180).

Similarly, researchers have noted that the introduction of a radical technological innovation often attracts a flood of new entrants. During this period, intense rivalry among new entrants generates higher rate of successive innovations until a certain design combination is adopted by customers. The industry, in turn, adopts this standard that becomes a dominant design that stabilizes the market and ends the period of technological upheaval (Dewar and Dutton, 1986: Abernathy and Clark, 1985; Burns and Stalker, 1966). Building on these works, this study hypothesizes that competition among new entrants is key to stimulate the growth of a potentially disruptive innovation and propels it upward to the mainstream market.

> ***H6: Competition is positively related to a potentially disruptive niche market innovation growth (IG).***

3.3.5 Firm-Specific Strategic Capabilities

In business science, innovation is defined as a process by which organizations exploit opportunities. An innovator firm's ability to change disabling forces, such as constraints and competitive pressures, into innovation enabling opportunities are entrepreneurial prerequisites of business model innovation (Drucker, 1985: 19). Building on the RBV and Porter's competitive strategy theories, this study proposes that developing organizational specific capabilities that are inimitable, superior, scarce among competitors and unique in strategic positioning will critically decide the innovator's ability to capture and sustain value for itself (Porter, 2001; Teece et. al., 1997; Collis and Montgomery, 1995; Grant, 1991). Firm-specific internal strategic capabilities include Intellectual Property (IP), and firm specific capabilities including codified knowledge, leadership, policies, processes/activities, brand, mission, firm's reputation, firm's identity and culture. The significance of using IP as a specialized capability to capture and sustain value depends on the degree of technical uniqueness of a disruptive product compared to the competitive products, the nature of innovation (whether it is a product, process or business model), and the strength of intellectual property laws in a given country. These intangible assets are often intertwined, and when they reinforce each other coherently over time they can become firm-specific capabilities that are difficult if not impossible to emulate (Chesbrough, 2006: 8; Teece et. al., 1997: 519; Collis and Montgomery, 1995: 120).

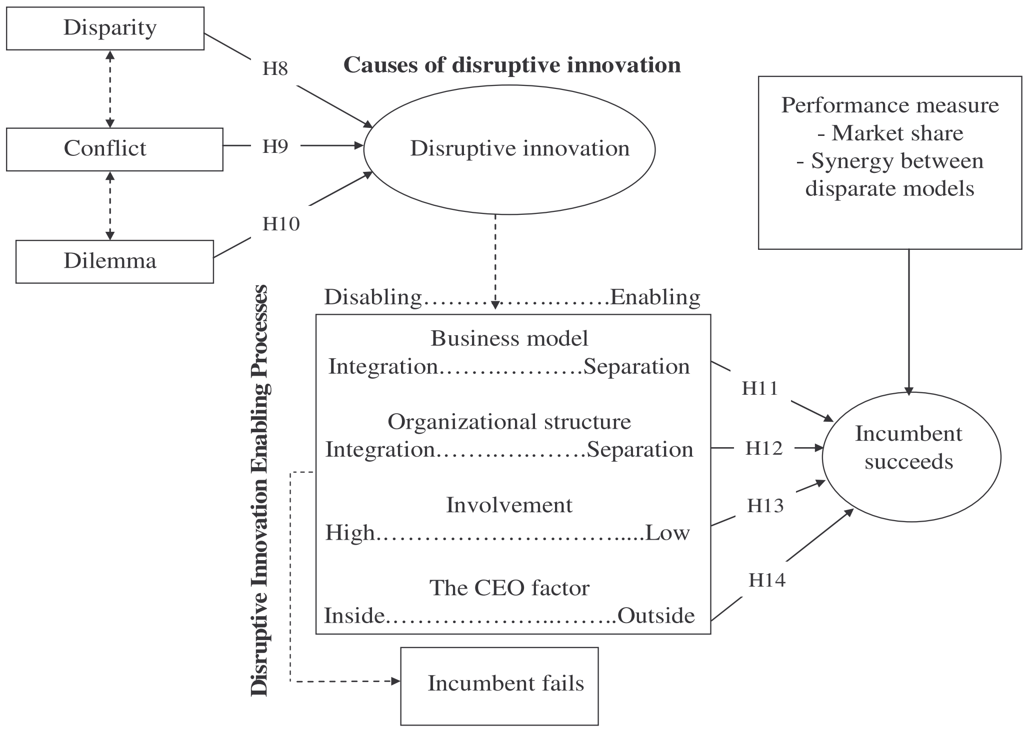
> ***Hypothesis 7: Strategy is positively related to a potentially disruptive niche market innovation growth (IG).***

The conceptual model for creating a potentially disruptive business model in a niche market (Figure 3.2) assumes that, from an entrant's perspective, a business model innovation is an evolutionary process across the five hypothetical interdependent relationships through successive and dynamic adaptations to endogenous and exogenous, enabling and/or disabling forces. When the variables evolve positively and coherently overtime reinforcing each other around a center of sustaining economic logic, they may create a potentially disruptive niche market (Govindarajan and Gupta, 2001: 3). The discussion below advances the argument of this thesis by stressing that succeeding in creating a potentially disruptive niche market is a necessary condition for a potentially disruptive business model innovation, but it is not a sufficient condition for effecting disruptive innovation. Stated differently, a commercially successful business model cannot, on its own, lead to disruptive innovation. Disruption occurs only when the new business model encroaches an established market and disrupts fully or partially an incumbent's established business model (Gilbert, 2003: 32; Rafi and Kamps, 2003: 117).

3.4 Mainstream Market Disruption

Figure 3.5 presents the second conceptual model for enabling disruptive innovation, from an incumbent's perspective. This model describes seven hypotheses (H8 – H114) that are necessary to examine the disruptive impact of innovation on incumbents' traditional business models and how incumbents adapt their organizations to deal with disruptive innovation. The emerging academic view elucidates that disruptive innovation is a function of conflict between disruptive and traditional business models (Christensen, 2006; Markides and Charitou, 2004). The present study extends this view by hypothesizing that, from an incumbent point of view, disruptive innovation is a function of (H8) disparity between a disruptive and traditional models (Gilbert, 2003: 32), (H9) conflict between a disruptive and traditional models (Markides and Charitou, 2004: 23) and (H10) incumbent's entrepreneurial dilemma (Christensen, 1997: 63; Henderson, 2006: 5). First, disruptive innovation introduces a business model that is fundamentally different to that of industry incumbents. Theoretically, a potentially disruptive innovation creates and grows a niche market in a disparate trajectory in the form of new product, new competencies, new customers and/or new revenue model long before it directly encroaches on an established market (Gilbert, 2003: 30).

Figure 3.5: Incumbent's Perspective: A Conceptual Model for Enabling Disruptive Innovation



Second, the disparate paths between an incumbent's established and historical business model cause real-time conflict when incumbent managers may decide to respond to disruptive innovation (Rafi and Kampas, 2002: 117; Tripsas and Gavetti, 2000: 1147). In turn, the disparities and conflicts cause incumbent's entrepreneurial dilemma which in turn effects disruptive innovation (Chandy and Tellis, 2000: 1; Vlaar et. al, 2005: 154). Disruptive innovation arises when disruptors rise to dominance, whereas the relative performance of the incumbent declines as a result of that dilemma (Christensen, 1997: xv; Hill and Rothaermel, 2003: 259; Paap and Katz, 2004: 13).

Subsequently, the conceptual model hypothesizes that the extent of incumbent's performance to enable disruptive innovation depends on (H11) reinventing a separate business model, (H12) creating a separate organization (Christensen and Raynor, 2003: 117), (H13) the level of senior management involvement (O'Reilly and Tushman, 2004: 475), and (H14) appointing an outsider CEO to manage a disruptive innovation (Chesbrough and Rosenbloom, 2002: 501). The following sections will theoretically build and underpin each hypothesis.

3.4.1 The Causes of Disruptive Innovation

Gilbert (2003: 30) observes that a potentially disruptive innovation creates and grows a niche market in a disparate trajectory in the form of new products, new competencies, new customers and/or a new revenue model long before it directly encroaches on an established market. The construct of 'disparity' entails that a potentially disruptive innovation creates a disparate path fundamentally different to an incumbent's established sustaining trajectory of performance and market. This construct assumes that an incumbent's senior management may ignore or overlook emerging or latent disruptive opportunities, probably due to their perception of disparities. This management wrong presumptions arises when management assume that a potentially disruptive innovation may not pose threats to their established business models since it originates and characteristically evolves in a disparate path that is viewed outside of the incumbent's core market boundaries. Disparities in paths between an innovator and an established incumbent in terms of one or more of the following; core product design, core competencies, market focus and business models may cause incumbents to struggle to adapt their organizations to disruptive innovation (Gilbert, 2003: 32; Henderson and Clark, 1990: 27; Tushman and Anderson, 1986: 440).

Dewar and Dutton (1986: 1422) argue that incumbents may struggle to adapt to the shifting environment when an innovation involves radical change in a set of scientific and engineering principles that displaces previously established dominant design of technology. Early entrants are likely to have the first mover advantage and gain experience for developing an emerging dominant design, whereas late followers may lag behind in acquiring the technical competence for developing radical innovation, especially where industry incumbents have already made substantial physical and emotional commitments to their previously established technology (Dess and Robinson, 1984: 270; Hannan and Freeman 1984: 149; Rothwell, 1986: 231).

Shifting the argument from a technology dominant design to a systemic architecture of innovation, Henderson and Clark (1990: 27) argue that architectural innovation alters the relationships in which the components of a product are connected together, although it may not change the existing dominant design concept. Architectural knowledge is the know-how about how all individual parts of a product fit together to function as a system. According to the authors the lock-in effect of an incumbent's evolutionary learning process in a previous architectural design can cause the firm to overlook a seemingly incremental change that alters the systemic architecture of the existing technological system.

Tushman and Anderson (1986) earlier observed that competence-destroying discontinuities entail new capabilities (skills, abilities, and knowledge) that did not exist in the incumbent's technical knowledge for product development process. According to Tushman and Anderson (1986: 461), competence-destroying innovations that fundamentally change the incumbent's core competencies can create uncertainties and turbulence that create a favorable condition for entry of new companies that have developed the necessary capabilities to appropriate the new market's potential.

From an incumbent's perspective, although taking different views, all the above discussions seem to point to the causes of incumbents failure or entrants success arising due to the incumbents' managers' perception about the disparities between a potentially disruptive innovation and existing products, technologies, competencies, and/or business models.

Hypothesis 8: Disparity is positively related to disruptive innovation.

In this study, the notion of 'disparity' is distinguished from the construct of 'conflict'. Disparity is defined as the dissimilarity of technology or business model progress performances and markets between a potential disruptor and certain incumbents that evolves before the innovation makes it to the established market and inflicts disruption. Particularly in this study, it refers to the failure of the incumbent's managers to act early because of perception about the dissimilarity of an emerging or latent disruptive innovation that evolves outside of their main markets (Christensen and Bower, 1996: 198; Hill and Rothaermel, 2003: 259; Paap and Katz, 2004: 13). In contrast, conflict refers to real-time incongruence between the components of disruptive innovation and existing business models, even when managers are cognizant and willing to embrace a potentially disruptive innovation (Mason and George, 1994: 163; Chandy and Tellis, 1998: 474).

Core product design, core competencies, market segment and revenue models are intertwined within a particular firm's business model. Because each firm's capabilities evolve in idiosyncratic ways contingent upon its own context and historical paths, the capabilities determine what a firm can or cannot do. When a firm's environment is said to change fairly predictably, and that the firm has been successful in the past, its capabilities may feed each other dynamically to enhance its already successful business model in the future. But when a firm's environment is said to be discontinuously changing, its current capabilities and business model may become sources of its rigidities causing an incumbent's entrepreneurial dilemma (Foster and Kaplan 2001: 61; Normann, 2001: 82; Christensen, 1997: 23; Leonard-Barton, 1992: 111).

Therefore, when an innovation is characterized as potentially disruptive to a specific established firm, managers may still face a dilemma due to the concomitant conflict between disruptive and traditional business models. The conflict may arise due to risk of cannibalization (Mason and George, 1994), risk of lowering profit margin (Abernathy and Clark, 1985), risk of degrading existing product quality, risk of damaging company image, risk of damaging relationship with existing distribution channels (Markides and Charitou, 2004) and/or risk of defocusing from the main strategic market (Porter, 2001).

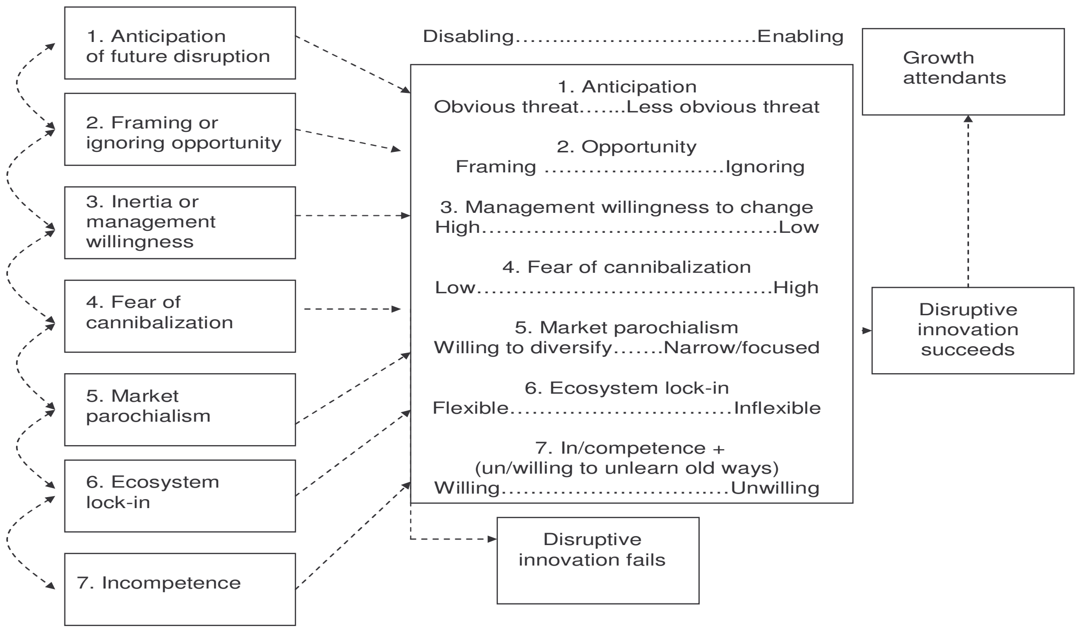
Hypothesis 9: The degree of conflict between disruptive and traditional business models is positively related to disruptive innovation.

The delay and hesitation, or simply incompetence of the incumbent's managers in properly addressing a potentially disruptive innovation, as the result of disparity and conflict, can be referred to as the incumbent's entrepreneurial dilemma (Christensen, 1997), where disruptors take the best advantage of this dilemma to rise to dominance, but the relative performance of the incumbent declines as a result of that dilemma (Hill and Rothaermel, 2003; Paap and Katz, 2004).

The incumbent's entrepreneurial dilemma can be explained by failure to anticipate (Paap and Katz 2004) or recognize the threat of disruption (Gilbert, 2003; Henderson and Clark, 1990), framing disruptive innovation as the wrong way to do business (Markides and Charitou, 2004), inertia (Hannan and Freeman, 1984), management's unwillingness to change or to take initiative (Beer and Eisenstat, 2000), failing to support high-risk ventures (Kuczmarski, 1998), fear of cannibalization (Chandy and Tellis, 2000), market parochialism (Day, 1999), ecosystem lock-in effect (Chakravorti, 2004) and incompetence (Henderson, 2006; Hill and Rothaermel, 2003). Chandy and Tellis (1998: 474) argue that management's unwillingness to cannibalize an established source of revenue deprives the incumbent from taking entrepreneurial risk in responding to potentially disruptive innovation effectively.

Figure 3.6 below shows a conceptual diagram of the incumbent's dilemma in dealing with disruptive innovation. It hypothesizes that an incumbent's overall strength or weakness in these factors determine whether an entrant succeeds or fails to disrupt the incumbent's main market. From the incumbent's perspective, it assumes that disruptive innovation can be moderated and even prevented if the disabling forces are relatively high. When the incumbent's problems in one or more of the factors are serious, the difficulties can feed on each other to create a vicious cycle, and pave the way for a disruptive attacker. From the insurgent perspective, the incumbent's weaknesses are enabling forces. Ultimately, a successful entry must translate into economic growth for the new entrant.

Figure 3.6: Incumbent's Entrepreneurial Dilemma



Anticipation of disruptive threat

Some types of innovation can be difficult to anticipate until they become disruptive. In theory, disruptive innovation is less obvious for incumbents during the introduction phase because it appeals to small margin, low-end markets or non-customers who are not the concern of incumbents. The less obvious nature of disruptive innovation is thus an important characteristic that allows entrants to gain market footholds.

An alternative view would suggest that when an incumbent is able to anticipate the threat or imminent disruptive innovation in its early stage, the incumbent can respond aggressively to slow down or suppress the threat of disruption (Gilbert, 2003: 32; Christensen and Raynor, 2003: 32-45; Christensen and Bower, 1996: 198; Henderson and Clark, 1990: 17).

Framing disruption as opportunity

Even when an incumbent is cognizant of a possible threat or emergence of latent disruptive innovation, whether the incumbent's management views the disruptive innovation as an opportunity to grow a new business, or as a wrong business to ignore, will probably determine the possibility of disruption (Markides and Charitou, 2004: 28).

Inertia or management unwillingness

Organizational theorists use the theory of inertia to understand cognitive "lock-in" in organizations. As an organization matures, the forces of inertia tend to grow which are likely to prevent entrepreneurship and risk taking behaviours (Beer and Eisenstat, 2000; Blau and Schoenherr 1971; Terrien and Mills 1955).

Abrahamson and Fombrun (1994: 751) found that some managers tend to overlook emerging disruptive opportunities due to macro-cultural homogeneity – a relatively industry-specific shared belief by managers across organizations about business models, customers, markets, competitors, technologies and how to choose the best strategy in a given situation. Chandy and Tellis (1998) argue that management's unwillingness to cannibalize established sources of revenue deprives the incumbent from necessary funding, resources and support to respond to potentially disruptive innovation.

Fear of cannibalization

One of the reasons for the state of dilemma is the threat of cannibalization. In marketing literature, cannibalization refers to decrease in sales revenue, sales volume or market share of a firm's existing product due to the commercialization of new products of similar nature by the same firm. When a firm is said to be relatively successful in its current business model, managers may be reluctant to share necessary funding, resources, or provide autonomy to a spin-off venture to manage a new (potentially disruptive) business model separately in order to avoid erosion of existing sources of competitive advantage in their current markets (O'Reilly and Tushman, 2004).

Economic theorists argue that in the face of uncertainty, incumbents that are committed irreversibly to existing business models will be less inclined to cannibalize the flow of income from current markets (Gilbert et. al., 1984: 238; Reinganum, 1983: 741). This suggests that rational incumbents will be less inclined to disrupt themselves. The absence of retaliation from incumbents due to fear of cannibalization, therefore, is likely to encourage disruptors.

Alternatively, it can be assumed that when the senior corporate management is willing to take risk and to cannibalize the company's previously established product or service, the management may think about developing appropriate strategies to respond to disruptive innovation aggressively. This will mitigate the dilemma. The factors that need to be investigated in this study are therefore the incumbents' managers' willingness to cannibalize their established value offerings, their willingness to change – that is willingness to create a disruptive spin-off and share resources with that spin-off company (see Markides and Charitou, 2004: 36; Chandy and Tellis, 1998: 474; Mason and George, 1994: 163).

Market parochialism

Another well documented reason for incumbents' failure in the face of disruptive innovation is explained by the notion of "asymmetric motivation". According to this concept, differential economic incentives tend to drive incumbents to advance sustaining innovations while new entrants seek disruptive innovations. Large firms that have already made substantial investments in the past will logically continue to invest more in opportunities that are proportionate to their sizes. On the other hand, small start ups often target small and low-margin markets that are proportionate to their cost structure but that are less attractive to incumbents profit models (Christensen and Raynor, 2003).

The absence of competition from incumbents as a result of "asymmetric motivation" can allow disruptors time and space to keep improving their products. An anti-thesis assumption can be conceptualized to argue that if incumbents perceive the small disruptive market to be desirable in the future, they may respond aggressively to preempt entrants invading their main market (Henderson, 1993; Gilbert and Newbery, 1982; Reinganum, 1983).

Ecosystem "lock-in" effect

The ecosystem "lock-in" effect is the function of the relative strength/weakness of established customers' switching barriers and the firm's commitments with its long-term suppliers and distributors. The relative strength or weakness of the ecosystem "lock in" effect can determine how effectively a firm adapts its organization to a disruptive innovation in the face of a radically shifting landscape. The firm's depth of commitment with value network partners can determine its ability to adapt to disruptive change effectively. This is better explained by the concept of ecosystem, which is defined in business literature as a large business community consisting of economic communities of interest, and co-evolving organizations including suppliers, producers, channels, customers, competitors, government agencies and institutions (Leibold et. al., 2002: 181; Moore, 1993: 76). An ecosystem approach to strategy shows that the creation and delivery of products or services depends not only on a single firm's value chain but also on its external value network. A firm's business model is part of a larger open and complex system (Iansiti and Levien, 2004; Leibold et. al., 2002; Gulati et. al., 2000). When the existing ecosystem or network is said to be healthy, a firm's external value network linkages are beneficial for improving its performance. But when a potential disruptive innovation is likely to threaten the ecosystem dominant players' business models and markets, it will be difficult, if not impossible; the ecosystem members are likely to raise barriers by taking individual or collective counter-actions (see Chakravorti, 2004, p. 65).

Incompetence

Incompetence is often cited as a reason to explain why incumbents' performance declines in the face of discontinuous technological innovation. Tushman and Anderson (1986: 444) argue that decline in performance occurs because the core competence that brought incumbents to preeminence is likely to be rendered obsolete in the face of discontinuous innovation. Whereas new firms that possess the required capabilities to create and commercialize the discontinuous technology will capture the growth of the new market. Although this view comes from studies on technological innovation, there is no reason not to assume that some incumbents' may as well experience knowledge gaps in the face of the disruptive innovation. The incumbents' learning lag (delay in developing competencies for the new market) can provide opportunities for disrupters to enter into the main market.

However, it is important to note that an incumbent's inertia and incompetence are not always insurmountable. In fact, some incumbents may deliberately destroy their old ways of doing things if they are willing to learn and employ new knowledge and skills. Particularly, if the threat of disruption is obvious from the beginning, an incumbent can minimize its impact if willing to unlearn old methods and develop new capabilities (Henderson and Clark, 1990: 17). A point that needs examination is therefore the extent of managers' willingness to unlearn old methods and develop new capabilities as to deal with disruptive innovation. The above explanations suggest that the state of dilemma and uncertainties created in incumbent's managers' minds, due to disparities and conflicts between innovation and the traditional business model can provide disruptors with the necessary momentum to improve their product in ways that permit them to eventually invade the established market. Thus, disparity, conflict and dilemma reinforce each other to create a vicious cycle that paralyzes the incumbent in face of disruptive innovation.

> ***Hypothesis 10: Incumbent's entrepreneurial dilemma is positively related to disruptive innovation.***

3.4.2 Strategic Approaches for Enabling Disruptive Innovation

The literature examination in Chapter 2 shows somewhat conflicting academic conclusions and recommendations with respect to the issue of dealing with disruptive innovation. The academic recommendations range from complete "separation" at one extreme (Christensen and Raynor, 2003), to "ambidextrous organization" (O'Reilly and Tushman, 2004) and "contingency approach" (Markides and Charitou, 2004) in the middle to complete "integration" (Campbell and Park, 2004), at the other extreme.

Building on existing literature, the second conceptual model (Figure 3.5) hypothesizes that the incumbent's performance (IP) in enabling or disruptive innovation will depend on reinventing a separate strategic business unit (SBU) (H11) (Porter, 1996) in a separate organization (H12) (Christensen and Raynor, 2003). Beyond creating a separate business unit and organizational structure, enabling disruptive innovation critical depends on the incumbent's senior management's involvement in ways of taking risk initiative, showing willingness, providing vision and championing the disruptive unit (H13) (Hamel, 2000), and appointing outside hired CEO to manage the disruptive company (H14) (Garvin, 2004).

When incumbent firms mitigate the dilemma at an early stage, or when they make strategic decision to respond to disruptive innovation when it hits their established markets, managers face a critical challenge whether to integrate or separate a disparate business model (Adner, 2002; Chesbrough and Rosenbloom, 2002; Christensen and Overdorf, 2000). Porter's (1985: 16) 'trade-off' principle of strategy theory states that firms are normally incapable of managing both differentiation and low-cost strategies simultaneously in the same business model. This is because attempting to do both often results in compromising sources of competitive advantage in the established business model (Porter, 2001: 71; 1996: 62). Some scholars extend this view by contending that established organizations that adopt integration strategy are likely to fail because they attempt to manage disruptive innovations with the very capabilities, processes and values that brought the firm to success in sustaining innovations (Gilbert, 2003: 30; Adner, 2002: 681). Christensen and Overdorf (2000: 71) propose that when there is a relative high degree of conflict in processes, capabilities and values between disparate business models, an incumbent firm must create a separate strategic business unit (SBU) to manage disruptive innovation. Extending this view, this study hypothesizes that:

> ***Hypothesis 11: Responding to disruptive innovation in a separate SBU is positively related to incumbent's performance (IP) in enabling disruptive innovation***

While H11 deals with the question of integrating or separating a disruptive innovation from existing business models by means of creating an SBU, a pertinent issue that needs further probing is whether the disruptive SBU requires isolation from the entire organizational structure. Ghoshal and Gratton, 2002: 31) argue that, in order to adapt to abruptly shifting complex business environments, many large corporations around the world opted to compromise their potential to exploit economies of scale and scope between business units in favour for creating autonomous and small entrepreneurial companies (see also Probst et. al., 2005: 90).

Critics of organizational integration hold that emphasis on gaining economies of scale and scope can diminish both the internal autonomy and the competitiveness of a disruptive business unit

(Chandy and Tellis, 1998: 475; Vlaar et. al., 2005: 165). A company that attempts to compete by integrating conflicting business units under one organizational structure could risk suppressing the novelty of a potentially disruptive innovation (Chandy and Tellis, 1998: 475). In their study of the European airlines industry, Vlaar et. al., (2005: 165) found that the search for balance between exploitation of existing businesses and exploration of an emerging disruptive innovation under existing organizational structure contributed to compromising the differential advantages of the incumbents when compared to full commitment exhibited by independent disruptors. Extending these views, Christensen and Raynor's (2003: 211) recommend that when a disruptive unit does not fit with the existing business models' resources, processes and values (RPV), it requires an entirely autonomous organization with complete freedom to create its own new capabilities, processes and values. Taking this view, this study hypothesizes that:

> ***Hypothesis 12: Organizational separation of disruptive business model is positively related to incumbent's performance (IP) in enabling disruptive innovation.***

The paradoxical challenge for incumbents facing disruptive innovation is that, on the one hand, a company that attempts to compete by integrating disruptive SBU under one organizational structure could risk eroding potentially disruptive innovation. On the other hand, disconnecting the new unit entirely from the parent company deprives the new unit from vital resources and experiences (Markides and Charitou, 2004: 22). In the RBV theory, one of the most salient strategic resources is the parent company's senior management, often in the form of soft assets including knowledge, experience and capabilities (Grant, 1991: 114; Teece et. al, 1997: 511), which can play imperative roles in screening and approving projects (Cooper, Edget, &

Kleichmidt, 2003: 201), championing new ventures in critical phases (Hamel, 2000: 67; Takeuchi and Nonaka, 1986: 141), supporting new product development (Brentani, Kleischmidt & Salomo, 2010: 149) and resolving cultural and managerial conflicts (Garvin, 2004: 19).

When an incumbent creates a separate organization, Garvin (2004: 10) observes that allowing different values and culture to that of a parent company will eventually lead to a recurring political struggle in which managers of the parent company will invariably win. Managers from both sides are likely to have little motivation to share knowledge or other resources since their performances are evaluated primarily against their immediate units. In such situation, the need for senior management involvement in addressing conflicts, championing the disruptive venture and ensuring some sort of synergy is critical. Recognizing the vital input of senior management, O'Reilly and Tushman (2004: 74) propose ambidextrous organization which is a type of management style that initiates a radical technology through a structurally independent venture, having its own processes, structure, and culture, but that is integrated at the senior executive level.

> ***Hypothesis 13: Senior management involvement is positively related to incumbent's performance (IP) in enabling disruptive innovation.***

Another intriguing question associated with the problem of disruptive innovation management is the nature and degree of senior management involvement. While senior management's willingness and involvement are important, some organizational behavior and strategic management studies seem to suggest that appointing an insider CEO from the current senior management to run the disruptive innovation company may be seen as a misguided approach to enabling disruptive invocation (Beer and Eisenstat, 2000: 29; Prahalad and Bettis and 1986: 485; Von Krogh, Ichijo & Nonaka, 2000: 51; Weick, 1976: 1).

Management decision making processes are influenced by a corporation's 'dominant logic' (Prahalad and Bettis, 1986), 'Values' (Beer and Eisenstat, 2000) or 'mental models' (Foster and Kaplan 2001). These are 'sense-making' mental frameworks which help executives to reduce ambiguity and filter in information that conforms the previously successful ways of doing business and make decisions when faced with complex choices (Weick, 1976: 11). But these are not only abstract representation of models and processes within one's head, but also feelings and belief systems that managers may not even be conscious of (Von Krogh et. al., 2000: 51). When the corporate values are explicitly or implicitly clear and broadly disseminated, they are useful in prioritizing tasks, making judgments and decisions that are internally consistent with the corporate objectives and missions (Teece et. al., 1997: 520).

However, when internal managers are appointed to manage a disruptive company, the endeavors may fail because the values or cultures of the parent company may influence evolutionary adaptation process, consequently creating a *de novo* business model, rather than a disruptive one (Chesbrough and Rosenbloom, 2002: 550). Abrahamson and Fombrun (1994: 728) found that macro-cultural homogeneity, which is defined as a relatively industry-specific shared belief by managers across organizations about customers, markets, competitors, technologies and how to choose the best strategy in a given situation influences most managers to overlook emerging disruptive opportunities. In contrast, managers of disruptive entrant firms are likely to succeed because they have no previously established values or they have fundamentally different values and belief systems Chesbrough and Rosenbloom, 2002: 552 Foster and Kaplan 2001: 74; Henderson and Clark, 1990: 14). This suggests that incumbent firms should hire external CEOs that have good insights and experiences about the disruptive market.

Hypothesis 14: An externally hired CEO is positively related to incumbent's performance (IP) in enabling disruptive innovation.

3.4.3 Measuring Entrant's DI and IP in Enabling DI

From the disruptor insurgent perspective, the problems of rival incumbents in dealing with disruptive innovation must be translated into growth. From an incumbent perspective, the success of its performance in face of disruptive innovation may be evaluated by the extent to which it has disabled or enabled a disruptive innovation, how effective its second business model has become part of a disruptive market in terms of regaining market share, and whether it has achieved synergy between its disruptive and traditional business models. From a theoretical perspective, the key success factor is to design a conducive organizational structure that allows close collaboration between managers for sharing and leveraging relevant capabilities and resources on one hand, and on the other hand that simultaneously nurture institutionalized independence of the disruptive unit to guarantee that the corporation's established processes, identity, culture, brand and value systems that do not overwhelm the disruptive business model reinvention process (Dess and Robinson, 1984: 265; O'Reilly and Tushman, 2004: 77).

3.5 Innovation Dichotomy and Relativity of Disruptive Innovation

In order to address the first study question, this chapter presented the conceptual framework and hypotheses for examining business model innovation and reinvention processes for enabling disruptive innovation. The second research objective is to investigate whether a "*market-driven*" disruptive business model innovation has different processes, competitive dynamics and disruptive effects compared to *technological* disruptive innovation. This study aims to answer this question by introducing a dichotomy of *technological* versus *market-driven* business model innovations and subjecting each group to the same ten hypotheses outlined above and using a common research method.

The concept of disruptive innovation is a relative concept, not an absolute one. Stated differently, a similar innovation that may constitute disruptive to a particular incumbent's business model in a given context may be considered sustaining to other incumbent's business model in another context (Christensen, 2006: 48). To determine the relativity of disruptiveness, i.e., whether a particular innovation constitutes disruption or not, the second question tries to examine disruptive innovation problem by disaggregating the sample data into technological and non-technological market-driven innovations.

3.6 Summary

The purpose of this chapter was to develop a conceptual framework to inform and guide empirical investigation. To address the first question of this thesis, this chapter developed the conceptual framework with ten hypotheses for examining business model innovation and reinvention processes for enabling disruptive innovation. The framework follows two logically linked processes. The evolutionary process is concerned with innovation of a potentially disruptive business model in niche market. The revolutionary process deals with the probable disruptive impact of an innovation on traditional business models and how incumbents reinvent their business models to deal with disruptive innovation.

The conceptual model presented in the evolutionary section portrays three avenues through which managers can pursue business model innovation. A potentially disruptive innovation process may begin by the redefinition of existing value propositions or by identifying an un-served or under-served price sensitive customer segment. Alternatively, redesigning of an end-to-end value chain may create a new business model. The study proposes that when changes in some of the components are substantial and that they automatically cause other enabling conditions to fall in favorably, the alterations may lead to innovation of a potentially disruptive business model. Value innovation depends on changing constraints and competitive pressures into opportunities by identifying, developing, integrating and coordinating core capabilities. The chapter postulates that a new business model may create a niche market without necessarily being disruptive.

In the disruptive (revolutionary) section, three major hypothetical factors that will probably determine the disruptiveness of a business model innovation are the disparity and conflict between an innovation and a traditional business model and an incumbent's entrepreneurial dilemma. The study proposes four hypothetical strategic approaches, namely creating a separate SBU, isolating the SBU in separate company, significant but not overwhelming senior management's involvement and hiring an external CEO that could probably determine the success or failure of incumbent's performance in enabling disruptive innovation. Finally, the chapter further proposes re-examination of the replication of disruptive innovation theory across technological and market-driven disruptive innovations.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

The multi-dimensional, complex, holistic and dynamic natures of the concepts of disruptive innovation and business model demand a multi-method research approach including deductive, inductive, qualitative and quantitative. This study utilizes all these methods with the purpose of addressing the relevant research questions.

4.2 Deductive and Inductive Approaches

The process of reasoning from a theory to a particular phenomenon is known as the deductive method. Through the deductive approach, i.e. through constant examination and empirical testing of established theories research gaps are identified. In order to investigate the research gaps systematically, conceptual frameworks and hypotheses are developed in Chapter 3. A study that seeks to understand a relatively unknown social phenomenon needs to adopt an inductive approach. Although the concepts of a business model and disruptive innovation are well established in the literature of strategic management, disruptive innovation is traditionally linked to technological discontinuities.

The question of how organizations enable disruptive innovation by reinventing their business models, particularly in a developing economy setting, is an under-researched phenomenon. In this study, the process of data collection, analyses, conclusions and formulation of the theoretical framework follows an inductive method. Therefore, the research approach used in this study is both deductive and inductive (Christensen, 2006: 40; Rafi and Kampas, 2002: 117).

4.3 Qualitative Method: Case Study Approach

Disruptive innovation is an uncommon and evolutionary phenomenon. The rarity and dynamic nature of this innovation arguably makes a firm-level case study method the preferred approach to study disruptive innovation phenomena (Chesbrough and Rosenbloom, 2002; Hamel, 2000; Macher and Richman, 2004; Tripsas and Gavetti, 2000 Voelpel et. al., 2005).

A case study method is an in-depth qualitative investigation of a single phenomenon or case over a period of time. 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).

Table 4.1: Case Studies of Pioneering Companies in South Africa

Innovation Identification[8]	Innovation	Comparable existing product/business model	Type of innovation	Industry
Innovation 1	Instant mobile messaging (IMS) (MXit,)	Short Message System (SMS)	Technology	Mobile-phone
Innovation 2	Mobile VoIP (V-mobile) via 3G network	Voice via GPRS/3G	Technology	Mobile-phone
Innovation 3	Mobile banking (M-banking)	Full-service banking model	Business model	Banking
Innovation 4	Hybrid-Direct (HD) short-term insurance model	Broker's model	Business model	Insurance
Innovation 5	Hybrid-Direct (HD) airlines model	Premium model	Business model	Airlines

As described in Table 4.1, Chapter 5 presents five case studies of pioneering companies (insurgents) that have presumably introduced potentially disruptive technological and market-driven business model innovations in four South African industries namely, mobile-telephony, banking, insurance and airlines. The case studies have been developed using multi-design

[8] Codes used in place of real pioneering companies names.

exploratory research including, but not limited to, open interviews with 32 top level executives in the mobile, banking, insurance and airlines industries, using open questionnaire (interviews lasted between 1 to 2 hours; see Appendix B for open questionnaire and Appendix C for list of interviews conducted), focus group discussions, company and industry archives, the Internet, and the media. Many of the interviews were tape-recorded and transcribed. Disruptive innovation often attracts high attention, mostly from the media because it is new compared to what existed before it (Moore, 2004: 88).

4.3.1 Reliability and Validity Measures in Qualitative Research

In developing the case studies, the measures of credibility and transferability are used in place of internal reliability and construct validity. Credibility refers to the congruence between the constructed realities that exist in the minds of the respondents and the objects that are attributed to them. It involves establishing that the outcomes of qualitative research are believable and credible from the researcher's perspective (Lincoln and Guba, 1985).

In this study, credibility is achieved through prolonged engagement in studying the disruptive innovation phenomena, consistently seeking different influencing factors and interpreting the phenomena through a process of constant and iterative analysis and triangulation including, but not limited to, open interviews, focus group discussions, company and industry archives, the Internet, and the media (Babie and Mouton, 2001; Yin, 1994). Transferability refers to the degree to which the outcomes of a case study can be generalized or transferred to other contexts or settings. According to Yin (1994) a multi-case studies approach has a significant potential for generalization, if the researcher attempts to relate findings to similar cases and previous theory and research. Although the researcher may have attempted to meet these requirements, in qualitative research all observations are defined by the specific contexts in which they occur. The case studies results of this thesis are peculiar to the four South African industries. Therefore, the case studies findings do not imply generalization to the universe across time and place (Lincoln and Guba, 1985).

4.4 Quantitative Method

While the case study method investigates the process of disruptive innovation at a firm-level, some scholars have used survey-based quantitative method to indentify common patterns at a system-level (see Adner, 2002; Markides and Charitou, 2004). Thus, the purpose of survey-based quantitative method is to identify common patterns first on aggregate level of analysis (system-level) that can be generalized across industries, and second to identify differences between technology and non-technological market-driven innovations. Chapter 6 presents the quantitative results for the first-order study. Chapter 7 discusses the differences or similarities between technology and market-driven disruptive innovations. In both empirical chapters, qualitative data will be used in interpreting the quantitative analysis, where relevant.

4.4.1 Sample Design

The study is conducted in South Africa. The country mixed economies structure provides a good case to represent a developing economic context. The problem of disruptive business model innovation is examined at a business unit (SBU) level of analysis. The sample selection is carried out over four course of selection process, i.e., searching for (1) disruptive innovation in South

Africa, (2) industries affected by disruptive innovation, (3) firms and SBUs within these industries and (4) informants.

1. The selection of potential disruptive innovations in South Africa is made based on the theoretically established characteristics of disruptive innovation: (a) the innovation is typically simpler, cheaper, and convenient to use relative to existing products, (b) it targets low-end or new customers (non-consumers) who were not part of the incumbent's consumption trajectory of "sustaining innovations" due to lack of financial and/or technical abilities, (c) the quality is relatively inferior when measured by the performance dimension of the incumbent's current customers, and (d) over time the disruptive technology improves its performance on the dimensions the mainstream market values and begins to displace previously existing products of similar nature (Christensen and Raynor, 2003: 32; Rafi and Kampas, 2002:16). From a number of seemingly disruptive innovations that were introduced into the South African markets in the last twenty years, the author selected five potentially disruptive innovations; (a) mobile VoIP (V-mobile) via 3G network, (b) Instant Mobile Messaging (IMS), (c) low-cost no-frills airlines business model, (d) online direct insurance model, and (f) mobile (cell-phone) banking.

2. Four South African industries; mobile-telephony, banking, insurance and airlines have been identified as industries that have been affected by the above potential disruptive innovations (see Table 4.1).

3. Within these industries, the selection of sample firms and SBUs is made by identifying (a) new companies (business units) that have introduced potentially disruptive innovations, (b)

industry incumbents that have introduced a second business model in their industries and (c) industry incumbents that were (likely to be) affected by innovations introduced in their markets.

4. To ensure that the right informant participated in the survey, a respondent selection was based on several criteria: (a) founders of a potentially disruptive business unit, spin-off or new company, (b) managers with responsibility for strategic business units (SBUs), (c) active involvement in managing innovation or major company transformation projects (d) seniority in management position and (f) possible familiarity with the practical business concepts of disruptive innovation and a business model. All means of communications were used in accessing managers including referrals, post office, email, fax and telephone. One of the most effective ways of accessing top level managers was attending executive seminars. The author attended a number of useful events, presentations and talks given by several top leaders of industries at many local events including the Wits Business School (WBS), University of Pretoria's Gordon Institute of Business Science (GIBS) and Sandton Convention Center. These conferences and seminars helped the researcher to get to know key industry players, establish contacts, collect business cards and ask senior managers for their willingness to participate in a survey.

Based on the above selection criteria, a convenience sampling method was employed in choosing respondents. Because the focus of the research is on strategic business units (SBU), a single respondent is represented per SBU (managing a particular business model innovation). New companies are mostly represented by a single questionnaire. Some large corporations have a number of strategic business units (SBUs) managed by different managers.

4.4.2 Data Collection

Using the insights gained from the literature review and case studies, a pilot survey of 200 questionnaires was administered to middle level managers across the four industries; it yielded 47% completed questionnaires. The returned questionnaires were examined for completeness of responses, reliability and construct validity. After necessary changes were made, a ten page structured questionnaire was developed with a seven-point (Likert) scale, “1” indicating the lowest value and “7” indicating the highest value (see Appendix A for a sample of the questionnaire).

During the period January – December, 2008, three postgraduate research assistants were employed to administer the questionnaire, set up appointments, follow-up and conduct the survey. 500 questionnaires were distributed to various firms across the four industries (see Table 4.2). 128 responses were obtained. Out of the total, 14 deemed unusable, yielding 114 usable responses representing 87 different firms. The total responses (114 = 100%) comprises 18% (n = 21) representing 19 banking companies, 16% (n = 18) representing 18 insurance companies, 16% (n = 18) representing 15 airlines companies, and 50% (n = 57) representing 35 mobile (and IT) companies. Out of the total response (n 114), 77% (n = 88) represented business units that operated traditional business models in established markets before the introduction of respective disruptive innovation. This data represented 61 incumbent firms that responded to disruptive innovations in different ways. The rest 23% (n = 26) represented 26 entrant companies. This data comprises both start-up (new) and established companies that introduced disruptive business model innovations for the first time into the South African markets.

Table 4.2: Description of the Survey Data

Industry	Innovation	Sent	Received	Unusable	Net usable	No. of firms
Mobile	Instant mobile messaging	100	25	2	23	
	V-mobile	100	38	4	34	
Technology	**Total**	**200**	**63**	**6**	**57**	**35**
Banking	M-banking	100	24	3	21	19
Insurance	Direct short-term insurance model	100	23	5	18	18
Airlines	Direct airlines model (LCC)	100	18		18	15
Market-drive innovation	**Total**	**300**	**65**	**8**	**57**	**52**
Grand Total		**500**	**128**	**14**	**114**	**87**

The size of the 87 respondent firms measured in terms of employees numbers are 18% (n 16) small (< 50), 36% (31) medium (51 – 250) and 46% (n 40) large (250 <). The sample respondents are top level senior managers including CEOs, managing directors, business unit managers, innovation hub managers and executives in areas of strategic planning, marketing, finance and operations. Table 4.3 provides the profile of the 114 respondents. The total number of responses is divided equally into 57 technology and 57 business model observations. The sample selection ensured fairly equal representation across innovation dichotomy (technology vs. market-driven innovation), innovation types, industry types and firm size in terms of industry structure including large, medium, and small firms. Data was captured in Microsoft Excel and analyzed using SAS 9.2 software. Both descriptive and inferential statistics are used to test the conceptual model and hypotheses.

Table 4.3: Profile of Respondents

The mobile and IT industry		The banking industry	
Position	**N**	**Position**	**N**
CEOs	7	CEOs	1
Executive managers: Strategy, investment and business planning	9	Executive managers: Strategy, investment and business planning	2
Executive managers: Retail business	3	Managers: Innovation & Customer Insight	4
Executive managers: Network solutions	6	Business Development Executive	1
Senior Manager: HR, training, leadership & talent management	3	Managers: Micro finance, product and channel areas	2
Senior Manager: Sales, marketing & support services	10	Senior Manager: Sales, marketing & support Services	2
Executive directors	5	Executive directors	1
Senior management positions	14	Senior management positions	8
Total	**57**	**Total**	**21**
The Airlines industry		**The insurance industry**	
CEOs	0	CEOs	2
Executive managers: Strategy, investment and business planning	3	Executive managers: Strategy, investment and business planning	2
General manager: Operations	2	Managers: Innovation hub	1
Senior Manager: HR, training, leadership & talent management	3	Organization Development Manager	1
Senior Manager: Sales, Marketing & Support Services	2	Senior Manager: Sales, marketing & client networks	6
Senior management positions	8	Executive directors	2
		Senior management positions	4
Total	**18**	**Total**	**18**

4.5 Model and Hypothesis Testing

This study attempts to answer two questions. The empirical studies in Chapter 6 and 7 are systematically organized into the first and second orders of analysis respectively. The first-order level of analysis discusses the result of the study at a firm-level of analysis by aggregating all data into a single set. The second-order level of analysis presents the findings about the differences between technology and market-driven business model innovation by disaggregating the data into two groups.

First-order analysis: The primary research purpose of this study is to develop an integrated framework for reinventing a business model to enable disruptive innovation. The core premise underlying this purpose is the notion that disruptive innovation is a function of conflict between an incumbent's traditional business model and an insurgent's disruptive business model (Markides and Charitou, 2004).

This premise suggests that a systematic investigation of the disruptiveness of an innovation must meet two prerequisites. The first is to describe the entrant's business model development process for creating a potentially disruptive niche market. The second is to examine the disruptiveness impact of insurgents' business model innovations on incumbents' traditional business models. The first question is, therefore, by examining the two aspects of the disruptive innovation problem: how should incumbents reinvent their business models to deal with disruptive innovation?

> **Research question 1: How should organizations reinvent their business models to enable internally or externally disruptive innovation?**

The first-level analysis is an overall aggregated statistical analysis that seeks to identify common patterns at a system-level. Following the case studies in Chapter 5, Chapter 6 attempts to examine the first conceptual model which is an evolutionary and proactive niche market innovation by testing seven hypotheses that form the model (H1 to H7). Chapter 7 examines the second model that deals with the revolutionary processes of disruptive innovation. It investigates the disruptive impact of the entrant's potentially disruptive business model on the incumbents' established market (mainstream), and how incumbents reinvent a second business model to deal with disruptive innovation by testing the next seven hypotheses (H8 – H14).

Second-order analysis: Markides (2006:19) notes that although the original theory of disruptive innovation was focused on disruptive technologies, the same theory has been used to explain all types of disruptive innovation over time. The basis of departure from established literature, and the need for this thesis, is therefore, the dearth of knowledge with regard to how (non-technological) market-driven business model innovation can cause disruptive innovation. This study hypothesizes that the processes and evolutions for a disruptive *non-technological market-driven* disruptive business model innovation are different than those for a *technology-push* disruptive innovation.

Table 4.4: Technological vs. Business Model Innovations

Technological innovations	Business model innovations
MXit - Instant mobile messaging (IMS)	M-banking
V-mobile	Direct short-term insurance model
	Direct airlines model (LCC)

Within the generic integrated framework developed from the first-order analysis of the first question, this question attempts to identify the differences and commonalities between these two categories of disruptive innovation by applying the same hypothesis and statistical frames. The survey data are grouped into technological and non-technological market-driven business model innovations, as shown in Table 4.3:

Research question 2: What are the differences between disruptive *technology-push* and disruptive *market-driven* business model innovations in processes and dynamics?

4.5.1 Operatioalization Construct Variables into Manifest Variables

The conceptual framework chapter (Chapter 2) proposes two conceptual models. The first model conceptualizes an evolutionary phase where business model innovation process takes in niche market before it trespasses the mainstream market. This model puts forward five logically linked hypotheses that are assumed necessary for creation of a potentially disruptive niche market. The second conceptual model theorizes a revolutionary phase where the entrant's business model infringes the mainstream market, and where an incumbent should strategize to enable disruptive innovation. The second model proposes seven hypotheses. The following sections describe key manifest variables (MVs) that represent and measure the latent or construct variables (LVs) that form the hypotheses.

4.5.1.1. Hypotheses for Business Model Innovation for Creating Niche Market

H1: *All else assumed constant, an innovation's Relative Advantage (RA) is negatively related to "Asymmetric Motivation" (AM) during the introduction period of innovation life-cycle.*

H2: *AM is positively related to potentially disruptive niche market innovation growth (IG).*

The construct of Relative Advantage (RA) of innovation is measured by the following five manifest variables (MVs) in comparison to previously established comparable product or service (Agarwal and Prasad, 1997; Kim and Mauborgne, 1999; Rogers, 1995):

1. RA1 - Price
2. RA2 - Ease-of-use
3. RA3 - Technology "newness"
4. RA4 - Quality

5. RA5 - Brand recognition.

The construct Asymmetric Motivation (AM) is measured by the following four MVs (Abernathy and Clark, 1985; Christensen and Raynor, 2003; Gilbert, 2003):

1. AM1 - A low-end market not attractive to established incumbents
2. AM2 - Innovation not attractive to mainstream customers
3. AM3 - Previously un-served market
4. AM4 - A niche market size not big enough to attract established competitors.

H3: *Configuration of fundamentally different value chain (VC) is positively related to continuous innovation (CI).*

H4: *CI is therefore positively related to potentially disruptive niche market innovation growth (IG).*

The construct of differential value chain configuration (VC) is measured by different the components of entrant's value chain are compared to the industry's traditional value chain in the following four items (Adner, 2002; Chesbrough, 2006; Gilbert et. al., 1984; Reinganum, 1983):

1. VC1 - Differences in production process
2. VC2 - Differences in supply channels
3. VC3 - Differences in distribution channels
4. VC4 - Differences in marketing and sales.

Continuous innovation (CI) is assumed to be a function of three components including (Govindarajan and Gupta, 2001; Holmstrom et. al., 2000; Evans and Wurster, 1997):

1. CI1 - Lower cost advantage
2. CI 2 - Consumer-insight
3. CI 3 - Speed-to-market factors.

H5: *Constraint is negatively related to a potentially disruptive innovation.* The constraint factor (CINST) is operationalized in a manner of asking respondents to indicate their agreement/disagreement ranging from "strongly disagree" (1) to "strongly agree" (7) with respect to what level and nature of constraints an entrant start-up faces to scale up its innovation in the form of the following items (Chesbrough, 1999; Porter and Stren, 2001; Teece, 1986):

1. CONST1 - Lack of access to generic resources (capital, skilled labor, technology, et…)
2. CONST2 - Lack of accessibility (shortage of public and business infrastructure)
3. CONST3 - Customers lack of affordability
4. CONST4 - Lack of clear government or industry regulations
5. CONST5 - Incompatibility of innovation with existing complementary devices.

H6: *Competition is positively related to a potentially disruptive innovation.* Competition (COMP) is investigated by three MVs (Burns and Stalker, 1966Porter, 1985 Walker et. al., 2006):

1. COMP1 - The number of new competitors
2. COMP1 - The level of intensity of competition among new competitors with new business models
3. COMP3 - The level of intensity of competition coming from traditional competitors.

H7*: Strategy is positively related to a potentially disruptive innovation.* The construct 'strategy' refers to a specific firm's ability to develop a unique strategic position or to build internal firm-specific strategic capabilities Since the theory of strategy basically seeks to differentiate one firm from the competition, a survey-based quantitative method may be less suitable to investigate empirically the relationship between the construct of strategy and a pioneering firm's growth or success in creating a potentially disruptive niche market Therefore, building on the resource based view (RBV) and Porter's competitive strategy theories, the preceding case studies chapter examined how an individual innovating firm develops (a) internal firm-specific capabilities and (b) competitive strategy to create potentially disruptive niche market and capture and sustain value it creates in the long term (Amit and Shoemaker, 1993: 35; Collis and Montgomery, 1995: 118; Porter, 1985: 33).

By investigating the innovating firm using case study method, we seek to investigate a firm's ability to develop strategic positioning and firm-specific strategic capabilities that include both tangible and intangible assets:

1. Intellectual Property (IP)
2. Codified knowledge
3. Leadership vision, strategic direction, governance,
4. Human resources activities, process and policies including, selection, remuneration, motivation, skills development
5. Processes/activities
6. Exclusive membership in a certain ecosystem (value-network)
7. Brand strength, firm's reputation and organizational culture.

To provide competitive advantage these capabilities need to be (a) inimitable, (b) not readily substitutable, (c) superior to competitors, (d) scarce among competitors, and which (e) enable to leverage core competencies in related businesses (Chesbrough, 2006: 8; Clarke and Clegg, 2000: 231; 70; Teece et. al., 1997: 511; Collis and Montgomery, 1995: 118).

Dependent variable (DV): The construct of "creating a potentially disruptive niche market (a potentially disruptive innovation)", simply referred in this study as innovation growth (IG), should have been ideally measured by objective financial measures such as market share and revenue growth. This data is proven to be difficult to obtain due to confidentiality issues, the financial indexes of the new start-up companies not being yet registered in public institutions as well as other strong unexplainable external forces such the financial crises and oil price crises during the writing of this thesis (2007 – 2010). In absence of objective financial measures, we followed other researchers' recommendations to investigate an entrant's potential in creating a niche market (see Dess and Robinson, 1984; Markides and Charitou, 2004). Thus, the three MVs used to measure growth are:

1. IG1 - How big is the market share the innovation/new business model has achieved to date?
2. IG2 - How big do you think the market share of all new competitors (with the new business model) is at this point?
3. IG 3 - How big do you think the growth potential of this innovation in future?

More importantly, due to the classified nature of individual innovator's financial statements and other reasons mentioned above, the DV innovation growth (IG) is additionally examined by case studies research in Chapter 5, including but not limited to, using open interviews, Internet and media sources.

4.5.1.2. Hypotheses for Strategic Processes for Enabling Disruptive Innovation

H8: *Disparity is positively related to disruptive innovation.* The construct variable (LV) "disparity" is operationalized by the following four manifest variables (MVs):

1. Disparity1 - Disparity in core product design (Dewar and Dutton, 1986; Henderson and Clark, 1990)
2. Disparity2 - Disparity in core competencies (Tushman and Anderson, 1986)
3. Disparity3 - Disparity in strategic market focus (Gilbert, 2003)
4. Disparity4 - Disparity in revenue models (Christensen and Raynor, 2003).

H9: *The degree of conflict between disruptive and traditional business models is positively related to disruptive innovation.* The construct "degree of conflict" (CONFLICT) between disruptive and traditional business models is operationalized by the following six items:

1. Conflict1 - Risk of cannibalization (Mason and George, 1994)
2. Conflict2 - Risk of lowering profit margin (Abernathy and Clark, 1985)
3. Conflict3 - Risk of degrading existing product's quality (Markides and Charitou, 2004)
4. Conflict4 - Risk of damaging company's image (Markides and Charitou, 2004)
5. Conflict5 - Risk of damaging relationship with existing distribution channels (Markides and Charitou, 2004)
6. Conflict56 - Risk of defocusing from main strategic market (Porter, 2001).

H10: *Incumbent's entrepreneurial dilemma is positively related to disruptive innovation.* Incumbent's entrepreneurial dilemma is represented by seven MVs:

1. Dilemma1 - Failure to anticipate emerging or latent disruptive threat (Paap and Katz 2004)
2. Dilemma2 - Believing the innovation was the wrong way to do business (Markides and Charitou, 2004)
3. Dilemma3 - Inertia or management unwillingness to take initiative (Beer and Eisenstat, 2000; Hannan and Freeman, 1984)
4. Dilemma4 - Failing to take risk venture due to fear of cannibalization
5. Dilemma5 - Failing to take risk venture due to fear of losing main partners (Chandy and Tellis, 2000; Kuczmarski, 1998)
6. Dilemma6 - Market parochialism (Day, 1999)
7. Dilemma7 - Management's incompetence (Hill and Rothaermel, 2003).

The dependent construct variable (LV) - "disruptive innovation" (DI) should have been preferably measured by correlating a particular disruptor firm's growth with the incumbents' underperformance in face of disruptive innovation using objective monetary measures including market share gained by the disruptor and, as a consequence, market share lost by the incumbents. The limitation of this study in meeting this criterion can be explained by lack of access to financial data due to confidentialities and non-availability of public database of pioneering start-up companies. It has been particularly problematic to correlate the disruptor's growth with the incumbent's underperformance on opposite sides due to the effect of unexplainable complex factors, such as the global financial crises and oil price that affected considerably many industries market shares during the period of collecting empirical data for this research (2008 – 2009). Following other established researchers' recommendations (see Dess and Robinson, 1984; Markides and Charitou, 2004), the construct of disruption innovation (DI) is investigated by quantifying managers' opinion by means of the following four questions:

1. DI1 - How big do you think the market share of all disruptive (new) competitors at this point in time?
2. DI2 - How big do you think the market share your company or other incumbent(s) in the industry lost as a consequence of the disruptive innovation/new business model's growth?
3. D3 - How big do you think the market share other incumbent(s) from other industry lost as the consequence of this innovation's growth?
4. DI4 - How big do you think the future disruptive impact potential?

H11: *Responding to disruptive innovation in a separate SBU is positively related to incumbent's performance (IP) in enabling disruptive innovation.* The construct of "business model separation integration or separation" (BM_Separation) is examined by asking respondents to indicate one of the following choices that most likely demonstrate how their companies responded to disruptive innovation (Christensen and Raynor, 2003; O'Reilly and Tushman, 2004):

1. Stand-alone business unit via new company
2. Separate business unit under existing corporate structure
3. Integration without changing business model
4. Other/ No response

H12: *Organizational separation of disruptive business model is positively related to incumbent's performance (IP) in enabling disruptive innovation.* For respondents that indicated their companies had created a separate company to manage the disruptive innovation, a further question is asked to determine the extent of organizational separation (Org_separation) in terms of dissimilarities from the parent company in the following components (Bartlett and Ghoshal, 1986; Chandy and Tellis, 1998; O'Reilly and Tushman, 2004; Vlaar et. al., 2005):

1. Org_separation1 - Brand
2. Org_separation2 - Marketing and sales
3. Org_separation3 – Distribution
4. Org_separation4 - Production processes/activities
5. Org_separation5 - Supply processes/activities
6. Org_separation6 - Firm identity
7. Org_separation7 - Organizational culture
8. Org_separation8 – Management

H13: *Senior management involvement is positively related to enabling disruptive innovation.* Senior management involvement (INVOLVEMENT) is measured empirically by looking into what extent the parent company's top management is involved in the affairs of the disruptive (new) business unit or company in the following aspects (Brentani et. al., 2010; Cooper et. al., 2003; Garvin 2004; Grant, 1991; Teece et. al., 1997)

1. Involvement1 - Taking risk initiatives
2. Involvement2 - Championing disruptive ventures
3. Involvement3 - Resolving managerial conflicts

4. Involvement4 - Screening and approving projects
5. Involvement5 - Setting strategic direction
6. Involvement6 - Setting annual budget for the new unit
7. Involvement7 - Exercising overall financial control

H14: *An externally hired CEO is positively related to incumbent's performance (IP) in enabling disruptive innovation.* The CEO factor (CEO_Factor1) is examined by asking respondents whether their companies appointed a CEO from inside or outside of the company (industry) to run the new disruptive unit/company (Abrahamson and Fombrun, 1994; Chesbrough and Rosenbloom, 2002).

Two MVs are used to measure the dependent variable (DV) Incumbent's Performance (IP) in enabling disruptive innovation (Dess and Robinson, 1984; Markides and Charitou, 2004):

1. IP1 - Respondents are asked to rate the effectiveness of their disruptive business models in becoming part of the emerging disruptive market on a seven-point Likert scale ranging from (1) "Very ineffective" to (7) "Very effective".

2. IP2 – Respondents are asked to evaluate the level of synergy between the disruptive and traditional business units by indicating their agreement or disagreement to what extent the sharing has enhanced the competitive advantage of both units (if there is some nature of parent company's senior management involvement or some sort of organizational integration), ranging from (1) "Strongly disagree" to (7) "Strongly agree".

4.5.2 Reliability and Validity Measures in Quantitative Data Analysis and Reporting

Reliability refers to the consistency of a set of measurement tools (Yin, 1994). The reliability test of the major constructs is examined using Cronbach coefficient Alpha. Table 4.4 below shows the Cronbach Coefficient Alphas for the major constructs that range from 0.61 the lowest and to 0.90 the highest**.** These demonstrate sufficient internal consistency and reliability between inter-construct MVs that measure a single construct or latent variable (LV) (Govindarajan and Koppale, 2006: 192; Nunnaly, 1978: 244).

Table 4.5: Cronbach Coefficient Alpha

Constructs	Cronbach Coefficient Alpha	
	Raw	Standardized
Low Relative Advantage (RA)	0.822885	0.820675
Asymmetric Motivation (AM)	0.762196	0.760328
New/different Value Chain Configuration (VC)	0.764542	0.769186
Continuous Innovation (CI)	0.773943	0.774804
Constraint Factor (CONST)	0.608196	0.614214
Competition (COMP)	0.678278	0.674827
Disparity (DISPARITY)	0.746984	0.749602
Conflict (CONFLICT)	0.886515	0.890065
Dilemma (DILEMMA)	0.900433	0.900170
Disruptive Innovation (DI)	0.797860	0.800024
Organizational Separation (Org_Separation)	0.891172	0.890657
Senior Management Involvement (INVOLVEMENT)	0.844355	0.843769
Incumbent Performance (IP)	0.824618	0.832746

Construct validity refers to what extent a scale measures or correlates within the conceptualized psychological construct that it claims to measure. In other words, it refers to the extent to which the study investigates what it purports to investigate (Yin, 1994). In measuring the construct validity, we test convergent and discriminant validities using SAS 9.2 PROC FACTOR code for exploratory factor analysis (Principal Component Analysis). While convergent validity tests whether all MVs represent or load onto a single LV, the discriminant validity asses whether the MVs that load on a single LV discriminate adequately from other LVs (Hair, Babin, & Samouel, 2003). All factors of the major variables are with Eigenvalues equal to 1; the percentages of variance explained for the major variables are above 0.5, and all relevant factor loadings are greater than 0.5 (see Appendix D pages 382 – 399 for detailed relativity and validity test results). These results demonstrate significant convergent and discriminant validity (Govindarajan and Koppale, 2006: 192; Nunnaly, 1978: 244).

Content validity (also known as logical validity) evaluates to what extent a measure covers all facets of a construct(s) that made up the theoretical model in this study (Babie and Mounton, 2001). The content validity of this thesis is measured in theoretical and empirical dimensions. First, the theoretical dimension assesses the extent to which the concepts of business model and disruptive innovation represent the methodologically agreed upon concepts in the established literature and thereof, the conceptual models cover the fundamental dimensions, elements and principles of a business model and disruptive innovation. From the theory test perspective, all the definitions and meaning of concepts that represent the hypotheses of this study are well theoretically grounded, and all the constructs that build the hypothesis are chosen from established academic works, as much as possible.

Second, the empirical dimension attempts to measure the extent to which the survey samples represent the population of the study, i.e. disruptive innovation phenomena in the four South African industries, mobile telephone, banking, insurance and airlines. In this regard, content validity of this study is maintained by the informed identification of disruptive innovation phenomenon and sample selection made through consultations with academic and industry experts including professors at the School of Economic and Business Sciences (SEBS), and Wits Business School (WBS), University of Witwatersrand, Graduate School of Business, University of Cape Town and Gordons Institute of Business Science, University of Pretoria and proficient observers of the industries.

Content validity requires more meticulous and systematic qualitative and quantitative measures. The multiple case studies method is used to demonstrate a disruptive innovation process, first, by selecting five "archetypical" pioneering firms that introduced disruptive innovation in different industries, and then, making constant comparisons among these firms in order to identify common or different patterns, themes and categories for generalization across the population, or contextualization the findings (Yin, 1994).

The case study method is triangulated by rigorous statistical method. In carrying out the empirical research, meanings and definitions of question items, and the format of the questionnaire were reviewed by panel of experts. A pilot survey was conducted and checked for completeness, reliability and validity, subsequently improving the design of the questionnaire to raise its content validity. In a self-administered questionnaire, a possible bias may arise concerning content validity, i.e., whether respondents comprehend some constructs and whether they match it with what the constructs seek to measure, and whether they give comprehensive and correct answers (Cooper and Schindler, 2001). To control this bias, about 90% of the survey was completed through face-to-face interviews. This task was accomplished by employing three post-graduate students. In addition, the author conducted open ended interviews with over 30 top level managers. In conducting statistical analysis, this study relied on theoretical foundations as well as the case studies findings to interpret, confirm or reject hypothetical relationships (Hair et. al., 2003; Hoyle and Kenny, 1999; Kline, 2005).

With respect to external validity, while the empirical findings may be generalized from the sample to its target population (the four South African services industries), this study does not claim that its findings can be, in effect, reproduced to the universe of other populations across time and place. However, the thesis's integrated theoretical framework for "business model reinvention for enabling disruptive innovation" has been developed from both deductive and inductive research, through cross-examining and triangulation of qualitative and quantitative findings, and further referral to established theories. Thus, the study's theoretical implications might be generalized across time and place (Yin, 1994, Eisenhardt, 1989).

4.5.3 Regression Analysis

Chapter 6 and 7 present the analysis and results of the thesis. In this study, the major statistical instrument used to test the hypotheses is SAS 9.2 PROC REG (regression analysis). The regression analyses are conducted at two levels of analysis.

- The first-order analysis (system-level) keeps all data together in aggregation to test the two models at a firm-level with the purpose of finding common patters that can be generalized across all industries.

Chapter 6 will present the analysis and results of the first-order investigation. In order to conduct regression analysis, a multivariate test and Cook's D test were checked for outliers with residuals and for normality distribution. Residual data that with significantly higher <2 & 3 were identified and removed. The data are normally distributed in the norm <2 skewness and <4 kurtosis, passing the necessary assumption tests required for conducing regression analysis (Johnson, 1998). Furthermore, the Pearson correlation coefficients ('r') of the two conceptualized models presented in Chapters 6 and 7 show statistically significant correlations at p = 1%, 5% and only two variables marginally at 10% levels, thus most showing significant associations between hypothesized variables (Choudhury and Karaqhanna, 2008: 186; Govindarajan and Koppale, 2006: 192).

In regression analysis, the coefficient of determination (r^2) assesses the proportion of the variance of the dependent variable explained by the independent variable(s); adjusted R-square values closer to 1 indicate a better fit of a model. The model accounts for a significant portion of variation in the data (fit) when F (p-value) statistic is 0.01, 0.05 and marginally at 0.10 level. All measures in this study are with F = p<0.0001, indicating a better fit of all models. The Variation Inflation (VIF) of all regression analyses in Chapter 6 and Chapter 7 show no significant multicolinearity, indicating additional reliability of the statistic tests. The parameter estimates of the intercept and independent variables' slopes (standardised correlation coefficient β) are statistically significant at p-value 0.01, 0.05 and marginally at 0.10 levels, indicating a significant relationship and whether this relationship is positive or negative (Johnson, 1998). When the independent variable is a categorical variable, Analysis of Variance (ANOVA) is used to compare the means of the dependent variable of the categorical subgroups. The Model shows statistically significant difference if the Pr > F at 0.01, 0.05 and marginally at 0.10 levels. The Tukey Studentized Range farther determines where the difference lies at the alpha = 0.05 level.

- The second-order study investigates the differences between *non-technological market-driven* and *technological* disruptive innovations by subjecting each category of innovation to the same hypothesis and statistical unit.

Chapter 7 will present the analysis and results of the second-order analysis. A dichotomous categorical variable (technology innovation vs. business model innovation) has been set up to examine the two categories in opposition. The total number of observation 114 is divided equally into 57 technology and 57 business model observations. By using the same entrant's and incumbent's conceptual models and the 14 hypotheses, a moderated regression analysis tests whether the hypothesized relationships between the independent and dependent variables vary across the two groups of innovation. To get a standardized solution, the business model innovation group is set as a dummy variable (-1) representing a reference group, while the technology innovation category represents an effect coding group (1). The moderated regression results of significant (or insignificant) effects (differences) are interpreted by reporting the p-value of the interaction effect coefficient slop. We reject the null hypothesis that the two groups of innovation are the same if the p-value is 0.01, 0.05 or marginally 0.10. The limitation of moderated regression analysis is, however, that its the chi-square ($\chi 2$) and interaction effect statistic significant difference tests are power sensitive. In other words, they have the downside effect of ignoring differences of relatively small sample size such of this study (they are more reliable for more than 200 sample size). Thus, in interpreting the results and provide a visual (different) direction of the slopes of the two groups, the moderator and interaction effect coefficient slopes are plotted graphically. In addition, the thesis uses Student's *t* distribution (paired two sample *t*-test: –test) to support the significant difference analysis (Lee, 2008: 242; Kline, 2005:146; Oczkowski, 2003).

Furthermore, when necessary, a central tendency (mean) measure is used when we try to identify the most significant contributing MVs to a single LV. In using the mean analysis in a seven-point (Likert) scale, following inferential logic and referring to previous research, the author decided, with some degree of subjectivity, the cut-off mean point for each aggregate indicator to be 3.5. This means that a mean score above or below this point indicates significant (or insignificant) probability of accepting or rejecting a variable with higher/lower value, further in order to strengthen accepting or rejecting a hypothesis.. Moreover, in some instances, the statistical analysis alone cannot capture the complex and dynamic phenomena of disruptive business model innovation. Therefore, in all hypothesis testing and concluding the outcome, the dynamics and contextual factors are explained by drawing insights from the case studies, and further by referring to established theories (Shimp, 2010; 70; Markides and Charitou, 2004: 34; Rafi and Kampas, 2002: 116).

4.6 Ethical Considerations

This study has taken care of the ethics requirements to carry out this research activity (see Appendix E for letter of ethics clearance). In collecting the primary data, permission was granted from people participated in this research through open interviews and self-administered structured questionnaire. This study focused strictly on innovation process and the respondents were chosen based on their relevance to the study. The respondents were experienced top level managers who participated in this study voluntarily. As stated on the questionnaires (see Appendix A & B), the participants were notified for the confidentiality and anonymity of the study and that the information gathered from the research will only be used for academic purposes. Therefore, the observations and findings are kept anonymous. As mentioned in Chapter 5, the names of case companies are also kept anonymous. One company gave a written permission to use its name. The researcher adhered to the basic research principles in order to ensure that the observations are free from the researcher's personal bias and that the findings represent accurately what were observed and told by respondents. This is maintained through prolonged engagement in the phenomena under investigation and through the process of constant and iterative analysis and triangulation including, but not limited to, survey, open interviews, focus group discussions, company and industry archives, the Internet, and the media (Babie and Mouton, 2001; Yin, 1994).

CHAPTER FIVE: CASE STUDIES

5.1 Introduction

This chapter explores five case studies comprising two *technological* innovations and three *market-driven business model* innovations, representing four South African services industries, namely mobile, banking, insurance and airline industries. The case studies have been developed from interviews, focus group discussions, desk research and literature review. Yin (1994) argues that a multiple case study method is useful when exploring relatively less known phenomena, for it helps to investigate common patterns, themes and differences among the case studies for possible generalization across similar contexts.

Chapter three presented the conceptual framework with two major evolutionary and revolutionary models of disruptive innovation. The case studies explain the business model evolutionary processes in creating a potentially disruptive niche market, and how incumbents responded to each innovation. Thus, the five case studies sections are structured based on the conceptual models. This study withholds the names of case companies unless permission is obtained from a certain company to use the name. Therefore, the five companies are identified here as innovations 1, 2, 3, 4 and 5.

5.2 Innovation 1 - Mxit[9]

MXit is a “free” instant mobile messaging software application pioneered in 2005 by Herman Heunis, the current CEO of the company. The innovation, which was launched under the same

[9] Permission is granted from the company to use the name.

company name, MXit, is a social networking technology that allows users to exchange instant text messages and multimedia via a mobile phone. This case study examines the probability of MXit to be disruptive to the Short Message System (SMS) product. SMS is offered by three large mobile network operators (MNOs): Vodacom, MTN and CellC, hereafter referred to as incumbents.

The incumbents' revenue models are made to charge subscribers 86 cents per a text message sent via SMS[10]. In contrast, MXit has a radically different business model. To be a member of MXit, the company charges its customers nominal fees for signing up. Once a customer is a member, MXit charges only 2 cents per text message (98% less compared to the MNOs), plus the Internet data costs.

I. The RA of Innovation

The core product: The traditional SMS is a one-to-one text messaging communication product. MXit is a mobile social networking product that runs on java application that enables multiple users to chat instantly over the Internet using GPRS[11] packet data. The RA of the innovation can be examined in terms of price, ease of use, quality, brand recognition and technology "newness" in comparison to an existing comparable product's value proposition (Rogers, 1995).

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[10] Retrieved on 12 January, 2008 from ttp://phonecard.bootsnall.com/southafrica_sim.htm

[11] General Packet Radio Service (GPRS) is a packet oriented Mobile Data Service available to users of Global System for Mobile Communications (GSM) (mobile phones).

Price advantage: Tables 5.1 shows that MXit charges 2 cents per text message, plus the Internet data costs[12]. The GPRS/3G[13] data tariff is about R 1.2 a megabyte[14]. In comparison, MNOs charge 86 cents per SMS[15]. This shows that MXit has a price advantage over the SMS.

Table 5.1: The Relative Advantage of Mxit in Comparison to SMS

Value propositions	MXit	MNO's SMS
Price	2 cents per text message	86 cents per a text message
Ease of use	Mobility, interactive, social networking. Requires handsets enabled by Java with mobile Internet capabilities	Single use, one-to-one, not interactive. Can be used by older handsets with no access to the Internet
Quality	Limited product	Incumbents offer multiple products
Brand recognition	Not known in the mainstream market. Popular among the teen-agers	Well established in the mainstream
Newness of technology	Incremental technology	MXit is not radical compared to SMS technology

Ease-of-use advantage: The SMS technology can be used on any handsets with no access to the Internet. MXit combines mobility, instant messaging and social networking, which are not possible with SMS. Its interface is simple and can work on average handsets that are enabled by Java with mobile Internet capabilities (GPRS/3G).

Quality advantage: MXit provides limited functionality, i.e., only instant mobile text messaging. In contrast, incumbents offer multiple communications products in which SMS is just a single product, adding quality value to the user.

Brand recognition: The incumbents have well established brands that extend across all market segments. MXit brand is not known in the mainstream mobile market. But the company has

[12] MXit website:www.mxit.co.za. Retrieved on 12 January, 2008.
[13] 3G is the latest GPRS technology.
[14] Vodacom website:www.vodacom.co.za. Retrieved on 12 January, 2008.
[15] Retrieved on 12 January, 2008 from ttp://phonecard.bootsnall.com/southafrica_sim.htm

effectively established its brand among the teenagers through low-cost viral marketing and word of mouth. As one of its managers says, this has been one of its critical key success factors:

> *I think it was the fact that we used viral marketing very effectively. Our users like us, they still do, they are very loyal to the brand. So they didn't mind paying, not at all, we were giving them an opportunity to speak to their loved ones and friends for free. So to buy something from us to help paying for this was actually a very pleasant experience for them.*

Technology newness: Instant mobile messenger is a mobile extension to instant messenger over the Internet. It makes social networking possible via instant messaging over a cell-phone that was previously only possible over the Internet. It blends both the SMS mobility and the instant messaging element of the Internet. From a technology newness perspective, the innovation is simply an incremental improvement to SMS and may not be radical to users and the industry.

The purpose of analyzing the above five attributes here is to examine the innovation's probability of cannibalizing the SMS market. When we compare the two products on the above five attributes, typical to a low-cost technological innovation, instant mobile messaging appears to have relatively better price and ease of use advantages, and lower quality and brand recognition advantages.

Some managers argue that the technology has the potential to cannibalize SMS. The CEO of MXit defies this argument saying that the two products are fundamentally different. Both products can co-exist with enough markets for both of them:

Now when we started initially the Telco's (MNOs) – I think they were of the opinion that we cannibalized their SMS revenues. MXit is not a SMS replacement, its different. SMS, you send to someone, it is unsolicited, you respond maybe once or twice, but you cannot have a conversation with SMS, its not the same. MXit, it is a communication for communities, and that's a big difference.

The above examination suggests that MXit does not pose a significant cannibalization to SMS. Conceptually speaking, if the instant mobile messenger poses a direct threat of cannibalization to SMS, we expect incumbents to respond to this innovation aggressively.

I. Low-End Market Creation

Theoretically, if the innovation does not pose a direct threat of cannibalization to an established product's stream of revenue, it may create "asymmetric motivation," where incumbents are less likely to be provoked to take aggressive counter-actions (Christensen et. al., 2004: 13).

With telecommunication being a necessity basic product, MNOs serve virtually all markets. MNOs offer multiple products in which cellular voice calls are a vital source of revenue. In addition, SMS revenues cover some of the operating costs. To be able to use SMS, one has to buy airtime. The denomination of airtime vouchers range from R1000 for the top high-end user to R5 for the lowest-end user.

MXit targets largely teenagers, mostly high-school and college students, who cannot always afford to use voice calls even at its minimum tariff of R5. To make money from this market, MXit requires a low-margin and high-volume business model. According to one of its managers, the secret behind its success was developing a technology driven business model that meets this requirement:

> *I mean it is much easier to sell content to a user for 5 cents and make a lot of money if you have four or five million users than to have 20 users and you try and charge them R1000 or R2000 for something, its much easier going for large volumes and smaller amounts. I think that was the secret.*

The profile of the much lower-margin target market does not seem to fit even to the lowest end of the MNOs market segment. Incumbents use traditional and expensive advertising mediums such as TV to reach a large customer base. The challenge for an innovator with a low-cost – high-margin volume business model would be to reach a much larger customer base at low cost. The CEO comments that, five years after its launch, its low-cost creative marketing and the rebellious notion of the brand have been a critical source of success:

> *We acquired a big user base very quickly, and having a big user base makes the whole monetization of that much easier. The fact is that we realized we could monetize things that initially we didn't think would generate revenue. I mean we started charging for chat rooms. No-one charged for chat rooms in the world, we are crazy, but we did that and it actually worked. Part of it was because we were a very desirable product at that stage when we*

started, and we had a very loyal user base, and also we had this rebellious nature of the brand.

This insight reveals that an instant mobile messenger does not only create "asymmetric motivation" based on economic differential revenue models, but also the fact that it is a mobile social networking product means it is a fundamentally different product to SMS that created a new consumption pattern for an entirely new market that has never been the domain of the mobile industry incumbents.

III. Cost and Continuous Innovation Factors

The higher RA price and ease-of-use of innovation often stem from configuring a shorter and lower cost value-chain when compared to the traditional industry value-chain. Once an innovating firm achieve this, it is critical that the firm continues to improve its performance in order to move up market from its initial low-end niche market to the mainstream market.

The three essential tests towards this goal are first, the extent to which an innovating firm can gain lower cost advantage to create a cheaper and simpler product, second the extent to which it can gain consumer insight so as to continue improving its innovation from the customer perspective, and thirdly the extent to which it can take its innovation to market faster (Govindarajan and Gupta, 2001: 5).

Cost advantage: The traditional mobile network industry business model is characterized by high CAPEX and high OPEX[16] cost structure. Data transmission through the GSM[17] network require extensive capital investments to build GPRS/3G networks, towers and dedicated channels to transport data through circuit switching infrastructure. Additionally, the rapidly changing technological landscape in the telecom industry means that MNOs have to invest in upgrading their network infrastructure from time to time.

The use of large established retail intermediary services providers adds a significant portion to the MNOs cost structure. This requires them to generate revenue by offering higher margin services at the high-end of the market, and through economies of scale by stretching their cellular network to maximum possible capacity to generate revenue from relatively low-margin and high-volume mass market.

MXit uses the public Internet to transmit data through the MNOs' network. Its major fixed asset is basically a server that can host a bigger ISP[18]. The company's mobile instant messaging software was originally developed from open source (e.g. Linux). Its biggest cost is the software development that can provide features and Value Added Services (VAS) with the basic mobile text messaging. This suggests that MXit has a better cost advantage than the MNOs in operating a mobile instant messaging.

Consumer insight and speed-to-market: Although the company interacts directly with its users locally and internationally, it goes to market through partners around the global and locally using

[16] CAPEX = Capital expenditure, OPEX = Operating expenditure
[17] Global System for Mobile Communications
[18] ISP = Internet Service Provider

its direct Internet channel. In South Africa, prospective users visit its website to sign up and to download the MXit application software. Internationally the company partners with national IT terminators around the world including Malaysia, India, Indonesia, United Kingdom, United States, Nigeria, Brazil, France, Germany, Italy, Portugal and Spain. The partners assist MXit in converting the program into local languages and deliver the service to their domestic markets. This allows MXit to focus on its core competencies which is developing software programs. This is also known as a distributed model that refers to an open system where different independent companies work in collaboration across the value chain to create and deliver a single product (Chesbrough, 2006: 10). Domestically, the company relies on its virtual brand that has been effectively built through viral marketing, as a major driver of building customer base and pushing sales.

Examining the hypothesis, the company's technology-based direct, distributed and shorter value-chain is fundamentally different to incumbent MNOs' traditional value chains. Therefore, MXit has relatively better cost, consumer insight and speed-to-market advantages.

IV. The Constraint Factor

The instant mobile messenger technology was launched by an independent small start-up company called Swist Group Technologies that was established in 1994. In July, 2006 the company was named MXit Lifestyle (Pty) Ltd. With no major external financing, the initial development costs almost drove the company to bankruptcy. The founder of the company shares his experience as follows:

> *That was extremely difficult. First of all, we go to banks – they were not interested, we were too high a risk. Then we go to VC's (venture capital)– they want your whole company before they give you money. It was tough; I tell you it is very tough to start a company from scratch. So yes finding finance is a huge problem, and our saving grace was that we started generating revenue much earlier than what we anticipated. If it wasn't for that I don't think we would have made it.*

Introducing a technology that allowed a low-margin and high-volume business model allowed the company to make profit quickly within seventeen months of its launch. When its business model became successful, one of South Africa's largest media companies acquired a 30% stake in MXit, further ensuring its future through that equity capital infusion.

MXit is un-supported and stand-alone business model that has succeeded through creative endeavors. When examining the relationship of access to generic resources and MXits ability to scale up its business model, this company's experience seem to suggest that, although financial support would have made a difference, this kind of information technology innovation may not entirely be constrained by this barrier. Typical to an information technology product, such as Google and Facebook, MXit software is scalable over the Internet to an extent of a global reach. This nature of the product allows the company to reach a critical mass necessary for its low-margin and high volume business model.

V. Firm–Specific Strategic Capabilities

Developing firm-specific strategic capabilities is critical for a firm to capture value it creates. The core value creation capability of MXit is its mobile instant messaging software that runs on GPRS/3G mobile phones and on PCs. Because of the open nature of this software, it is probably difficult to use Intellectual Property (IP) to protect its technology. The company's business model is to charge for signing up subscribers, service fee and to provide an advertising platform via its social mobile networking technology. This business model does not seem difficult to imitate by rivals either. Its key source of value capture and sustainability comes from its *first mover advantage*, *network economies of scale* and *continuous innovation*. By being *the first* to introduce this innovation, it has achieved a critical mass of a 12 million customer base in less than five years. Having a social networking product in such a massive base means that the greater the number of people connected, the greater the value of being connected; therefore, generating *network economies of scale* (Evans and Wurser, 1997: 23).

In the information technology business, where the technological and competitive environments change constantly, these advantages alone may not guarantee the firm's value capture sustainability. There were virtually a handful of competitors when the company started. Today it faces competition both from within the country and around the world. The company does not have a clear strategic position to compete against its rivals. A closer look at the company's situation provides us with two key secrets for its success. The first is the company's commitment to innovation, as it is slogan says "We don't compete, we create". The CEO explains how its innovation process works:

We have an innovation team which is a very small team. It is only like five engineers and all they do is listen to what our users want. We've got a very active forum. The last time I checked it was 150 thousand users on our forum.

We have beta testers also from our user base. So what this innovation team is doing is that, they get input from our users saying we would like to see this and this and that and so on. They also look at what is happening in the technology space. So we have input coming from our users, and we have input coming from our innovation team, and then we have input coming from everyone in the company. And most people in the company are software engineers, and they are very well aware of what's happening in the technology space.

We have got enough ideas to keep our development team busy for the next 2 – 3 years. And it boils down to take a 2 – 4 year look at where technology is going and take a bet and start developing for that, most of the time it comes off, sometimes it doesn't come off.

What we do is we have got a steering committee with its chairman. His job is to take these ideas and make a business space out of it and then it goes to the (approving) committee, which I am head of it and all the heads of all the departments sit in on it every Wednesday, and we take a decision. This is so important that we adjust the priority depending on the amount of work we have got. So its a very structured approach and I think our biggest challenge at this stage is that we don't have enough developers, we are continuously hiring developers, but still we have not got enough.

The second is that the management firmly believes its innovation process cannot work without staff motivation. The company has few but well trained and above average paid software developers. As the result of such structured innovation process, it releases new version of MXit every eight to twelve months, and has developed many products over the last five years including, MXit Café and MXit Music.

VI. Niche Market Growth

One of the growth indicators of the company is that, in five years time since its inception, it has a registered user-base of about 12 million and over 230 million messages traffic per day on average worldwide. It has officially obtained licenses to operate in Malaysia, India, Indonesia, United Kingdom, United States, Nigeria, Brazil, France, Germany, Italy, Portugal and Spain.

This case study seems to suggest that MXit has successfully met the five business model innovation determinants namely (a) RA of innovation for (b) a particularly low-end market, (c) continuous innovation, (d) overcoming constraints and (e) competitive barriers. The key research question is whether this innovation amounts to disruptive innovation from an incumbents' perspective, to what extent the company's market growth has disrupted the MNOs' SMS revenue, and how should incumbents respond to this innovation.

VII. Incumbents' Response to Potentially Disruptive Innovation

The interviews conducted with managers reveal that initially most managers perceived MXit to be highly disruptive and problematic to integrate the innovation into their existing business model. This is because MXit users use massive data at a very low tariff for MNOs, which creates a bottleneck on the incumbents' network capacity, blocking and interfering with cellular voice and SMS traffic. Over time, as the market of MXit became clearer, the MNOs found that MXit was not disruptive. Instead, manager realized that it might create a new source of revenue. MXit users are using the network to send more messages more efficiently. Thus, the bigger the data, the more the revenue for incumbents. A top executive commented as follows:

> *We have got first hand experience from more than one operator [MNOs] that is saying to us that it is not disruptive. The amount of revenue generated from [MXits] GPRS data for the MNOs is quite satisfactory. If I can just give you an example; in South Africa the operators here charge roughly about R2.00 a megabyte. What happens now is on MXit, because users can send pictures and voice clips and text, they start sending more and more pictures, they start forwarding video clips, MP3's, all of those sort of things, and the Telco's are charging R2.00 a megabyte. So they are making a substantial amount of money.*

Having realized that MXIt was not disruptive to their traditional revenue models, most MNOs incumbents responded by integrating the IMS without changing their business models. In 2007, two years later after MXit was launched, two of the countries largest MNOs launched their own version of instant mobile messenger called "Nok-Nok" and "the Grid" within their existing business models.

5.3 Innovation 2 –VoIP Mobile

Three computer science honours students at the University of Cape Town, who were not able to afford talking on their mobile phones, wondered why they couldn't use VoIP on their cell phones for free. In 2006, the students opened their start-up company called "Innovation 2", at about the right time when *GPRS* and 3G technology was setting off in South Africa.

The company launched its first mobile V-mobile product in February, 2007. The cellular voice calls market in South Africa is dominated by two large MNOs, Vodacom and MTN, with Cell-C as the medium player, and Virgin Mobile, a small virtual mobile operator (VMO). Innovation 2 uses a fundamentally different business model compared to the traditional mobile industry. MNOs charge their subscribers per minute for cellular voice calls. Company 2 distributes its V-mobile voice call services through voice over IT terminators (intermediaries) for a flat license fee for about R10 (USD$1.3) per subscriber per month. This case study explores the potential disruptiveness of VoIP-mobile (V-mobile) relative to the MNOs' cellular voice calls revenue.

I. The RA of Innovation

The core product: V-mobile is a mobile extension to VoIP over a fixed-line telephone network, which is transmitted through the public Internet to mobile phones via existing GPRS/3G networks. The traditional cellular voice calls are transmitted via capital intensive GPRS/3G networks.

Price advantage: Innovation 2 distributes its V-mobile through voice over IT terminators (intermediaries), for a flat license fee of about R10 per subscriber per month. Table 5.2 presents a price comparison between incumbents' cellular voice calls and one of Innovation 2's distributors in South Africa. For off-network local calls (V-mobile to other MNOs), the V-mobile price is about 50% cheaper compared to traditional voice calls. For international calls, the tariff is about 80% cheaper depending on destinations compared to fixed line international calls. The V-mobile terminator offers free on-network calls (V-mobile to V-mobile users). It charges a flat fee of R25 per month subscription. In addition, subscribers pay for the Internet data costs charged by MNOs. A mobile VoIP call may use about 250k per minute which costs between about 8 – 20cents.

Table 5.2: Price Comparison between MNOs and Innovation 2's VoIP mobile[19]

Call Type	**Contract Cellular Phone tariff***	**Pre-paid Cellular phone tariff**	**V-mobile tariff**
On-network calls (e.g. MTN to MTN)	R1.75 per minute Typical peak-rate cost R2.35 per minute	R2.50 - R2.89 per minute Typical peak-rate cost R2.90 per minute	FREE for Innovation 2-to-Innovation 2 calls. Subscribers pay R25 flat fee per month, plus Internet data costs
Off-network calls (e.g. MTN to Vodacom)	R2.35 per minute	R2.90 per minute	R1.30 per minute
Calls to Telkom lines	R1.75 per minute	R2.90 per minute	R0.59 per minute
International calls	Between R2.90 & R5 per minute according to destination	Prepaid cellular customers cannot make international calls	Main destinations are between only R0.46 & R1.00 per minute

* This is a typical price. But charges could vary depending on demand and capacity fluctuations and a particular MNO's dynamic tariffing scheme.

Ease of use: The V-mobile technology is simpler to use compared to GSM cellular calls. In the traditional GSM cellular voice services, a user has to follow a series of codes to perform a particular task. For example, a user needs to dial 121 to check voice mail or to dial *111# to check his/her balance. In the V-mobile application software, a user can simply select from a menu and simply click a button to perform a particular task.

[19] www.primetel.co.za/index.php. Retrieved on 4 November, 2008.

However, its price and technical convenience benefits are severely compromised by the technology's incompatibility with the existing average cellular handsets and its limited area coverage. At present, V-mobile requires WiFi enabled Smartphones, and to some extent more expensive 3G enabled handsets, which are not affordable by the low-end market segment. It is accessible only within Wi-Fi access points or 3G covered metropolitan areas.

Quality advantage: The greatest disadvantage of VoIP at present is its poor quality and limited functionality. A voice call over the Internet is carried through the public Internet that intermingles with many complex elements at varying levels in the Internet wireless where some packets can be lost or delayed in transmission. There is a significant voice interruption and voice quality degradation which makes it unreliable for important and urgent calls.

Brand recognition: The country's MNO's brands are well-established. Typical to low-cost innovation, Innovation 2 does not spend money on marketing and branding. It focuses on developing the innovation while partnering with distributors who control their own brands and customer base.

Technology newness: V-mobile is an incremental improvement to VoIP over fixed line. It does not constitute a radical change to users and incumbents.

In view of the question whether V-mobile has the possibility to cannibalize cellular voice calls, it can be understood that the innovation has considerable price advantage. But this is significantly compromised by inferior quality and lower brand recognition. Based on the above five value attributes, at present its cannibalization potential seems low. With its current limitations, the next section explores what type of market segment may adopt this innovation presently, and whether this target market draws incumbents' attention.

II. Low-End Market Creation

Cellular voice communication is a public utility that appeals to every person and business who can afford to make calls. MNOs serve virtually all markets including high-end corporate, middle and small enterprises and personal markets, with the denomination of airtime vouchers that range from R1000 for the top high-end to R5 for the lowest-end user.

Although, the V-mobile "free" on network calls may attract the lowest end or previously un-served market segment, that may not be attractive to incumbents revenue model. The technology's incompatibility with low-end handsets and its restricted coverage may be major obstacles to create a low-margin – high-volume market foothold. The company presently targets medium and small businesses that can afford to own sophisticated handsets. As the founding director of the company says, V-mobile is nontheless offered as a part of a total fixed-mobile converged business communication solution:

> *Right now Voice over IP is the big hype and that is what everyone talks about and that is what we do to get into the market, but it is a very, very small component of it. Our (Innovation 2's) valued proposition is the ability to deliver services on a fixed and mobile platform.*

The innovation is creating a very small niche market in the lower-end commercial market, targeting the small and medium enterprises. A crucial point to examine in the next chapter is, whether this innovation will be perceived, from the incumbents' perspective, as disruptive to cellular voice calls and whether the market is likely to be attractive to incumbents.

III. Cost and Continuous Innovation Factors

Cost advantage: The GSM[20] cellular voice network requires extensive capital investments to build *GPRS*/3G networks, towers and dedicated channels to transport data through circuit switching infrastructure. The rapidly changing technological landscape in the telecom industry means that MNOs have to invest in upgrading their network infrastructure from time to time.

V-mobile technology can be transmitted via the public Internet using the mobile existing network infrastructure including the GPRS/3G network, fiber optic, as well as the fixed-line Public Switched Telephone Networks (PSTN) infrastructure. As any mobile Internet user, specialized V-mobile companies can pay MNOs for using the existing mobile network for data transmission. By using the established infrastructure, a small start-up V-mobile may not be deterred by the need of costly investments in GSM, cable wire or fiber-optic physical network infrastructures. Similar to MXit, Innovation 2's only major capital expenditure is the cost of software development. This indicates that V-mobile has a massive cost advantage over the MNOs' GSM cellular's value chain.

The lower cost advantage may be moderated by the mobile industry's specific conditions and practices. The high CAPEX and OPEX costs, the perishable nature of service (cost always incur

[20] Global System for Mobile Communications

whether or not people call), the wide fluctuation of demand that characterize the industry put pressure upon MNOs to use a dynamic pricing model to adjust prices to these variables.

Consumer insight: Innovation 2 concentrates on creating and developing V-mobile. It licenses its innovation to established companies with major brands and distributions channels in order to get its product to market. Company 2 therefore also adopts a distributed model. As one of its managers' comments this model may limit the company from learning first-hand about its users.

> *Yes (answering to the question whether the model limits the company to get first hand customer insight), that is definitely, because we are not directly in touch with the client base. That is a bigger problem. We would like to be conducting more usability tests with our clients or any sort of random people we decide to collect into a user group or focus group and that will get better in touch with the market. So this far we have unfortunately not conducted enough usability testing or product and the like.*

Speed-to-market: The greatest benefit of a distributed model, as the CEO of the company, argues is its speed-to-market.

> *It [the distributed model] is much better for us to work with a company that has resources, established distribution, user base and knowledgeable of a particular market. It is a shorter lead-time before you start making money, it is a lower investment on our part and it allows us to scale up (our innovation) globally.*

IV. The Constraint Factor

Graduating from college with a viable business idea, the entrepreneurs faced serious challenges in raising capital to finance the development costs. Responding to the question how can innovators in South Africa access capital, one of the founders of Innovation 2 replied as follows:

> *South Africa has got no capital markets whatsoever for start up. In America and the UK, yes, they have got support structures like that where literally you can walk out of varsity, go somewhere, where in three to six months they do something for you and then by which time you are ready for investment and you go on. There is nothing like that in South Africa.*

One of the major reasons Innovation 2 adopted a distributed business model is to overcome the generic resources limitations including capital, brand recognition, customer base and distribution channels. One of South Africa's largest voice over IP terminator acquired the majority ownership stake (51%), with the founders holding the remaining stake (49%). The core competencies of these two companies fit appropriately with each other in that, whereas Innovation 2 specializes on software development, the service provider has the IT capabilities to carry and terminate the V-mobile calls.

The present major hurdles of V-mobile innovation are quality, compatibility, accessibility and affordability. Technically, the VoIP-mobile currently suffers from quality and functionality limitations. The innovation is not compatible with the low-end handsets that can be used by the mass market. It requires a high-end Smart phone devices equipped with Wi-Fi and Internet capabilities. The current penetration of Smart phones globally is only 10% of the global mobile market share. At present only very few people in South Africa own such high-end latest handsets such as NEC N900iL, i-Mate, HTC, etc.. In an attempt to overcome this hurdle, Innovation 2 uses a lighter version Java enabled device that can operate on most average handsets. However, this does not provide all the functionality and version that is suitable for Smart phones. On the Java enabled handsets, users make calls in slightly different ways. A user has first to call a central place that calls out destination. Thus, it basically connects two calls and this will increase the cost slightly higher relative to Internet calls via WiFi enabled Smart phones.

Yet, the entry of VoIP-mobile, even with Wi-Fi enabled Smart phones, into the mass market entirely depends on the availability and access to broadband Internet. At present broadband Internet such as Wi-Fi, W-Max and iBurst have limited geographical coverage to cellular networks in South Africa.

V. Firm–Specific Strategic Capabilities

To protect its innovation the company uses a copyright protection for its software. But since the V-mobile technology is entirely software based, and not a radical innovation originally invented by the company, it may be difficult to use this protection alone to prevent imitation by rivals, as one of the managers says:

> *Our product is entirely software based. So we have not patented anything. We simply have a normal copyright protection. In South Africa it is extremely difficult to patent software. In the US you might be able to get a few things here or there, but from our*

perspective, it is not worthwhile because it costs a lot of money and a smart developer can just find a small variation and then they can use a similar [technology], and they can have some something similar working.

In terms of competitive environment, similar to MXit, Innovation 2 does not have a competitive strategic position *per se*. It's strategy to capture and sustain value depends significantly on continuous innovation.

Being its sole core competency is software development, and not having to worry about marketing and sales problems, the company sees itself as a center of innovation. The present challenge for the company is to address the compatibility and technical performance problems of V-mobile, rather than introducing new products, as one of the innovators says:

It is not so much about coming up with new features because people are still getting used to the idea of Voice over IP software on the cell-phone. So we focus a lot on the innovations on making a more seamless, more enjoyable mobile experience.

VI. Niche Market Growth

V-mobile is at its early stage globally. Likewise in South Africa, it is apparent that the innovation has a long way to go. The current global market share of Smartphones that are compatible for V-mobile is only about 10%. Its economic benefit is again offset by functional wireless coverage limitations. Yet, this South African pioneering company is hopeful that the V-mobile is an imminent disruptive to cellular voice calls, and having nothing to lose, it is poised to surf in the next waves of disruptive growth of the mobile industry.

VII. Incumbents' Response to Potentially Disruptive Innovation

When we examine all traditional MNOs that are said to be affected by V-mobile in future, we find that only one agile MNO incumbent embraced the innovation. Other incumbents did not respond to the latent disruptive V-mobile in any organizational way. For example, the second largest MNO of the country introduced very strict clauses requiring its subscribers not to use its GPRS, GPRS+, EDGE or 3G networks for transmission of mobile VoIP.[21] Some managers interviewed shared their concerns that some MNOs try to discourage use of V-mobile by increasing tariff when they detect it on their network. One manager commented as follows:

> *Some operators increase this rate by ten fold, or throttle the traffic or introduce latencies, if they detect VoIP over their network.*

The leading traditional mobile incumbent that embraced the V-mobile innovation, it created a new division, as part of its large-scale move into the fixed-mobile convergence landscape, that comprises WiMAX[22], Wi-Fi, NGN[23] and V-mobile. One of the main reasons to introduce a separate business division was to prevent "risk of cannibalization" and "conflict" with its traditional cellular network voice revenue model. To achieve this, it used the Multi Protocol

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[21] MTN Product Terms and Conditions. Retrieved on 3 November, 2008 from http://www.mtn.co.za/Support/Legal/TermsAndConditions/Pages/ExtendedData.aspx

[22] Worldwide Interoperability for Microwave Access

[23] Next Generation Networks is a general term used to describe some major architectural innovations in the telecommunications that will be utilized over the coming 5 – 10 years.

Label Switching (MPLS)[24] IP network that can route over, and terminate the mobile VoIP voice calls. This eliminates the possibility of network congestion (conflict) with its traditional voice network. Additional insights emerging from the qualitative research is that, beyond the "degree of conflict", another major reason for the MNO incumbent to launch a separate business unit appears the maturing of the cellular voice calls market in South Africa, as one senior manager explained:

> *This is the innovation (fixed-mobile convergence) that's going to take mobile operators forward. Because we are in a market that is certainly reaching saturation point in terms of mobile subscribers, mobile operators need to find new avenues of revenue and I guess the logical extension for a mobile operator is to expand its services horizontally into the ICT space. So, what we have done is we've set up a separate business unit.*

5.4 Innovation 3 – Mobile Banking

In March, 2005, Innovation 3 was launched as the first South African virtual branchless mobile bank (m-bank). Innovation 3 uses a "pay-as-you-go" business model in which it does not charge monthly fees, compared to the full-service banking model that charges monthly fees even if customers do not use the services. This case study examines the disruptive potential of pure mobile banking (m-banking) to traditional full-service branch-based banking model in the South African banking industry setting.

[24] Multi Protocol Label Switching (MPLS) is a data-carrying mechanism that belongs to the family of packet-switched networks.

I. The RA of Innovation

The core product: Innovation 3 is a low-cost, high-volume pure mobile banking model that offers two limited low-value transactional products; a P-SMS (cell-phone) and a debit card, with no minimum balance requirement. Its cell-phone services include payment and transfer money, purchase prepaid electricity and prepaid airtime for a mobile phone. Since the mobile phone cannot be used to withdraw cash on its own, the company issues its customers a debit card to withdraw cash from ATMs, deposit cash at specified branches, and pay for goods at point of sale (POS).

At this early stage of the innovation, its relative advantage can only be compared with the lowest-end limited product offered by the South African traditional banks called Mzansi. In October 2004 the country's four largest banks known as "Big Four" (ABSA, Standard Bank, First National Bank and Nedbank) and the Post Bank[25] jointly launched the low-end Mzansi account as part of the FSC[26] initiative. Mzansi' banking fees are cheaper 35% to 60% compared to the traditional banks' fees. It offers a debit card and no-fee banking as long as transactions are limited to debit card purchases, a single deposit, and a limited number of ATM withdrawals each month.

Price/fees advantage: Table 5.3 shows that the comparison of fees among Innovation 3, Mzansi and the Big Four full-service branches. Innovation 3 uses a "pay-as-you-go" model in which it does not charge monthly fees (the table shows monthly summed figures). Its monthly fees (R36) appear 35% cheaper than the Big Four's (R55) and 27% cheaper than Mzansi's (R49).

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[25] A state agency fully owned by the South African Post Office.

[26] The Financial Sector Charter (FSC) was signed in October 2003 by the private finance sector to voluntarily extend the banking facilities to the under-banked and un-banked population.

According to FinMark Trust[27], the minimum cost that poor people can afford to access a bank is 2%. While Innovation 3 falls within this range (2.1%), the Big Four and Mzansi's annual banking cost as percentage of annual income are above the threshold (Mitchell and Heil, 2006a: 9).

Table 5.3: Comparison of Innovation M-Banking Relative to Mzansi and the Big Four

Same transactions fees	Innovation 3		Big Four		Mzansi	
	Rand	USD	Rand	USD	Rand	USD
Bank fess per month (total transactions fees)	36	5	55	7	49	6
Airtime fees per month	2	0	0	0	0	0
Transport to bank per month	7	1	11	1	11	1
Total monthly cost	45	6	66	9	60	8
Annualized cost	537	70	790	103	718	94
Annual cost as days of time	7.5		11		10	
Annual cost as % of annual income	2.1%		3.1%		2.8%	

Source: Ivatury and Mark, (2006: 3).

Ease of use: Mzansi account does not offer cell-phone banking. Innovation 3 uses the cell-phone as the primary channel, with no physical presence. In theory, this saves transport time and costs. Its disadvantage is that its low-end target segment cannot be signed up and reached using a cell-phone alone. Since the company does not own ATMs and branches, customers incur additional monetary and non-monetary (transport) costs to withdraw or deposit cash from third party banks.

In an effort to address this problem, the company recruits young agents from its low-end market, the previously disadvantaged community to sell mobile banking face-to-face. Innovation 3 charges a customer R39.99 to open an account in which R19.99 goes to the agent as a commission. In addition, support services are provided by an in-house call-center located in the

[27] FiMark Trust is an NGO whose objective is to take banking to the poor.

Innovation 3 office. The call-center communicates in 11 South African languages for 18 hours a day.

Quality and brand recognition advantages: As a branchless virtual bank, Innovation 3 services are very limited compared to face-to-face services of Mzansi, which is offered within the full-services branch model and under the well-established brands of the Big Four. As a low-budget independent, standalone star-up, it lacks capital to spend on marketing and branding.

Technology newness: M-banking is an extension to online banking that has already been integrated easily by banks within the full-service branch based model.

When we compare the pure m-banking innovation with Mzansi on the five attributes, it has relatively higher price advantage, but lower ease-of-use, quality, brand recognition benefits. This suggests that its cannibalization potential is significantly low.

II. Low-End Market Creation

Traditional banks mainly compete in the established high-end and middle markets that are characterized by predictable revenue and low risk. Innovation 3 mainly targets the low-end "under-banked" and "un-banked" segments. "Under-banked" is a person who has a bank account but not fully integrated into the mainstream banking system, and who is still dependent on non-bank services. The "un-banked" refers to a person who does not have access to basic banking services. According to Finmark Trust, about 16 million South Africans are un-banked and under-banked that fall below the category of 5 LSM[28] (Finscope, 2003).

Some bank managers believe that the Big Four banks do not generate profit from the low-end Mzansi account. As part of the FSC initiative, they argue that banks subsidize the account mainly due to their corporate responsibilities in order to extend banking access to the poor. Other managers argue that there is an increasing awareness at present that the activity and size of the informal economy have long been underestimated by the formal economy. With technology advancement, banks can capitalize on their economies of scale to make money by introducing low-margin and high-volume business models. With these two opposite views in mind, the next chapter will systematically examine managers' views whether this market segment creates asymmetric or symmetric motivation between the innovating firm and incumbents.

III. Cost and Continuous Innovation Factors

Cost advantage: Similar to the mobile industry, the traditional banking cost structure is characterized by high CAPEX and OPEX components. Banks recover costs and create value through both economies of scope and economies of scale. The economies of scope advantage come from product bundling and cross-selling. The vertical integration of the value chain coupled with the application of IT platform enable banks to control their costs and achieve economies of scale, that also permits low-margin – high-volume business at the low-end of the market (such as Mzansi).

[28] The Living Standard Measure (LSM) is applied to categorize the population according to income and asset levels, based on household assets including, land, dwelling, productive assets and durables. It categorizes customers into to groups, with LSM 10 representing the most asset rich and 1 signifying the most asset poor people in the society.

Compared with traditional banking value chain, as a virtual banking operator Innovation 3's value chain is much shorter and cheaper that operates with very few people. Innovation 3's pure m-banking model blends the banking and cellular mobile network capabilities. To access these capabilities from both ends, Innovation 3 adopts a distributed model. For banking capabilities, it outsources the back-end activities to the Bank of Athens, in return for a management fee. For mobile capabilities, it uses Vodacom mobile network as a virtual distribution channel to reach customers, which is supported by in-house call center. Its m-banking software runs on a USSD[29] and WAP[30] technologies platforms that processes virtual transaction on any cell-phone via any network.

Table 5.4: Banking and MNO Core Capabilities

Banking	MNO
• Banking license • Banking technology • Payments skills • Payment interoperability – local and international • Physical and virtual channels	• SIM and handsets • Distribution • GSM network access • GSM interoperability

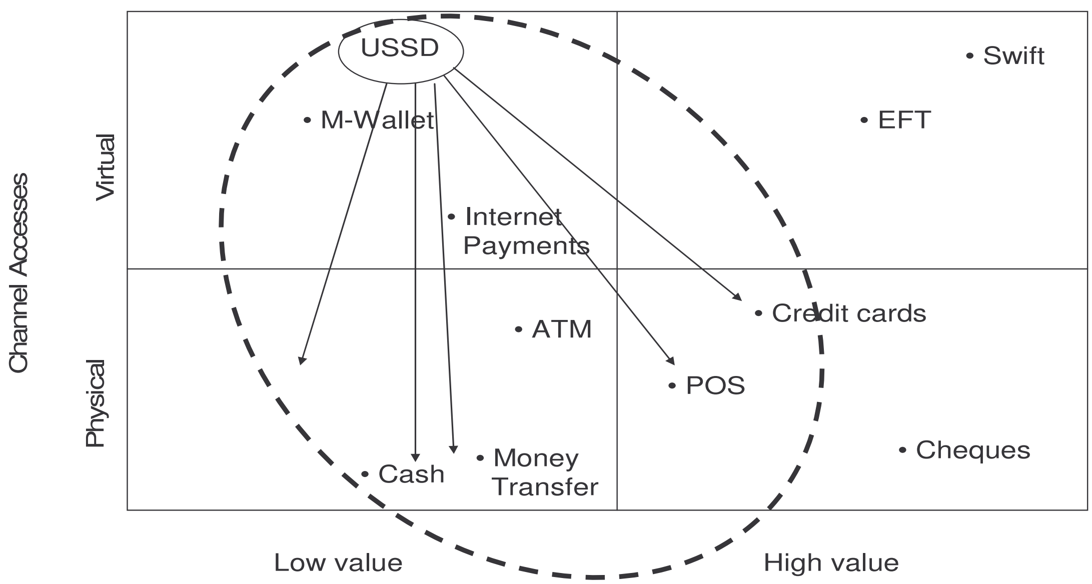
Although USSD is similar to SMS in terms of technical and functional features, it is an interactive system with continuous online session that informs customers about their transaction immediately when it is executed. The Innovation 3 mobile transaction processing systems are certified by MasterCard, a global financial organization. The USSD technology can be scaled up to operate high volume limited transactions with efficiency (Mitchell and Heil, 2006a: 9; Wright, 2005: 2).

[29] Unstructured Supplementary Service Data (USSD) is a GSM supported technology for real-time or instant messaging mobile phone services, which is generally quicker and cheaper than the short message services (SMS).

[30] Wireless Application Protocol (WAP) is an open international standard for application layer network communications which connects a mobile phone to the Internet.

Theoretically Figure 5.1 can be used to analyze the disruptive potential of m-banking to incumbents' full-service business model. Figure 5.1 shows that for a traditional banking model, the high-value physical and virtual channels are credit cards, POS[31], cheques, Swift[32] and EFT[33]. The low-value physical and virtual accesses include cash (branch), ATM, money transfer, M-Wallet[34], and Internet payments. The arrows in Figure 5.1 indicates that USSD technology has a probably potential to disrupt the physical low and high value channels.

Figure 5.1: The M-Banking (USSD) Disruptiveness Potential to Full-Service Model



According to Wright (2005) and (Deloitte. 2004), partly because of the high CAPEX and OPEX cost structure and partly because of the cosy-oligopoly industry structure, the South African banking fees are among the highest in the world – in some levels 14 times higher compared to

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[31] Point of Sale
[32] The Society for Worldwide Interbank Financial Telecommunication manages worldwide financial messaging network that enables a secure and reliable exchange between banks.
[33] Electronic Funds Transfer, a computer-based financial transaction.
[34] M-Wallet is an electronic wallet used to store a person's confidential details such as bank accounts, credit card, insurance policies, memberships, passwords, etc…

the United States fees. Some of the major transaction revenues for banks are third party bank charges that are called “interchange fee” and “carriage fee”.

If a customer conducts the transaction electronically via the cell-phone, the third party costs can be eliminated. In the USSD technology, operating a single transaction costs only 60c per minute on any mobile networks, which is much lower to what banks currently charge.

In theory, this may suggest that the m-banking has the possibility to cannibalize both the high-value and low-value transactions, eliminating the charges of a branch, ATM, POS, credit cards and cheques. In reality, however, perhaps due to lack of physical banking infrastructure the m-banking model has increasingly gone from purely virtual to physical face-to-face services. As one bank manager commented a banking sales force needs to be well trained and FICA[35] certified which would add extra costs:

> *To be a FICA agent you have to have a minimum of a Matric [high school degree]. You have to have a certain minimum of qualifications, and one of them is that you have to have a bank account. So what you end up with is a costly sales force.*

Consumer insight and speed-to-market: In its distributed model, Innovation 3 is located at the front end of the value chain where it interacts directly with the customer. This has helped the company to improve its internal processes and systems considerably. For example, when the company discovered that some of its customers are well-educated about the m-banking product, it employed some qualified people at its call center to deal mainly with this segment.

[35] One of the South African banking regulations, Financial Intelligence Center Act.

The company relies on its call center and face-to-face consultation with customers for consumer insight and sales. For a low-cost model, these mediums may be costly. According to one manager interviewed, the company does not provide free call access to customers who may provide some insight. It costs about R20 per minute for the company to answer calls from a customer. Another manager doubts that the amount of commission given to a sales agent/consultant can hardly motivate them to be creative in acquiring more customers:

> *An agent is only making ten bucks an account. With all due respect, how much does a local bread cost right now? You know, like the bread cost; a pint, a liter of milk cost, R17 for a little of milk. So you are telling me that for every account they are only going to get half a little of milk. Then they are actually not making enough money as individuals to be viable individuals.*

In examining the relative advantage of Innovation 3's value chain relative to traditional banking model, we observe that it capitalizes on technological changes to gain substantial cost advantage. However, given the South African informal economy conditions and infrastructure it faces stiff challenges to overcome distribution and innovation constraints.

IV. The Constraint Factor

Innovation 3 faced critical challenges to enter into the banking industry and to raise capital. The South African banking industry historically maintains a cosy-oligopoly structure with high entry barriers where few large banks dominate the financial market. Banking license costs R250 million (Mitchell and Heil, 2006b:1). To overcome this barrier, it used the Bank of Athens license in South Africa to operate as a virtual bank. After its new business model started to show some progress, one of the country's trade unions acquired 30% share of the company.

V. Firm-Specific Strategic Capabilities

Innovation 3's m-banking capabilities USSD and WAP technologies cannot be considered as firm-specific specialized capabilities for value capture and long-term sustainability, since these technologies are accessible for competitors. The company seems to rely on a focused low-cost strategy to create value from its low-margin – high-volume business model.

VI. Niche Market Growth

Innovation 3 (m-banking) showed some growth in a very small, low-end price-sensitive niche market, reaching about 300,000 total customers by the end of 2008. This number is a far lower volume for a low-margin and very high volume business model. Managers of these companies expressed concern that the low level of transactions and the large number of dormant accounts have somehow delayed the potential growth of m-banking as a standalone business model in the country.

Innovation 3 faces a typical challenge of a low-end Bottom of the Pyramid (BoP) innovation in developing economies. The lack of accessibility (lack of banking infrastructure in rural and townships areas) and lack of affordability (low-level of income, low-education and unemployment) are key challenges for the m-banking innovation in South Africa. As quoted by Wright (2005:1), its founding director is hopeful that the innovation will succeed; "We think we can achieve what everyone says in unachievable: a profitable transactional bank at the low-end of the market.” In the following chapter, we will examine if this innovation poses any threat to incumbents’ established source of revenue and how they adapt their business models.

VII. Incumbents’ Response to Potentially Disruptive Innovation

All South African traditional banks integrated the m-banking without changing their existing business models. This practice appears in line with their previous experience on online banking, which they had easily integrated that otherwise have been disruptive to airlines and insurance companies (Enders et. al., 2006). One of the major reasons is that banks can easily integrate direct models is that they do not face significant degree of conflicts between the innovations and their business models, simply because they own their distribution channels. One insurance manager explains why this is the case:

> *I think banks own their channels. So it was quite the rational decision to go direct, it is a cheaper and more efficient touch point than branches. So going direct makes more sense for a traditional bank. The problem is that if you look at the traditional insurance model, we don’t own that channel. Those people are our business partners. So you stand the risk of damaging to your partnerships. And I think that has slowed the process down significantly.*

Nevertheless, in 2005 one of the Big Four leading traditional banks has introduced a separate stand-alone pure virtual m-banking company in a 50-50 joint venture with one of the country leading MNOs, in addition to integrating the mobile banking within its full-service banking model. There are three possible explanations why this bank did so.

The first possible reason is to prevent an uncertain or probable future disruption coming from the mobile industry into banking. As the cellular voice market is reaching its maturity, MNOs could embark on the cell-phone banking by offering it as a value added service in order to retain their existing subscribers. As one manager puts it:

> *You see, they [The MNO company] were going to launch it any way. So they wanted to do it, we wanted to do it. By doing it together we minimize our risk jointly. If we did it ourselves we would have turned them into an enemy. The idea was a bank and a mobile company to get together in a 50-50 joint venture, focusing initially at a transactional banking. The prepaid SIM card is distributed through the MNO channels in the normal course of events. So the SIM is both an airtime and a banking capability.*

The second reason is to meet the corporate citizen obligation in compliance with the Financial Sector Charter to extend banking access to the poor. The third possible reason was to generate revenue from the previously untapped un-banked and under-banked low-end market.

While the incumbent bank launched the m-banking model officially in a separate organizational structure via a spinoff company in partnership with the traditional MNO, a qualitative investigation suggests this partnership model has three possible problems. The first is that the model is built on two seemingly conflicting interests and objectives. Unlike the MNOs that launched the V-mobile, there seems luck of a unified top management commitment to bring these interests together. The MNO company saw the m-banking as a means to retain its customer base and to cut intermediaries. Its cellular subscribers can use their cell-phone bank account to top up their airtime directly. The bank saw it as filling its corporate citizenry obligation by extending access to the poor, and perhaps as a means to prevent potential future disruption coming from MNOs. One manager said:

> *The MNO guys core business is to sell airtime, not banking. The bank guys see us as a threat to their core business. These corporate antibodies are a big, big issue. The most important thing is you have to have champions at very senior executive levels from both companies, who can say (to corporate antibodies) 'if you do this again I will fire you.*

A greater influence comes from the MNO company since the m-banking head office sits in its innovation center building. The second is that the virtual m-banking is, on one hand, organizationally separated, on the other hand, it relies heavily on the traditional bank branches for distribution. As organizationally separate company, without having its own distribution channel, this appears to be problematic, as one manager said:

> *If you send the m-banking customer to collect a card from a branch, they say they are not there to sell cards (for the m-banking spin-off), they are there to sell accounts of their own. So the people at the junior level have got to appreciate the strategic collaboration.*

The third factor concerns with the very question of financial viability of the pure virtual mobile banking model itself in developing countries. In Chapter 5 it was uncovered that the m-banking has gone increasingly from purely virtual to low-end physical banking, relying more on physical branches and face-to-face sales, thus adding extra costs to its original pure low-cost virtual network structure. One senior bank manager questions the feasibility of the model as follows:

> *I do not think it was foreseen by the virtual m-banking guys that the costs to acquire a bank customer relative to the costs to acquire a (cellular) network customer is quite high, simply because fundamentally banks cannot just acquire customers by phone, but they have to sell face-to-face, one-on-one.*

The total customer base of all m-banking companies is about 700,000. This number is a far lower volume for a low-margin and very high volume business model. Bank managers expressed concern that the low level of transactions and the large number of dormant accounts have detained the potential growth of m-banking as a stand-alone business model in the country.

5.5 Innovation 4: Direct Insurance Model

In 1998, one of South Africa's largest financial conglomerates launched a direct short-term insurance model called "Innovation 4". This case study examines the disruptive potential of Innovation 4's direct model relative to the traditional full-service broker's model in the short term insurance industry in South Africa.

I. The RA of Innovation

The core product: As indicated in Table 5.5 below, in comparison to multiple insurance products offered by the broker's model, the direct model offers limited products such as vehicle and household insurances.

Table 5.5: Comparison of Value Propositions between the Direct and Broker's Models

Value propositions	Broker's model	Direct model
Core product	Multiproduct • Business products • Consumer/personal	Limited products • Vehicle insurance • Household insurance
Price: premium is determined based on risk factors	Generally higher: Includes insurer's premium plus broker's commission	Generally lower: no broker's commission
Ease of use	Intermediation, complicated and longer processes	Direct, simpler, quicker and efficient
Quality	• Face-to-face consultation • Good risk assessment	• Selection is purely based on price • Speedy service
Brand recognition	High brand loyalty and trust	• Low brand recognition • Benefits from low-cost to build brand
Target market	• High-end commercial market • Upper and middle LSM personal markets	• Upper/middle FSM[36]

Price advantage: The premium offered to an insurance customer is usually customized along the lines of individual risk factors including age, marital status, residential address, and model of a vehicle. In general, the price of direct short term business model is cheaper relative to the broker's model primarily because it cuts broker's commission.[37]

Ease of use: The greatest advantage of the direct online model is that supplier selection and evaluation process is simpler, quicker and cheaper compared to the broker's model.

[36] Financial Sophistication Measure (FSM) measures individuals, among others, their financial knowledge and control, financial discipline, and connectedness and optimism (quality of life and future outlook), and by their abilities to access formal institutions in terms of distance and time (eg., access to Internet). FSM 8 signifies most sophisticated and FSM 1 refers to the least financial sophisticated consumer.

[37] As per actual quotation obtained on 8th January, 2008, a monthly premium for a comprehensive insurance cover for 2008 Toyota Corolla 1.4 Professional owned by a 40 years old male, married and living in a secure middle-class Johannesburg neighborhood is R800 from Innovation 4 compared to R1070 from a broker.

Quality advantage: The direct model is efficiency driven where quality is somewhat compromised. In the broker's model quality may be derived from a number of elements including a broker's full knowledge of underwriting risk and actuarial rating, face-to-face consultation, brand equity, ambience of offices, and the largeness and charm of a company's building. Many of these are lacking in the low-cost direct model. From a client perspective, selection of a supplier is primarily based on price.

However, an Innovation 4 manager contends that their direct model's has good risk assessment capabilities and quality service:

> *We are talking to the consumer directly. So we ask the right questions, so we would like to think that we are slightly more scientific. Because we speak to the consumer first hand, we probe for a lot more information than the broker, who is not going to ask for the same kind of information, because you must understand that his commission is at stake here. Its not him paying the claims, its actually the parent company paying the claim. In terms of quality, we are definitely not a low cost operator. We are a low-cost operative from an operation efficiency point of view, but we certainly are not giving a customer bare bone service.*

To add value to its insurance services, Innovation 4 pioneered the concept "Outbonus," that offers customers a payback bonus if they don't claim within a certain period of time.

Brand recognition: The greatest disadvantage of the direct model is the Internet's lack of visibility in the physical world. Innovation 4 managers believe that they need to spend considerably on marketing and branding for two reasons. First, while traditional insurers rely on brokers to acquire and retain customers, the direct player must advertise extensively to acquire customers. Second, because of intensive competition among the direct players in the South African market, Innovation 4 seeks to differentiate itself by redirecting its cost saving gained from disintermediation into building its brand.

Technology newness: a direct model is an Internet business model innovation, with nothing new for incumbents about the application of Internet as a distribution channel.

When the RA of innovation of the direct short-term insurance model is compared with the broker's model based on the five features, it appears significantly higher in price and ease-of-use benefits and moderately lower in quality and brand recognition. This may suggest that it has a moderate degree of cannibalization effect.

II. Low-End Market Creation

Traditional insurance incumbents primarily target the profitable commercial market (business to business). In addition, they generate substantial revenue from the higher and middle personal markets (above 6 LSM).

The direct-hybrid model does not necessarily target customers below the category of 5 LSM, for instance, such as that of the mobile banking. Nevertheless, the need of familiarity with SST (self-service technology) and with the insurance concept may suggest that not all above 5 LSM household can be an ideal target of direct models. About 55% of the South African population is generally categorized as financially unsophisticated in terms of knowledge and access[38]. According to interviews conducted with insurance managers, about 1/3 of vehicle owners in the country are not insured.

The appropriate way to identify the target market of the direct insurance model is by using the FSM model. The short-term direct-hybrid model, in principle, targets the personal market comprising middle class, young professionals who are fairly sophisticated in term of knowledge of finance and use of self service technology (SST) (FSM 6 & 7). After the transformation of the economy in 1994, the number of people who own a vehicle dramatically increased. With access to education and the global spread of the Internet and Information Technology (IT), many people have become knowledgeable about insurance products, thus no longer requiring the professional intervention of intermediaries. In the next chapter, it would be interesting to explore incumbents managers views whether this market segment would be attractive to large established insurance corporations.

III. Cost and Continuous Innovation Factors

The traditional insurance model sources of revenue are economies of scale and scope. Economies of scale advantage stem from both supply and demand sides. As shown in Figure, 5.2 the supply-side scale efficiency comes from massive corporate financial power and massive capabilities in underwriting, administration and marketing. On the demand side, the quasi-oligopoly market structure where few companies dominate the insurance market with massive customer base enables the carrier (insurer) to spread the insurance business risk. This can be achieved by

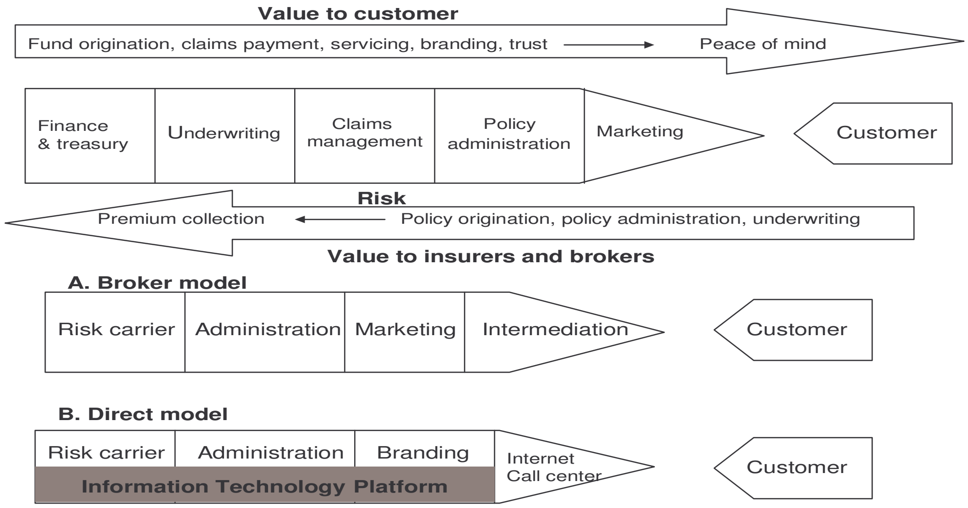
[38] FinScope (2006).

imposing strict and standard clauses in policies and enforcing implementation of risk prevention mechanisms.

Economies of scope are generated from product bundling and cross-selling. There is often a trade-off between scale and scope as a result of higher brokers fees, who are mainly small and geographically scattered. In addition, there is relatively higher inefficiency resulting from channel conflicts as a result of diverse business units within a corporation competing for the time and resources of the same broker. Thus, economies of scale and scope are rarely translated into lower premium to customers.

Figure 5.2 shows that a risk policy originates from customer acquisition. Value flows from a customer through the broker to the risk carrier in terms of monthly premium collection. On the opposite side, value flows to the customer through the broker from the carrier in terms of claims payments, customer services, branding and trust that together comprise the value proposition. Figure 5.2 shows that although the direct player (Figure B) performs similar activities in the upstream value chain, they use the Internet and call centers, displacing brokers, to reach the customer directly. When the value chain is deconstructed form model A to model B, the value to the direct player and the customer can be greater. From a customer value proposition point of view, a customer may care less as to who provides the service as long as the service is efficient and there is one contact place.

Figure 5.2: The Comparison between Traditional Insurance and Direct Value Chains



The direct-insurance market is highly competitive in which a lower cost advantage alone cannot create a sustainable competitive advantage. Innovation 4 pioneered the concept of "Outbonus," the first innovation in the South Africa that offers clients financial rewards for not claiming for a period of three years. Although the company does not have a defined innovation process, the management puts high emphasis on innovation. It believes in employees satisfaction. It has created conducive organizational environment for innovation, such as open door policies, in an effort to encourage its staff to share ideas openly. Innovation 4's key emphasis of innovation is on marketing and branding, always looking for creative ways to draw customers to visit its website or call its call center.

This implies that the direct player model's value chain has better advantages in cost, consumer insight and speed-to-market factors compared to the broker's model. On the distribution side, the direct model's electronic channel and a large call center base can be more scalable than the small and geographically scatted brokers.

IV. The Constraint Factor

Being a supported model (launched by a major finance corporation), Innovation 4 obtains similar supply-side scale capabilities. It was launched in a stand alone company with different identity, brand, organizational culture and management with full managerial freedom to run the company.

V. Firm-Specific Strategic Capabilities

As of end of 2008, there are about 80 long-term and 109 short-term registered insurers in South Africa. Today, five pure direct companies including, Auto & General, Dial Direct, Budget, 1st for Women, MiWay and Innovation 4 compete intensely in the direct short-term insurance[39]. Auto & General Insurance Company Ltd. was the first to introduce the direct model in the country in 1985. In the past two decades, while a number of entrants have advanced the direct model, many believe that it was the late entrant, Innovation 4's latest innovation of the Outbonus concept that marked a "tipping point" for the potentially disruptive direct short term business model in the South African insurance industry.

In such intensively competitive environment and given the generic nature of direct insurance business model, the key challenge for a direct player is differentiation. In such effort, Innovation 4 spends heavily on marketing to build a strong brand, around its popular "Outbonus" proposition.

VI. Niche Market Growth

[39] Financial Service Board Annual Report 2008. Retrieved on 17 Feburary, 2009 from: ftp://ftp.fsb.co.za/public/documents/AReport2008.pdf

In South Africa, the direct insurance short-term has grown rapidly achieving 25% market share in the last ten years. Currently, Innovation 4 is the leader of the direct insurance market with a 12% market share. Coming from "no-where" into the insurance industry, the company has achieved a total asset of R2.6 billion with a solvency of 42% as of 30 June, 2007. Having proven successful its business model in South Africa, the company (Innovation 4) is going global[40].

VII. Incumbents' Response to Potentially Disruptive Innovation

One of the leading traditional leaders of the insurance industry responded only when the disruptive innovation affected its market. It responded in 2008, 10 years later after the introduction of the disruptive short-term direct model insurance by the case pioneering company. The main reason for the long delay in responding was, among others, the disparity between innovation and the traditional models. The "disparity" in the insurance case can be inferred to the difference between direct and broker's based model. One senior manager explains:

> *We had the largest market share in the short-term market until the direct insurance model hit us. On the one hand, we said that maybe you should not do anything about it. On the other hand, you want to prevent it. When you start to do something about it, you have exceptional broker reaction to it. I mean your large brokers threaten to leave, they threaten to take away all their books, they look to you as a supplier as someone who should support them in their value proposition going out there saying, direct is not the way to go, this is the value of the broker and we should all be broker-driven. Because our brokers are so important to us and they have made us the successful company that we are today, we've*

[40] Innovation 4 Annual Report (2007).

operated in this way for the past 90 years, so we have continued operating through a broker channel.

Pointing to the "entrepreneurial dilemma", probably arising due the disparity and conflict factors, another insurance executive said:

We have always worked through brokers. In the beginning everyone was saying it wouldn't work and it wouldn't go anywhere. There was a bit of denial and a bit of "let's watch and see". We looked at international things and thought that the South African domestic market was thin and wasn't evolved as Europe and America to accept a direct model. So there was still an element of denial in it.

Considering the conflicts the company faced to integrate the disruptive innovation, the company introduced a separate company in 2008. A senior manager explains the degree of conflict faced by one incumbent company as the major reason for introducing a second business model in a separate organizational structure:

Should I change my business model? And then what impact did it really have on the traditional model, because I am still strong on the existing markets? And then there is new market that you never thought was a market of insurance, then all of a sudden it is a market of insurance. Can we take our premium business model and run it successfully in that market? So the way we make money, the way we price, the way our systems work etcetera, can we really introduce that in the new market? If you see our (brokers based) business *model, it is very difficult being the lowest cost supplier, and at the same time a value adding, or a premium supplier in one business model. You can't, I don’t know, I haven’t seen it in any other industry.*

5.6 Innovation 5: Direct Airlines Model

In August, 2001 Comair introduced the first Low Cost Carrier (LCC) called Innovation 5. Established in 1932, for almost a century, the state owned South African Airways (SAA) was a monopoly in the country’s civil aviation industry. In 1996, Comair, which had been operating in the domestic air travel since 1946, acquired a franchisee license to operate British Airways business in South Africa, thus becoming a major rival to SAA in the domestic market. SAA and BA are known as a full-service model or premium model. In this study, these models are alternatively referred to as a network carrier or a legacy carrier.

In February, 2004, a second LCC, 1Time was launched by independent entrepreneurs. In September, 2006, the South African Airways (SAA) responded by launching the third LCC called Mango (with 51% majority share holding). Originally, the first LCC business model in the world was introduced by Southwest Airlines in 1971 in the USA (see Anon 2006; Francies, Humphreys & Aicken, 2005; Alamdari and Fagan, 2005). This case study provides bases for examining the disruptive potential of Innovation 5’s LCC relative to the leading incumbent, SAA’s premium model.

I. The RA of Innovation

The core product: The traditional full-service model value attributes comprise multiple service tiers (first class, business and economy), advanced ticketing procedures, multiple aircraft types, pre-arranged bookings, free meals, marketing and branding, interline agreements, international routes, connecting flights, use of the Global Distribution System (GDS), and code-share agreements. In comparison, the generic LCC model is configured to offer cheaper fares, direct booking, no free meals or drinks on board, non-allocated seating, higher density standard seats, and no loyalty programs (see Table 5.6).

Table 5.6: Comparison of LCC and Full-Service Value Propositions

LCC	Full-service
Cheaper fares	Premium fares
Direct booking	Intermediary agent
No free meals or drinks on board	Meals and drinks are included in the fare
Non-allocated seating	Allocated seating
Higher density standard seats	Business and economy classes
No loyalty programs	Loyalty programs

The investigation of LLC in South Africa reveals that its introduction does not only entail possible disruption to network carriers, but also probably to the long haul bus industry. The following analysis thus includes the bus industry.

Price advantage: Before the introduction of LCC in South Africa, SAA virtually dominated the domestic market. It charged about R3,000 in economy class between Johannesburg and Cape Town. Innovation 5 introduced its hybrid LCC with a cheaper price in the range of R400-R1000 for one way in the same route. In late 2006, Mango brought the fare down, offering its lowest

R200 and its maximum fare R1000[41]. As shown in Table 5.7, when we compare the September 2008 – January, 2009 fares, the premium fares (SAA and BA) are higher, on average, about 40% than all LCCs (Innovation 5, Mango and 1Time).

The table indicates that the LCCs fares are, on average, higher compared to the bus fares (except to that of the premium bus Baz Bus). But on low peak season, the LCC fares can be competitive to bus fares. For example, in March 2009, Margo's lowest fare was R485 for one-way Johannesburg to Cape Town.

Table 5.7: Fares Comparison of Different Flights and Long-Haul Bus Companies[42]

Flight fares from Johannesburg to Cape Town						*1) Bus fares from Johannesburg to Cape Town*					
Date	1Time (LCC)	BA	Innovation 5 (LCC)	Mango (LCC)	SAA	Baz Bus	City to City	Greyhound	Intercape	SARoadlink	Translux
10 Jan 2009	928	1177	913	-	1207	1200	380	450	510	399	450
29 Nov 2008	810	1564	959¹	899	976	1200	420	450	620	599	550
18 Oct 2008	876	1514	729	690	1536	1200	380	450	500	399	450

Ease-of-use advantages: LCC uses the Internet as a primary distribution channel. Travelers are able to book directly bypassing agents by using their credit cards.

[41] Adams, Sheena, (2006).
[42] Retrieved on 30 January, 2009 from http://www.southafrica.to/transport/Airlines/South-Africa-within/fli

Quality advantage: As a no-frills business model, the LCC quality proposition is generally perceived lower relative to the premium airlines. To differentiate itself from other pure low-cost competitors, Innovation 5 offers some extra quality features, which adds a level of complexity and cost to the operating model.

Brand recognition: Traditionally, brand recognition is a major component of premium carriers' value propositions. Similar to Innovation 4, Innovation 5 redirects a substantial amount of its saving to marketing and branding. The philosophy behind this is that, as one senior manager commented, in absence of travel agents advertising is the only medium to get Innovation 5's "product on the shelf" as well as to differentiate the company from other low-cost competitors.

> "*Innovation 5" is very much a retail environment, so you need your product on the shelf in order for it to sell. BA on the other hand is very much wholesale based; we still get a large percentage of our business through the travel agents, so we focus our efforts on the travel agents. So when we talk about marketing, a lot of money has been spent on building the brand (Innovation 5) to differentiate from other LCCs.*

Technology newness: A direct model is an Internet business model innovation, with nothing new for airlines about the application of Internet as a distribution channel.

When the RA of the innovation (Innovation 5) is compared with the full-service network model, it has substantial benefits in price and ease-of-use, but moderately lower in quality and brand recognition. The model can be identified as a hybrid, as one of its senior managers claims:

We lean towards a hybrid model, and the reason being is that its the way we have positioned Innovation 5 in the marketplace. We are of the belief that we positioned Innovation 5 slightly more premium than our competitors. Our customer proposition and the customer experience is invariably quite well received, which is a nice benefit to have, because what you've got is the expectation of the customer who is usually down at the bottom when booking with a low cost carrier, yet provide them with this experience that they weren't expecting, and you get really good feedback, and by word of mouth sells more tickets.

II. Low-End Market Creation

The major source of revenue for the state-monopoly incumbent SAA is international travel. In addition, it had also dominated the domestic routes of few major cities for almost a century, which have later been major battle grounds for SAA and BA after the introduction of the latter into this country. For the full-service models, the market segments are generally classified as business to business and middle and high-end leisure markets. Innovation 5 created a niche market by targeting the price-sensitive leisure market. It tapped into this market simply because this segment was already educated about the concept of flying, possessed credit cards and had access to car transport to/from the airports. The lower fares allowed price sensitive previously "flown" passengers to fly more frequently. After the transformation of the economy in 1994 with more people having disposable income, the market also attracted some of the previously "un-flown" market, probably entailing a disruptive threat to bus operators. This market would ideally fit into the direct short term insurance model customer profile, who is fairly sophisticated in terms of the concept of flying and the use of self service technology (SST) and possesses credit cards (FSM 6

& 7). The following chapter will investigate whether Innovation 5's target market motivates incumbents to respond.

Table 5.8: Cost Advantage of LCC over Full-Service Operators

LCC	Full-service (legacy carrier)
Direct distribution (no commission paid to agents)	Use of intermediaries (commission paid to agents)
No free meals or drinks on board	Meals and drinks are included in the fare
Non-allocated seating. Standard high-density seating	Allocated seating. Services tiers: first class, business and economy classes
Use of homogenous small air craft. Utilizing latest generation planes such as Boeing 737-800 that are more fuel efficient fleet and higher seat density[43].	Use of older and larger aircraft
High capacity utilization. LCCs fill approximately 80% capacity utilization out of maximum 150 seat capacity on average.	53% utilization out of maximum150 seat capacity on average.
High frequency flights. LCC can operate 12 to 15 hours a day.	Low frequency flights. Network carriers operate for an average of 8 hours a day.
Point to point domestic flights	International and transit flight
Quicker turn-around (shorter waiting times). Focus exclusively on passengers, not cargo. Passengers will need to pay for any excess baggage[44]	Longer waiting times at major airports
Low maintenance cost	Higher maintenance costs

III. Cost and Continuous Innovation Factors

Table 5.8 summarizes the comparison of cost efficiency between LCCs and legacy carriers. It shows that the LCCs low cost advantage results from the elimination of commissions paid to agents, costs of providing free meals and drinks on board and seat assignments.

The LCC model uses high density latest aircrafts, higher frequency flights, point to point short haul services, quicker turn-around (shorter waiting periods in airports) and low maintenance costs. There are three factors that may moderate the LCC's lower cost advantage. First, similar to

[43] According to one senior manager, being the latest mover of all three LCCs, Mango's aircraft are almost 30% more fuel efficient than the traditional carriers older fleets in the skies.

[44] Some LCCs offer sometime special fares to encourage passengers to fly with less weight of a luggage. One manager interviewed said that each kilogram that an aircraft travels lighter saves Mango about R40,000 a month in aviation gas costs. From 1 August 2008 to 31st August Mango Airlines offered a 10% discount voucher on their next Mango flight for passengers with less than fifteen kilograms of luggage.

the telecommunication industry, the airlines industry is characterized by high CAPEX and OPEX cost structure, perishable nature of service (cost always incur whether or not people fly) and wide fluctuation of demand and capacity. These cost drivers put pressure on incumbent airlines to use the revenue management model to lower prices to adjust demand in low demand seasons.

Second, compared to developed countries, the South African LCCs do not have the benefit of low cost advantage emanating from using a secondary airport. Major airports are expensive for LCCs because they have regulated fees on passengers service, airport tax's, landing, etc…which make them costly for LCCs. Innovation 5 is the only LCC to use Lanseria that is the only secondary airport in the country, located on the outskirts of Johannesburg.

Third, the biggest cost of LCC which makes about 50% - 60% is fuel. Worldwide, the sharp increase of oil price during 2008 had put considerable pressure on airlines cost structure requiring them to find ways to cover costs. The network carriers have been cutting some of the value added options to save costs. Whilst the LCCs that started out as pure low-cost models, have been adding up other services in order to cover costs.

The Innovation 5's experience suggests that, when an input cost is highly variable, such as the oil price, an integrated hybrid model may have a relative benefit in absorbing costs. An integrated model refers to a system that manages conflicting new and old business models in one organizational structure (O'Reilly and Tushman, 2004). Comair manages the two models in one organizational structure. It initiated a special organizational-wide program headed by senior managers to identify cost cutting opportunities across both models. By the end of 2008, the company reported that its program, driven by creativity and commitments of its employees, resulted in R100 million cost savings.[45] One of its manager argues that:

> *Its been helpful having the Innovation 5 model within our organization structure. So the full-service premium business has got these high costs and these high costs have been driven down on the Innovation 5 side. But Innovation 5 has benefited from the premium model, from its service offering around the customer proposition – the brand, and that's fed into the Innovation 5 model. So we have benefited on both sides from understanding both models.*

IV. The Constraint Factor

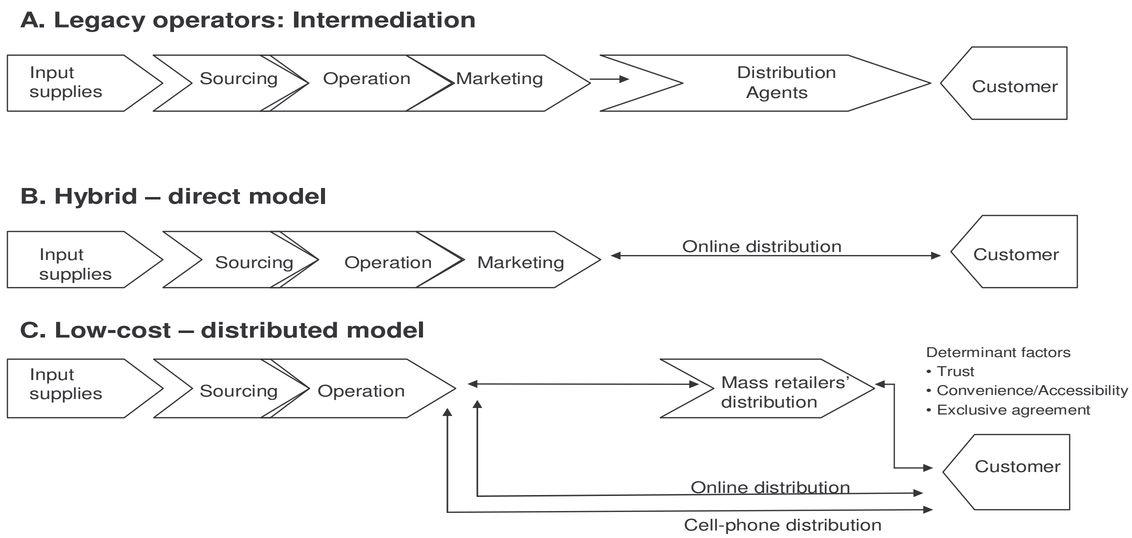
Similar to Innovation 4, Innovation 5 was introduced by an established corporation, Comair. The parent company manages the disparate models simultaneously in the existing organizational structure under one license and one management of Comair.

V. Firm-specific strategic capabilities

In South Africa, competition among the LCCs on one hand, and between the LCCs and the premium models, on the other hand, is fierce for the thin domestic market. Apparently this competition has been a key driver for advancing the LCC model in South Africa. Presently there are three types of models in the South African passenger airlines industry as shown in Figure 5.3 depicted by A, B and C.

Figure 5.3: Three Types of Airlines Business Models

[45] Comair Ltd Annual Report 2008.



At the backstage of the value chain, the core activities and processes of the three types of business models are somewhat similar. The management, crews and ground technicians perform similar activities in sourcing fuel, to fly, to ensure the safety of passengers and to manage the operations and liaise with regulators. The key differences between these three models are marketing and distribution channels.

Figure A shows the typical legacy model with emphasis on marketing and using agents to reach the final customer (intermediation). Figure B shows the direct model of Innovation 5, in which marketing plays key role in the model. It uses the Internet as a primary distribution channel. For majority of South African previously "un-flown" customers, with no credit card and access to the Internet, the direct model is not accessible.

Figure C shows the distributed model introduced by Mango (re-intermediation). Mango uses a different kind of intermediaries (mass retail outlets and cell-phone banking) in addition to its online distribution channel, to reach the mass market enabling customers to buy airfares at any of the country's largest mass retailers (Checkers/Shoprite and Edcon stores), while doing daily shopping in retail stores. In addition, by entering into agreement with one of the Big Four banks, customers can buy tickets directly via their cell-phone accounts. Mango's managers point out that for their distributed model there are three factors that are important for sustaining competitive advantage; trust, accessibility (convenience) and exclusive agreements.

- Trust: Customers have an existing trusting relationship with large well-established retailers. In these times where online fraud is prevalent, even some customers with credit card and access to the Internet would trust the face-to-face channels rather than online transactions.
- Accessibility (convenience): Customers can buy their air tickets while shopping around in malls. The physical retail outlets provide access to many people with no credit card and Internet access.
- Exclusive agreement: The critical determinant of competitive advantage for the LCC partnering with a mass retailer is to have an exclusive agreement to exclude competitors from using the same channel.

In view of this competition, an important question is how Innovation 5 should develop firm-specific strategic capabilities. The problem of managing conflicting models in one organizational structure has always been regarded as the most difficult managerial challenge (O'Reilly and Tushman, 2004; Porter, 1996).

Comair management addressed this problem by taking a number of strategic decisions: a) phased integration strategy, b) setting the boundaries of two separate strategic markets, c) setting imperative for collaboration and e) having a two CEOs managing the two models jointly.

a) Phased integration strategy: Initially, the company followed a separation strategy. Innovation 5 was created as a pure low-cost model in a completely separate structure for some years until it was proven commercially successful. Gradually the management looked for ways to integrate the two models in the back-end upstream value chain where it made sense (Markides and Charitou, 2004).

b) Setting the boundaries of two separate strategic markets: Innovation 5 primarily focuses on the low-end SMME (small and medium enterprises) and price sensitive leisure markets. BA mainly targets the high-end corporate clients and high-end leisure travelers connected via the British Airways international networks. The two models have separate brands, crew cabin, marketing and the distribution channels. While British Airways use the services of agents, Innovation 5 entirely depends on online channels and a call center. Given the different cyclical variation of demands between the business and leisure seasons, having two models in one organization protects the company against demand downturns in one market, and thus ensuring continuity of revenue streams.

c) Setting imperative for collaboration: As Innovation 5 moves from low-cost to hybrid, resembling more like BA, it has recruited top salaried marketing managers and staff to build its brand. Likewise BA marketing department strive for resources and top management attention to continue to excel in the high-end market. Comair management understood that the key for prevention infighting and conflicts in a simultaneous integration and separation strategy is setting imperatives and priorities where separated departments could collaborate, while operating independently. A weekly management meeting sets priorities and evaluates performance in operation, marketing and human resources.

e) Having two joint CEOs: The common failure of corporations that attempt to diversify into multiple markets is losing focus in main market as the result of stretching management capabilities. Comair seems to address this problem by having two joint CEOs equally responsible for the entire organization. Interviewed managers express this by saying that when one CEO is addressing the issue of BA, and the other manages Innovation 5's problems. The strategic priorities and directions they set finally integrate their decisions.

The fierce domestic competition and the generic nature of low-cost business model design makes differentiation a serious challenge for LCC competitors. While building strong Innovation 5 brand, the management believes on innovation as the only sustainable way of survival in the long term. Comair has a well-defined innovation process and formal staff motivation programs in which employees are rewarded for their creative ideas and commitments. A senior manager from the company shares his company's experience as follows:

> *The first key thing for our success is our people (employees). You cannot talk enough about the expertise that our people have got that have driven both brands (Innovation 5 and British Airways) to where they sit today. The second thing is our ethos around innovation.*

The base of people (customers) that we have got on the Internet site is in excess of 1 million. So those are people that are interacting with us more than once for our performance improvements. Its a huge success story to say that, we have got two airlines that are currently rated the best service airlines in the country.

VI. Niche Market Growth

Presently, the LCC total market share is about 25% in the passenger domestic market, with Innovation 5 holding about 14%. Within two years of its launch, Innovation 5 grew the total domestic passenger market by 10%.

VII. Incumbents' Response to Potentially Disruptive Innovation

Similar to the insurance industry case, the major incumbent in the airlines industry responded merely when the disruptive innovation hit its market. In 2006, the traditional state-monopoly airlines responded five years later after the introduction of LCC disruptive innovation in South Africa. The main "disparity" cause in the airlines case could be particularly referred to the differences in strategic market focus and market size, and asymmetric motivation. The incumbent's managers believed the thin domestic market is not big enough to be the priority of the network carrier. Referring to the small travel domestic market which is not the main strategic focus of the major incumbent, one airlines manager argued that:

Thin markets (domestic) mean that there's not a lot of traffic on that market. Now LCCs serve thin markets. Network carriers are not good at servicing thin markets. Okay? So, we needed… and that's why… one of the reasons… we always said we will launch a LCC *and we will embark on overhaul of the legacy business. Our whole overhaul plus our restructuring was part of positioning ourselves again… away from the low cost market, because we're not a low cost carrier.*

The incumbent's "entrepreneurial dilemma" encountered, probably as the result of disparity and conflict in markets, was one of the main reasons for disruption, as another manager explained as follows:

We did try to be all things to the market when the current proliferation of LCCs entered the SA market, but we could not make it work. Finally, we learned that the remedy to this was to stratify the market into the two segments and create two brands and two products designed to best fit each sector – hence the launch of the new LCC company.

5.7 Conclusions

The purpose of this chapter was to explore the conceptual framework developed in Chapter three with regard to how insurgent firms introduce a potential disruptive innovation. Through exploratory case studies, this chapter analyzed two *technological* innovations and three *market-driven business model* innovations, representing four South Africa services industries, namely telecommunications, banking, insurance and airlines.

The chapter discussed how pioneering insurgents develop their value innovation, configure new value chains and strategize to overcome constraints and capture value. The two technological innovations studied in this chapter, namely MXit and Innovation 2 introduced a typical low-cost technology that has yet to resolve many technical and functional hurdles. To overcome capital and market channel constraints, the two innovators constructed open business models where they rely for generic resources market channels on others while they focus on their core competencies; innovation. Market-driven innovations such as Innovator 4 and Innovator 5 are launched by major corporations. The constraints that have the potential to constrain these innovations are poverty, low education and lack of public and business infrastructure that provides bases for their innovation.

This chapter briefly explained how incumbents responded to these various types of potentially disruptive innovations. This chapter has provided exploratory case studies. The next two chapters will examine the disruptiveness probability of these innovations, and how incumbents responded to them based on our two conceptual models using statistical analysis.

CHAPTER SIX: DISRUPTIVE BUSINESS MODEL INNOVATION PROCESS AT A FIRM LEVEL

6.1 Introduction

To reiterate, the primary research question of this thesis is: How should organizations reinvent their business models to deal with internally or externally induced disruptive innovation? In order to examine this question empirically, chapter three proposed two conceptual models of disruptive innovation. From an entrant perspective, the first conceptual model proposes seven hypotheses that determine the evolution of a new business model in creating a potentially disruptive niche market. From an incumbent perspective, the second conceptual model again offers seven hypotheses that posit the causes of disruptive innovation, and how incumbent firms should reinvent a second business model to enable disruptive innovation. The purpose of this chapter is to conduct a first-order (system-level) empirical analysis to identify common patterns of disruptive innovation phenomena across industries based on the two conceptual models. The next chapter will present the empirical results of the second-order comparison study between *technology* vs. non-technological *market-driven* innovations.

6.2 The Entrant's Model: Creating Disruptive Niche Market

The entrant's conceptual model for creating a potentially disruptive niche market proposes the following hypotheses: Note that the seventh hypothesis (H7) that assumes a relationship between strategy and a potentially disruptive innovation is not included in the statistical analysis. This has been examined in Chapter 5 using only case studies and the qualitative outcome will be presented in this chapter in conjunction with the statistical analysis discussions.

H1: *All else assumed constant, an innovation's Relative Advantage (RA) is negatively related to "Asymmetric Motivation" (AM) during the introduction period of a potentially disruptive innovation life-cycle.*

H2: *AM is positively related to potentially disruptive niche market innovation growth (IG).*

H3: *Configuration of fundamentally different value chain is positively related to Continuous Innovation.*

H4**:** *CI is positively related to potentially disruptive niche market innovation growth (IG).*

H5: *Constraint is negatively related to a potentially disruptive innovation.*

H6: *Competition is positively related to a potentially disruptive niche market innovation.*

Table 6.1: Pearson Correlation Coefficients for Entrant's Model

N = 144, Prob > |r| under H0: Rho=0

	RA	**AM**	**VC**	**CI**	**Const**	**Comp**	**IG**
AM	-0.19**	1	-0.401***	-0.32***	-0.21**	0.12	0.10
VC	0.47***	-0.41***	1	0.71***	0.30***	0.094	0.162*
CI	0.56***	-0.33***	0.71***	1	0.10	0.15	0.31***
Const	-0.01	-0.21**	0.30***	0.10	1	-0.12	-0.47***
Comp	0.41***	0.12	0.09	0.15	-0.12	1	0.30***
IG	0.34***	0.09	0.16*	0.31***	-0.47***	0.30***	1

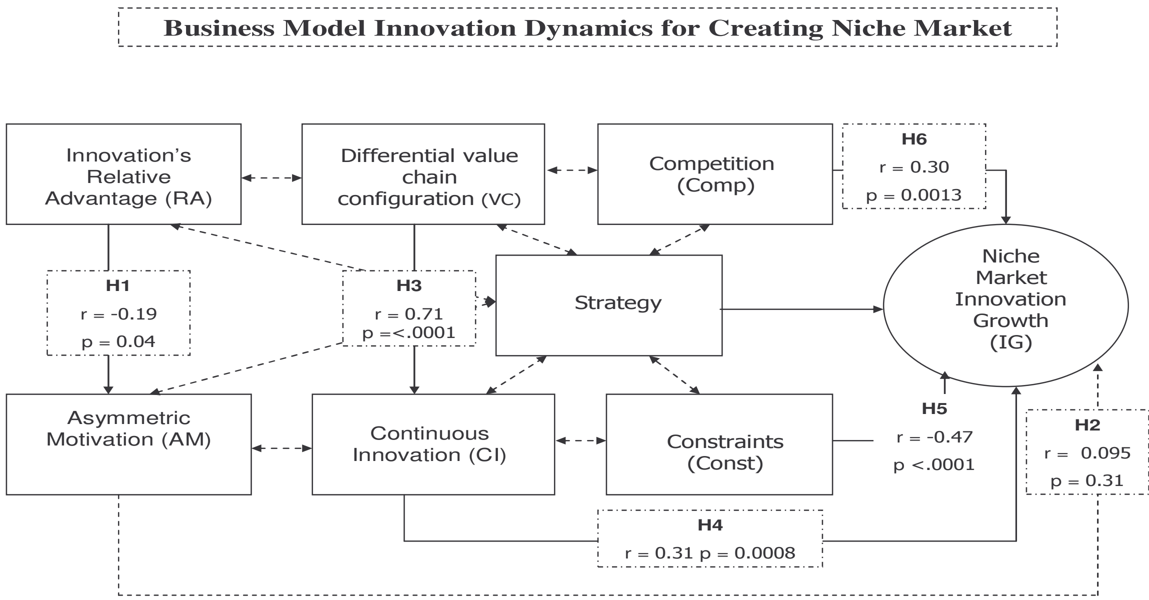
***p<.01, **p<.05, *p<.10

Table 6.1 shows the first-order aggregate results of Pearson correlation statistics for the six hypotheses that build the entrant's model. Figure 6.1 encapsulates the emerging empirical correlations between the hypothesized variables shown in Table 6.1 diagrammatically.

- H1: Consistent with the hypothesized H1, Figure 6.1 shows that RA is negatively associated AM at 5% significance level ($r=-0.19$, $p = 0.04$).
- H2: Contrary to H2, there is no significant correlation between AM and IG ($r=0.095$ $p=0.31$).
- H3: Supporting H3, there is a strong positive correlation between differential value chain (VC) and continuous innovation (CI) at 1% significance level ($r = 0.71$, $p<.0001$).
- H4: Confirming H4, CI is significantly associated with IG at 1% significance level ($r = 0.31$, $p<.0001$).
- H5: As hypothesized, there is a significant negative correlation between constraints (CONST) and IG ($r=-0.47$ $p<.0001$).
- H6: Consistent with H6, the "intensity of competition" (COMP) is positively correlated with IG at 1% significance level ($r=0.30$ $p=0.0013$).

It is worth highlighting that although the emerging Pearson intra-construct correlations are useful to infer statistically the positive or negative associations, they do not in principle predict the causal relationships between variables in a hypothesis. This study uses the PROC REG SAS 9.2 multiple regression analysis to test the causal relationships of hypotheses.

Figure 6.1: Emerging Pearson Correlation Model for the Entrant's Business Model Innovation Process



Note that H1 measure a relationship between exogenous variable RA and endogenous variable AM. Similarly, H3 assumes a relationship between exogenous variable VC and endogenous variable CI. This means that RA and VC variables do not have direct relationships with IG. IG is a function of AM, CI, Constraint and Competition variables. Understandably, we have three regression models that need to be tested. In symbolic notation these models are written as:

$$Y = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + e$$

Model 1 H1 $AM = \beta_0 + \beta_1 (RA) + e$

Model 2 H3 $CI = \beta_0 + \beta_1 (VC) + e$

Model 3 $IG = \beta_0 + \beta_1 (AM) + \beta_2 (CI) + \beta_3 (CONST) + \beta_4 (COMP) + e$

Where Y is the value of the independent variable, β_0 is the value of the intercept where X = 0, X_i is the value of the interdependent variable, 'e' is the value of errors or residuals.

First the regression analysis runs on model 1 (H1) and model 2 (H3) separately. This is because hypotheses H1 (model 1) and H3 (model 2) are analyzed as a baseline to test the theoretically established characteristics of disruptive innovation, not central contributors of innovation growth (IG). Next, we run a multiple regression analysis on model 3 to determine the effect of each independent variable (IV) on the response variable IG, holding other IVs constant (H2, H4, H5 & H6).

6.2.1 Relative Advantage (RA) and Asymmetric Motivation (AM)

H1: The PROC REG SAS 9.2 output (Table 6.2) shows that RA is negatively related to AM (β = -0.145 p = 0.0427). This result supports H1 at 5% significant level. In producing this outcome, the regression model is fit at 5% significance level (Pr > F 0.0427), with adjusted r^2= 0.0276. The latter means that the independent variable (RA) explains 2% of the variance in dependent variable (AM), which is significant to explain the relationship.

Table 6.2: Model 1 PROC REG for H1 Dependent Variable AM

Model Pr > F 0.0427, Adjusted r^2= 0.0276, Dependent Variable AM
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	13.22***	1.24318	0	0
H1: RA	-0.15**	0.07102	-0.19	1.00

***p<.01, **p<.05

Supporting H1, the first-order result suggests, that at a system (aggregated data of all firms) analysis of a firm-level study, most of the innovating firms share significant common pattern with regard to the negative relationship between Relative Advantage (RA) and Asymmetric

Motivation (AM). The result is consistent with the established disruptive innovation theory. The paradoxical concept of disruptive innovation suggests that an innovation that is perceived as negative or as having significantly lower RA by mainstream customers should create asymmetric motivation (AM) during the innovation's introduction life-cycle stage. Asymmetric motivation is created where a low-end innovation is likely to attract price-sensitive low-end or previously un-served market segments – which should be profitable to start-up innovators – but the same might not motivate incumbents to take action, or it might encourage them to flee that market in order to concentrate on the more profitable market segments (Gilbert, 2003: 32; Christensen and Raynor, 2003: 32).

6.2.2 Differential Value Chain Configuration (VC) and Continuous Innovation (CI)

H3: Table 6.3 shows that the PROC REG results strongly support H3 at 1% significance level (Pr > F <.0001). The adjusted R-square indicates that 49% (adjusted r^2= 0.4927) of variance in continuous innovation (CI) is explained by VC (configuring a different value chain). The intercept coefficient slop B of VC (independent variable) suggests that a unit change in value chain is responsible for 0.58 change in innovation performance (CI) (B = 0.58 p<.0001).

Table 6.3: Model 2 PROC REG for H3 Dependent Variable CI

Pr > F <.0001, Adjusted r^2= 0.4927, Dependent Variable CI
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	3.01***	1.17	0	0
H3: VC	0.58***	0.06	0.71	1.00

***p<.01

This positive significant regression outcome for the relationship between VC and CI (H3) is well established in business model innovation studies (Kim and Mauborgne, 1999: 85; Voelpel et. al., 2005: 27). Continuous innovation is a function of three factors: lower cost, consumer insight and speed-to-market. Initially a potentially disruptive innovator may begin by offering below standard customer value proposition (compared to similar traditional product) to low-end or previously un-served market segments (negative in overall RA). Over time, the extent to which the innovator's ability to improve the relative advantage of innovation considerably depends on creating and sustaining a new continuous innovation trajectory (Evans and Wurster, 1997: 18; Govindarajan and Gupta, 2001: 3; Holmstrom et. al., 2000: 64).

The case studies clearly provide supporting evidences for H3, as discussed in Chapter 5. They showed that all traditional value chains in the four services industries (telecommunication, banking, insurance and airlines) are characterized by high capital expenditure (CAPEX) and high operating expenditure (OPEX) cost structures. All innovator firms obtained essential cost advantage, consumer insight and speed-to-market capabilities by capitalizing on technology, such as the Internet, mobile cellular network and software to configure a direct and shorter, or a distributed and lower cost value chains that eliminated much of the CAPEX and OPEX elements.

6.2.3 Predictors of the Growth of a Potentially Disruptive Niche Market

Next we test the effects of asymmetric motivation (AM), continuous innovation (CI) constraint (CONST) and competition (COMP) factors on the growth of a potentially disruptive niche market (IG) using a multiple regression analysis, model 3: This regression model explains 0.37 variance in IG (adjusted $r^2 = 0.37$), and the model is fit at 1% level ($Pr > F < .0001$).

Table 6.4: Model 3 PROC REG for Dependent Variable IG

Pr > F <.0001, Adjusted r^2= 0.37, Dependent Variable IG

Variable	B	SE	β	VIF
Intercept	12.56***	2.58	0	0
H2: AM	0.096	0.08	0.09	1.19
H4: CI	0.39***	0.09	0.39	1.17
H5: CONST	-0.41***	0.07	-0.47	1.06
H6: COMP	0.18 **	0.08	0.18	1.07

***p<.01, p<.05

H2: Christensen and Raynor's (2003: 44) disruptive innovation model proposes that the absence of incumbents' aggressive counter-attack and a lack of motive to be concerned about the entrant at the early stage of the innovation (AM) provide a potential disruptor with necessary impetus to experiment and improve its performance in a niche market. While this assumption may hold valid in the experimentation and validation stages of disruptive innovation, Table 6.4 of model 3 shows, contrary to our hypothetical expectation, the variable AM does not seem to have significant effect on IG (B = 0.09 p=0.259). Therefore, H2 is rejected.

H4: CI is strongly related to IG at 1% significance level (B = 0.39 p<.0001). The result suggests that, from an insurgent disruptor perspective, the most important factor for creating and growing a potentially disruptive niche market is the innovator's ability to create and sustain continuous innovation, rather than the lack of retaliation from incumbents (asymmetric motivation).

H5: Table 6.4 shows that, as hypothesized, there is a strong negative association between constraint and innovation (B = -0.41 p<.0001). Complementing the statistical result, the case studies reveal that in general South Africa innovating firms face considerable constraints in their innovation processes. These include lack of R&D centres, innovation clusters, capital venture markets, strong national innovation policies, skilled labour, a vast poverty that affects affordability and lack of accessibility to innovation and to business infrastructure such as secondary airports, and in low-end population areas such as access to ATMs, branches banks and Internet."

H6: Supporting the hypothesis, competition is positively related to potentially disruptive innovation (B = 0.18 p = 0.0212). Although competition is a key driver for innovation, the five types of innovations face considerably varying degree of competition, possibly due to the nature of innovation, innovating firm's context and product-life cycle. The next chapter will further investigate this relationship at the second-order level of analysis.

6.2.4 Strategy and Disruptive Business Model Innovation

H7: Note that due to the firm- specific nature of strategic capabilities, H7 is exclusively examined using case studies compiled from, including but not limited to, open interviews with above 30 top level executives and exploratory qualitative research. Building on the resource based view (RBV) and Porter's competitive strategy theories, the preceding case studies investigated how innovating firms develop (a) internal firm-specific capabilities and (b) competitive strategy to capture and sustain value in the long term (Collis and Montgomery, 1995: 118; Amit and Shoemaker, 1993: 35; Porter, 1985: 33).

A. *Internal Firm-specific Capabilities:* In general, the five innovations are of a generic nature where open innovation designs and principles make it difficult for innovators to use any kind of intellectual property (IP) as a protection. The author finds that, regardless of differences in innovations and business models, there are three key firm-specific strategic capabilities that differentiate successful innovators from others: (a) A well-defined innovation process; (b) focus on human resources (HR) development and motivation; and (c) nurturing eco-system from the beginning.

Firstly, managers of those successful firms understand that in environments where technological and competitive drivers change the landscape constantly, developing a well-documented innovation process is vital for maintaining continuous innovation. Secondly, their focus on human development and motivation suggests that managers also understand the chain relationships between employees' competence and satisfaction on one hand, and the link between HR development and innovation and growth on the other hand (Anthony et. al., 2008: 171; Lovelock and Wirtz, 2007: 312; Govindarajan and Trimble, 2005: 149).

Thirdly, the successful firms are found to nurture a healthy ecosystem early from the beginning. Our case study of the disruptive business model in the airlines indsutry shows an interesting example of partnership between the LCC model and the country's largest mass retailers. This entrant leverages the retailer's eco-system to reach their established customer base through their existing distribution channels in the whole country. In this innovation business model, customers can book their travel while shopping in supermarkets without the need to have access to the Internet or posses credit cards. The study shows that this model works well where all partners have clear understanding, such as exclusive agreements, standard technology and ecosystem platform that provides stability for all contributors in the value chain (Chakravorti, 2004: 65; Gulati et. al., 2000: 203; Moore, 1993; 81).

B. *Competitive Strategy:* The second challenge for an innovating firm is to develop a strategy to compete and sustain competitive advantage in the long-run. Depending on the nature of innovation and firm specific competitive environment, different firms pursue different strategies. Thus, this question is more suitably examined at the second level of analysis in the next chapter.

In summarizing the entrant's model for creating and growing a potentially disruptive niche market, it can be said that asymmetric motivation does not seem to have significant effect on the disruptor's process in creating and growing a potentially disruptive niche market. Business model innovation is the result of a complex interplay between an innovating firm's internal ability to innovate continuously and exogenous constraint and competitive forces that shape the evolution of the business model. From an insurgent perspective, value innovation depends on the management's ability to change constraints and competition forces into innovation opportunity as well as finding creative ways to develop firm-specific strategic capabilities capture and sustain value in the long-run.

6.3 The Incumbent's Model: Enabling Disruptive Innovation

This section examines the impact of a potentially disruptive innovation on incumbents' traditional business models, and how incumbents strategize to deal with disruptive innovation. This section examines only the results of data from n = 88 respondents (representing 61 incumbent firms) that indicated their companies responded to disruptive innovation in different ways. The incumbent's model for enabling disruptive innovation has two parts; the causes of disruptive innovation and strategic approaches for enabling disruptive innovation. These two parts are constituted by the following seven hypotheses:

H8: *Disparity is positively related to disruptive innovation.*

H9: *The degree of conflict between disruptive and traditional business models is positively related to disruptive innovation.*

H10: *Incumbent's entrepreneurial dilemma is positively related to disruptive innovation.*

H11: *Responding to disruptive innovation in a separate SBU is positively related to incumbent's performance (IP) in enabling disruptive innovation*

H12: *Organizational separation of disruptive business model is positively related to incumbent's performance (IP) in enabling disruptive innovation.*

H13*: Senior management involvement is positively related to incumbent's performance (IP) in enabling disruptive innovation.*

H14*: An externally hired CEO is positively related to incumbent's performance (IP) in enabling disruptive innovation.*

Table 6.5 summarizes the first-order data of Pearson correlation coefficients for the variables that cause disruptive innovation (H8-H10).

Table 6.5: Pearson Correlation Coefficients for Factors that Cause Disruptive Innovation

Pearson Correlation Coefficients, N = 88 Prob > |r| under H0: Rho=0				
	Disparity	Conflict	Dilemma	DI
H8: Disparity	1	0.083	0.22***	0.17 *
H9: Conflict	0.083 0.3781	1	0.41***	0.44***
H10: Dilemma	0.22***	0.41***	1	0.78***
DI	0.16*	0.44***	0.78***	1

***p<.01, **p<.05, *p<.010

The next table (Table 6.6) presents the first-order aggregated data of Pearson correlation coefficients for H12 and H13. The independent variables of H11 and H14 are categorical variables namely, Business Model Separation and the CEO Factor. The ANOVA results for H11 and H14 will be discussed below.

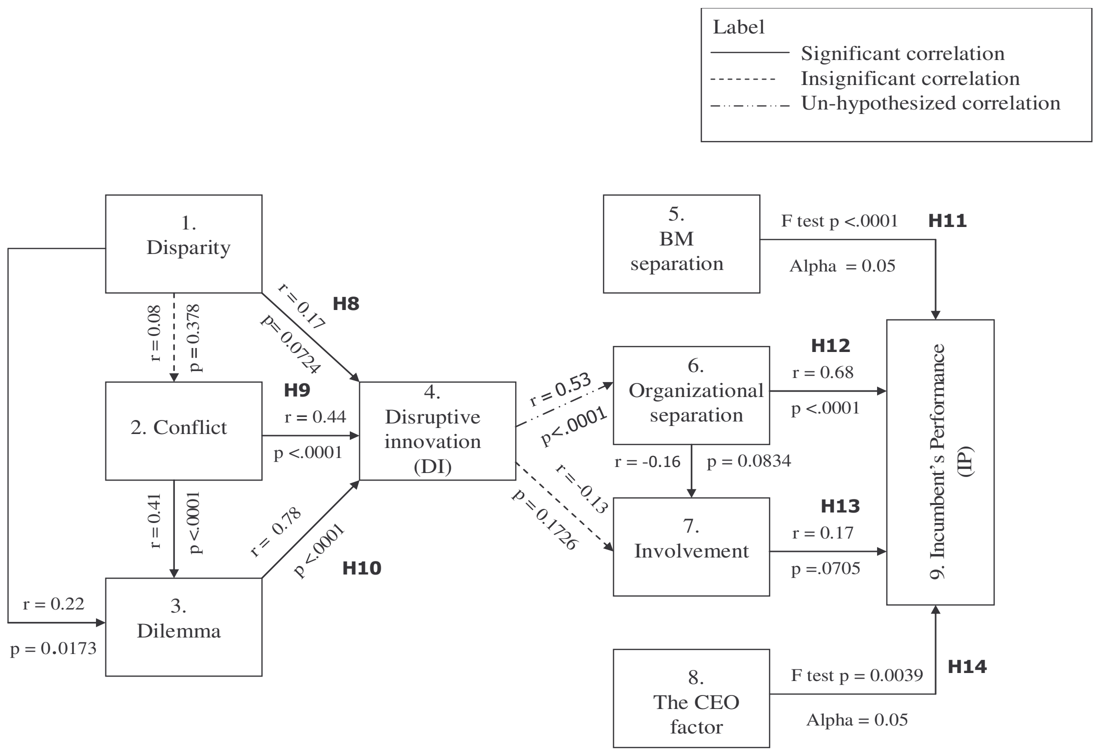
Table 6.6: Pearson Correlation Coefficients for Strategic Approaches for Enabling Disruptive Innovation

Pearson Correlation Coefficients, N = 88 Prob > |r| under H0: Rho=0			
	H12 Org_separation	H13 involvement	IP
H12: Org_ separation	1	-0.16*	0.68***
H13 Involvement	-0.16 *	1	0.17*
IP	0.68***	0.17*	1

***p<.01, **p<.05, *p<0.1

Diagrammatically, figure 6.2 below encapsulates the emerging empirical structure combining the results of Pearson correlation and ANOVA for the (a) causes of disruptive of disruption and (b) strategic approaches for enabling disruptive innovation (inputs from Table 6.5 and 6.6).

Figure 6.2: Pearson Correlation Coefficients and ANOVA results for the Incumbents Model



Causes of disruptive innovation

- H8: Figure 6.2 indicates that somewhat inadequately supporting the hypothesis, Disparity is weakly correlated with Disruptive Innovation (DI) at 10% level (r = 0.17 p = 0.07).
- H9: Confirming to hypothesis, Conflict is strongly correlated with DI at 1% significance level (r = 0.44 p<.0001).

- H10: Supporting the hypothesis, Dilemma is strongly correlated with DI at 1% significance level ($r = 0.78$ $p<.0001$).

Strategic processes for enabling disruptive innovation

- H11: The ANOVA results show that, as hypothesized, BM Separation is strongly associated with incumbents performance (IP) in enabling disruptive innovation at significance level 1% (F test = $p<.0001$ and alpha 0.05).
- H12: The Pearson Correlation Coefficient shows that, confirming to hypothesis, Organizational Separation is significantly correlated with IP ($r = 0.68$ $p<.0001$).
- H13: The Pearson Correlation Coefficient shows that, somewhat weakly supporting the hypothesis, Senior Management Involvement is poorly associated with IP at 10% significance level ($r = 0.17$ $p = 0.07$).
- H14: The ANOVA results show that, conforming to the hypothesis, the (outside hired) CEO Factor is positively associated with IP at 1% significance level (F test = $p<.0001$ and alpha 0.05).
- In addition, the emerging correlation structure shows interesting positive correlations that were not *a priori* hypothesized (see dotted arrows labeled un-hypothesized correlations) between DI and Org. Separation ($r = 0.53$ $p<.0001$). DI does not show significant correlation with Involvement ($r = -0.13$ $p = 0.1726$).

As it has been said earlier, the Pearson correlation coefficient is a necessary statistic inferential method to indicate basic correlations between variables, but it is adequate to test the hypothesis. We use the results of regression and ANOVA analysis and case studies findings to Test the causal relationships in our conceptual models. In accepting or rejecting hypotheses, we further compare the outcomes with the case studies, established theories.

6.3.1 Understanding the Causes of Disruptive Innovation

The first part of the incumbent's model assumes that disruptive innovation is a function of disparity, conflict and dilemma. The importance of this assumption in the model that incumbent firms must understand the root causes of disruption in order to find the best strategic solution to address the problem. Table 6.7 shows that the multiple regression model is fit to explain the relationships between the causes of DI and DI at 1% significance level (Pr > F <.0001), with 61% of the DV (DI) variance explained by the independent variables (Adjusted r^2= 0.6115).

Table 6.7: PROC REG for Dependent Variable DI

Pr > F <.0001, Adjusted r^2= 0.6115, Dependent Variable DI
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	0.31	0.41	0	0
H9: Disparity	-0.00	0.07	-0.00	1.05
H10: Conflict	0.15 **	0.06	0.15	1.20
H11: Dilemma	0.71***	0.06	0.72	1.25

***p<.01, **p<.05

H8: Disparity: Theoretically, a potentially disruptive innovation creates and grows a niche market in a disparate trajectory in the form of radical product, new competencies, new customers and/or new revenue model long before it directly makes inroads into an established market (Gilbert, 2003: 32). Statistically, holding other variables constant, the result shows that the independent variable (IV) "disparity" does not have significant relationship with the dependent

(D) variable “disruptive innovation (DI)” (B = 0.31247 p = 0.4438). This result rejects H8. This means that the emergence of a successful business model innovation that creates and grows a niche market in a disparate path relative to established incumbent’s business model and market does not, on its own, lead to disruptive innovation (Rafi and Kamp, 2003: 117).

H9: Conflict: This study distinguishes the notion of ‘disparity’ from the construct of ‘conflict’. Disparity is understood as incumbent’s management’s perception about an emerging or latent disruptive innovation long before it becomes partially or fully fledged disruptive innovation, or long before incumbents decide to act. It was hypothesized that the disparate trajectories between emerging disruptive innovation and established business models will cause incumbents’ managers to overlook or to ignore emerging or latent disruptive innovation that grows in a niche market, beyond their established industry and market boundaries, and this in turn will cause disruptive innovation. This is not proven at a firm level. In contrast, conflict is not a perception. It refers to real-time incongruities between the components of disruptive business model and existing business models that managers encounter, even when managers are cognizant and willing to embrace a potentially disruptive innovation (Mason and George, 1994: 163; Chandy and Tellis, 1998: 474).

Supporting H9, Table 6.7 indicates that conflict between the two disparate models has significant effect on disruptive innovation (B = 0.14922 p = 0.0220). Likewise, the case studies findings disclose that, particularly in non-technological firms such as the insurance short-term direct model and LCCs, incumbents faced real-time conflicts that could have caused considerable dilemma, which in turn allowed the disruptive innovation to make inroads into the mainstream market.

H10: Incumbent's entrepreneurial dilemma: It is hypothesized that disparity and conflict will cause managers to frame the disruptive innovation in a wrong way, to be hesitant, or simply not being able to know how to properly address a potentially disruptive innovation, which directly or indirectly allows disruptors to take the best advantage of this dilemma to rise to dominance, but the relative performance of the incumbent declines as a result of that dilemma (Christensen, 1997; Hill and Rothaermel, 2003; Paap and Katz, 2004).

The regression results (Table 6.7) shows a strong common pattern among incumbents across the four industries with regard to the relationship between incumbent's entrepreneurial dilemma and disruptive innovation among the majority of companies surveyed ($B = 0.70095$ $p<.0001$). The case studies further support this finding, revealing a positive relationship pattern between dilemma and disruptive innovation (refer to Chapter five).

6.3.2 Strategic Approaches for Enabling Disruptive Innovation

The second part of the incumbent's conceptual model posits that incumbent's performance in enabling disruptive innovation depends on creating a separate business model, creating a new organization, significant senior management involvement and hiring an outside CEO.

H11: Separation of disruptive business model: The survey captured three general categories of responses (1) a separate business unit via a new company, (2) a separate business unit in an existing company and (3) integrating the innovation in an existing business unit. The ANOVA results suggest a significant differences among the three types of response (F test p<.0001). The Tukey Studentized Range mean comparison across the three categories further shows that type 2 response yields the highest performance relative to the two types of response (at the alpha = 0.05 level). Type 3 response has the lowest performance mean (see Table 6.8). Nevertheless, the case study finding shows that strategic organizational responses to *potentially* disruptive innovation considerably vary depending on the nature of innovation and firm's context. For instance, most incumbents in the mobile industry have introduced a separate business model in an existing company structure. Most incumbents in airlines and insurance industries created a separate business model due to the high conflict between disruptive and their broker-based traditional business models. But most South African banks and MNOS have integrated mobile banking and instant mobile messaging technology without changing their traditional business models. This will be further discussed at the second-order analysis in the next chapter.

Table 6.8 ANOVA: Comparing the Mean of IP across BM Separation categories

BM_separation1 Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
2 - 1	1.2589	0.4235	2.0943	***
2 - 3	2.3231	1.4652	3.1809	***
1 - 2	-1.2589	-2.0943	-0.4235	***
1 - 3	1.0641	0.5009	1.6274	***
3 - 2	-2.3231	-3.1809	-1.4652	***
3 - 1	-1.0641	-1.6274	-0.5009	***

*** F test p<.0001

H12: Organizational separation: In the present study's survey, respondents that indicated their companies had created a separate business model to deal with disruptive innovation were further asked whether their companies created a separate company. Although the ANOVA results above show that firms that introduced a business unit within existing parent structure have achieved higher mean performance, the majority of the respondents replied their companies created separate spin-off companies. Therefore, Table 6.9 of the multiple regression analysis shows a strong positive association between organizational separation and IP (B = 0.86, p<.0001).

Table 6.9: PROC REG for Dependent Variable IP

Pr > F <.0001, Adjusted r^2= 0.5365, Dependent Variable IP

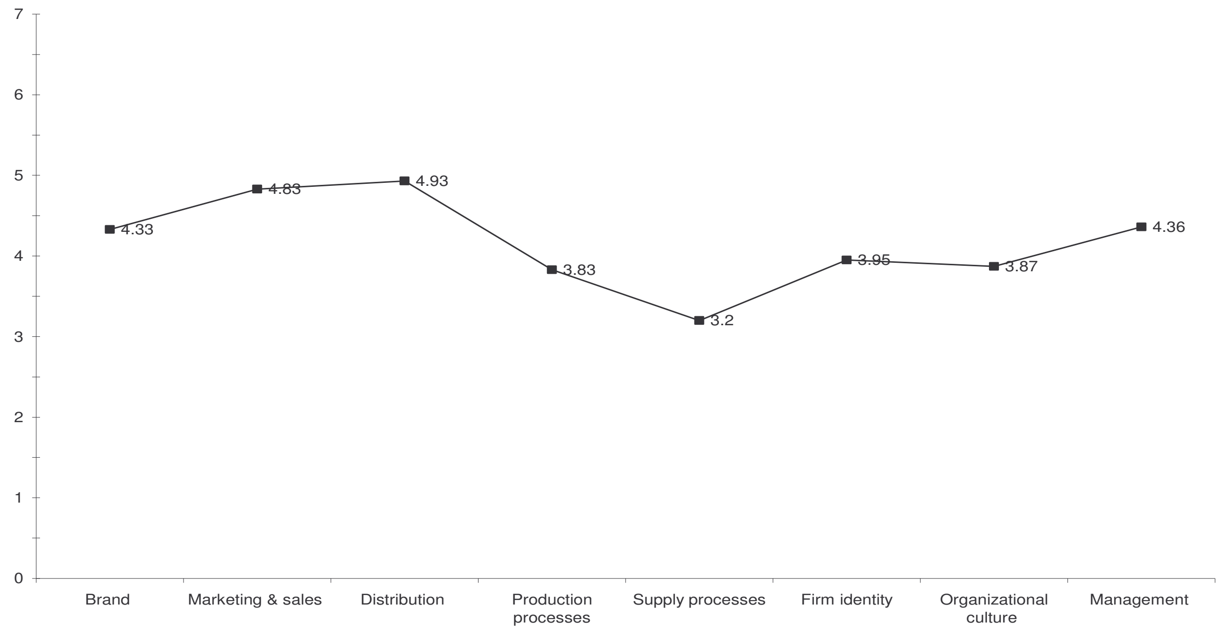
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	-1.24	0.53	0	0
H12 Org. Separation	0.86 ***	0.77	0.73	1.03
H13 Involvement	0.37***	0.08	0.29	1.03

***p<.001

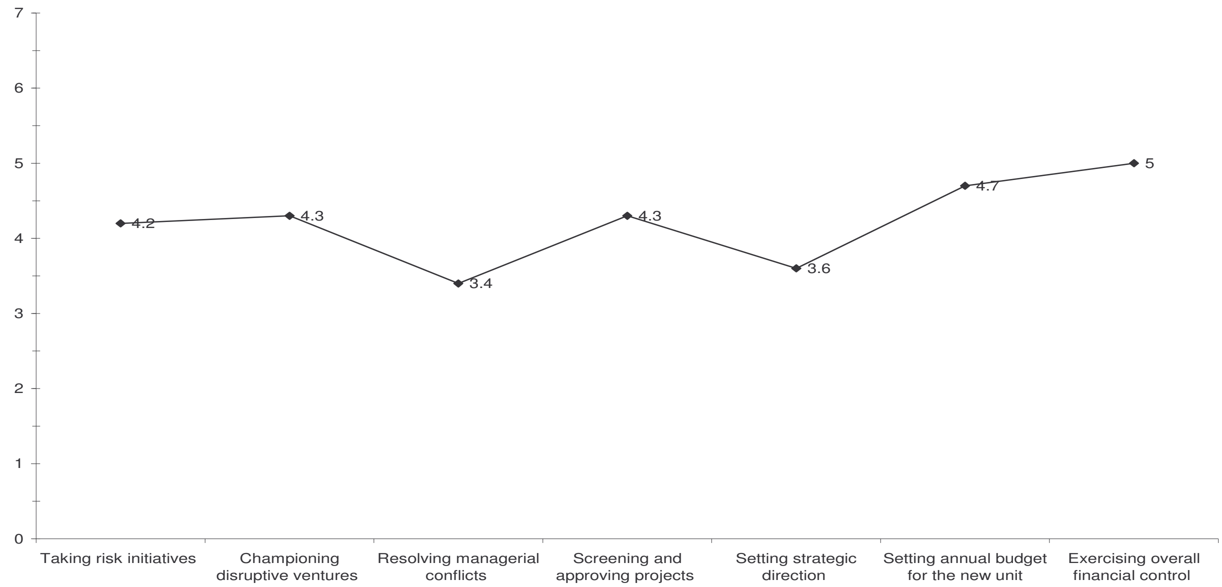
A closer look at the study results suggest that incumbents firms tend to separate the disruptive spinoff companies at the downstream value chain components including brand, marketing and sales, distribution, as well as at organizational components such as production processes, firm identity, organizational culture and management. But they seem to have some sort of integration at upstream value chain in supply processes. Figure 6.3 shows the mean values of manifest variables (MV) that construct the latent variable "Organizational Separation" in a survey of a seven-point Likert scale. Statistically the cut-off point (mean value) is 3.5. Therefore, the mean value of "supply process" is 3.2 which is below the cut-off point.

Figure 6.3 Mean Differences of MVs within the Construct of Organizational Separation



H13: Confirming the hypothesized relationship between senior management involvement and IP, Table 6.9 shows positive association at 1% significance level (B = 0.37, p<.0001). In similar fashion to the above analysis, if we scrutinize the statistical mean differences of MVs that collectively construct the latent variable "Senior Management Involvement", we see significant involvement of top management of the incumbents that launch disruptive spinoffs at major strategic levels including taking risk initiative, championing the disruptive unit, screening and approving investments, setting strategic direction and particularly exercising overall financial control. But senior managements do not seem satisfactorily involved in resolving managerial conflicts (3.4 mean score is slightly below the cut-off point).

Figure 6.4 Mean Differences of MVs within the Construct of Involvement



H14: The CEO Factor: The ANOVA analysis tests whether incumbents that assigned (1) an insider CEO or that (2) hired outside CEO have achieved higher mean of performance. Statistically, the ANOVA F test result shows a significant difference between the inside and outside hired CEO categories at 1% significant level (p =0.0039). The Tukey Studentized Range mean comparison across the two categories shows that type 2 response (outside hired CEO) yields higher performance relative to type 1 response (inside hired CEO) at the alpha = 0.05 level (see Table 6.10). However, the case study finding shows that the question of hiring inside or outside CEO depends on the firm's context. This factor will be further probed in the second-order study at a firm and innovation category level in the next chapter.

Table 6.10 ANOVA: Comparing the Mean of IP across CEO Factor categories

CEO_factor1 Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
2 - 1	0.7447	0.2443	1.2450	***
1 - 2	-0.7447	-1.2450	-0.2443	***

***p<.001

Table 6.11 below presents a summary of the hypotheses testing, findings and conclusions. The conclusions in accepting or rejecting hypothesis are reached by triangulating the statistical results with case studies and established research findings.

Table 6.11: First-Order Hypothesis Testing, Findings and Conclusions

	Hypothesis	Findings	B	Rejection/support for hypothesis
H1	RA is negatively related to AM.	There is somewhat significant negative relationship between RA and AM at 5% level.	-0.15 **	H1 is supported. at a system level.
H2	AM is positively related to GI.	AM does not seem to predict IG.	0.09	H2 is rejected.
H3	VC is positively related to CI.	There is a strong positive relationship between VC and CI.	0.58***	H3 is strongly supported.
H4	CI is positively related to GI.	CI is strongly associated with GI.	0.39***	H4 is strongly supported.
H5	Constraint is negatively related to GI.	Constraint significantly but negatively moderates disruptive niche market growth (GI).	-0.41***	H5 is strongly supported.
H6	Competition is positively related to GI.	On average, competition is a key driver of an emerging disruptive innovation (GI).	0.17**	H6 is supported.
H7	Strategy is positively related to GI.	Three common key firm-specific strategic capabilities are (a) a well-defined innovation process (b) focus on HR and (c) nurturing eco-system from the beginning.	Case study analysis	H7 is supported
H8	Disparity is positively related to DI.	Disparity does not have significant effect on DI.	0.31	H8 is rejected.
H9	Conflict is positively related to DI.	Conflict appears to cause disruptive innovation.	0.15**	H9 is supported.
H10	Dilemma is positively related to DI.	Dilemma and DI are strongly and positively correlated.	0.70***	H10 is strongly supported.
H11	Separation of business model is positively related to IP.	Separation of business model is positively related to IP.	Pr > F*** Alpha 0.05	H11 is supported.
H12	Organizational separation is positively related to IP.	There is a strong positive pattern among incumbents across industries.	0.86 ***	H12 is strongly supported.
H13	Senior management involvement is positively related to IP.	There is a strong positive pattern among incumbents across industries.	0.37***	H13 is strongly supported.
H14	Outside hired CEO is positively related to IP.	No common patterns at a system level.	Pr > F<*** Alpha 0.05	H14 is supported.

***p<.01, **P<.05, *p.1

6.4 Conclusion

The key research question of this thesis is: How should organizations reinvent their business models to deal with internally or externally induced disruptive innovation? This chapter addressed this question at a system-level (firm-level) by presenting the results of empirical analysis based on the two conceptual models. The entrant's model discusses key endogenous and exogenous factors that drive the evolution of a potentially disruptive business model innovation. The mainstream disruptive innovation literature largely focuses on the process of disruptive innovation merely from an incumbent perspective. Among the present thesis' core contributions are a more granular conceptualization of the factors that drive the growth of a potentially disruptive niche market long before the innovation infringes disruption in the main market.

The entrant's model was tested at two levels. In the first level, the two hypotheses (H1 and H3) test the disruptive phenomenon identified by this study against the theoretically established basic assumptions of disruptive innovation theory. Theoretically, disruptive innovation should create asymmetric motivation during the early innovation life-cycle. Innovators should not only discover disruptive value innovation, but also maintain continuous innovation afterwards by configuring fundamentally different value chain.

From the entrant's perspective, the empirically emergent significant, but not particularly strong, result for H1; the relationship between RA and AM may be inferred to the paradoxical nature of a potentially disruptive innovation. Initially, a potentially disruptive innovator may begin by discovering low-end customer value propositions that are significantly *negative* in overall RA compared to similar traditional product, when measured by the mainstream customers. This negative RA initially creates AM where entrants target a low-end or previously un-served market that generates low-margin that may not encourage incumbents to counter-attack. Although, this result proves the basic assumption of disruptive innovation, a caveat must follow that not all low-end innovations that emerge in low-end or previously markets that do not motivate established large incumbents' revenue models will ultimately become disruptive.

The result of H3 test asserts the basic assumption that infers innovators discover value innovation by configuring fundamentally different value chain relative to the traditional industry's value chain (H3). This new value chain configuration must meet three key factors to create a new (disparate) innovation trajectory namely, lower cost, consumer insight and speed-to-market factors. Firstly, the new value chain should yield lower cost advantage to create and deliver cheaper and easier-to-use product. Secondly, the extent to which the new value chain's inherent capabilities enables the innovating firm to generate consumer insight in order to keep improving the innovation constantly up-word, and thirdly, the extent to which it allows the innovator to take its innovation to market faster than the competition, or faster than other external changes, are critical for creating latent disruptive niche market.

The second part of the entrant's model tests the core factors that are hypothesized to effect the creation and growth of a potentially disruptive niche market. In this study, the absence of incumbent's reaction during the initial period of emerging disruptive innovation plays a significant role in stimulating a latent disruptive niche market is not empirically established. From an insurgent perspective, the most important factor for creating and growing a potentially disruptive niche market is the innovator's intrinsic ability to create and sustain continuous innovation, rather than the lack of retaliation from established incumbents. The emerging insights suggest that a potentially disruptive business model innovation is a process that evolves in a complex interplay between constant innovation, constraints and competition.

The statically strong negative relationship between constraints and innovation growth, as well as the case studies findings suggest that innovators in developing economies such as South Africa may encounter critical limitations to scale up their innovation. While constraints drive the innovation downward, it has been shown that competition, especially among the new entrants themselves, appears to have some positive effect on driving the innovation upward.

From an innovator perspective, the innovating firm's ability to acquire and develop generic and firm-specific strategic resources for scaling-up its innovation, capturing and sustaining value is critical. However, because of the open source nature of information technology innovations, and because of open principles and designs of market-driven business model innovations, pioneering firms find it difficult to utilize the use of patents or intellectual property to protect and capture the growth of their innovations. This appears to compel firms to focus on continuous innovation as the only source of survival. The case studies investigation reveals three fairly common key firm-specific strategic capabilities that differentiate successful innovators from others; a well-defined innovation process, focus on human resources (HR) development and motivation, and nurturing eco-system from the beginning.

This chapter discusses the incumbent's model in two parts. The first part emphasizes that understanding the causes and processes of disruptive innovation is fundamental for developing strategic approaches to enable disruptive innovation. The second part conceptualizes major hypothetical strategic processes for enabling disruptive innovation.

In the first part, it was hypothesized that disruptive innovation was a function of three factors; disparity, conflict and dilemma. A potentially disruptive innovation may evolve in a disparate trajectory in the form of radical product, new competencies, new customers and/or new revenue model long before it directly invades an established market. But this disparity does not seem to have significant effect on causing disruptive innovation. The statistical result reveals that conflict between the two disparate models, in a causal play with the dilemma factor, has a significant effect on disruptive innovation. The managerial implication of this finding is that incumbent senior management's competency and readiness in absorbing the dilemma and finding creative ways to prevent conflict can considerably mitigate a dire consequence of disruptive innovation.

In the second part, it was hypothesized that incumbent's performance in enabling disruptive innovation depends on creating a separate business model, creating a new organization, significant senior management involvement and hiring outside CEO. At a system level, the finding of this study shows that creating a separate business model and hiring outside CEO have positive effects on the incumbent's performance in enabling disruptive innovation. However, this will be more appropriately investigated at the second order analysis by disaggregating the data into dichotomous innovation categories in the next chapter.

The finding of this study suggests that there are two shared strategic approaches that most incumbents across industries seem to follow in dealing with disruptive innovation. First, when established organizations decide to respond to a disruptive innovation, they are likely to create a separate business unit. A closer look of this strategy shows significant separation at the lower stream of the value chain in terms of brand, marketing and sales, and organizational elements such us identity, culture and management, there appears to be some weak structural linkages specifically at the upstream supply chains. This may suggest that there is some sort of sharing or integration at a system level, if the integration makes sense without compromising the effectiveness of the disruptive company. The second common factor observed in most companies is a significant level of senior management involvement in disruptive units or companies at higher strategic levels.

CHAPTER SEVEN: TECHNOLOGICAL VS. MARKET-DRIVEN INNOVATIONS

7.1 Introduction

The purpose of this chapter is to investigate the differences or similarities between *technological* and *market-driven business model* innovations utilizing the same entrant's and incumbent's conceptual models. The total number of observation is 114, divided equally into 57 technology and 57 business model observations. A moderated regression analysis tests whether the hypothesized relationships between the independent and dependent variables vary depending whether the innovation is technological or non-technological. In general, moderation effects can be examined in two ways: either as moderating the 'form' or 'strength' of the hypothesized relationships (Venkatraman, 1989: 426). This study examines the 'strength' of the hypothesized relationships using subgroup analysis. The assumptions underlying subgroup analysis in the second-order study of the current dissertation is that, using the moderation method, the predictive ability of independent variables differs across the two categories of innovation.

To get a standardized solution, the business model innovation category is set as a dummy variable (-1) representing a reference category, while the technology innovation category represents an effect coding variable (1). In the moderated regression analysis, we reject the null hypothesis that the two categories are the same (no direct effect of moderator variables) when the p-value of the interaction's slop coefficients (β) is 0.01, 0.05 and marginally 0.10. In addition, the interaction slopes are presented graphically to visualize the effects of the moderator variables (Lee, 2008: 242; Kline, 2005: 146; Oczkowski, 2003). In the following section, first H1 and H3 are analyzed by conducting a single moderated regression to test the basic disruptive innovation theory assumption, not as main predictors of (potential disruptive) niche market innovation growth (IG). Next, H2, H4, H5 and H6 are run in a collectively in multiple regression analysis as principal predictors of the response variable, niche market innovation growth (IG).

7.2 Entrant's Model: Disruptive Business Model Evolution

H1: ***The relationship between Relative Advantage (RA) and Asymmetric Motivation (AM) will vary across the two types of innovation.***

Table 7.1 shows that the standardized interaction coefficient slop has marginally significant negative effect on the hypothesized relationships H1 (CATEGORYxRA B = -0.11, $p<0.1$). In addition, the t-test result shows a marginally significant difference between the means of the dependent variables (AM) of the sample groups ($p<.01$).

Table 7.1: PROC REG Tech vs. BM H1: RA - AM

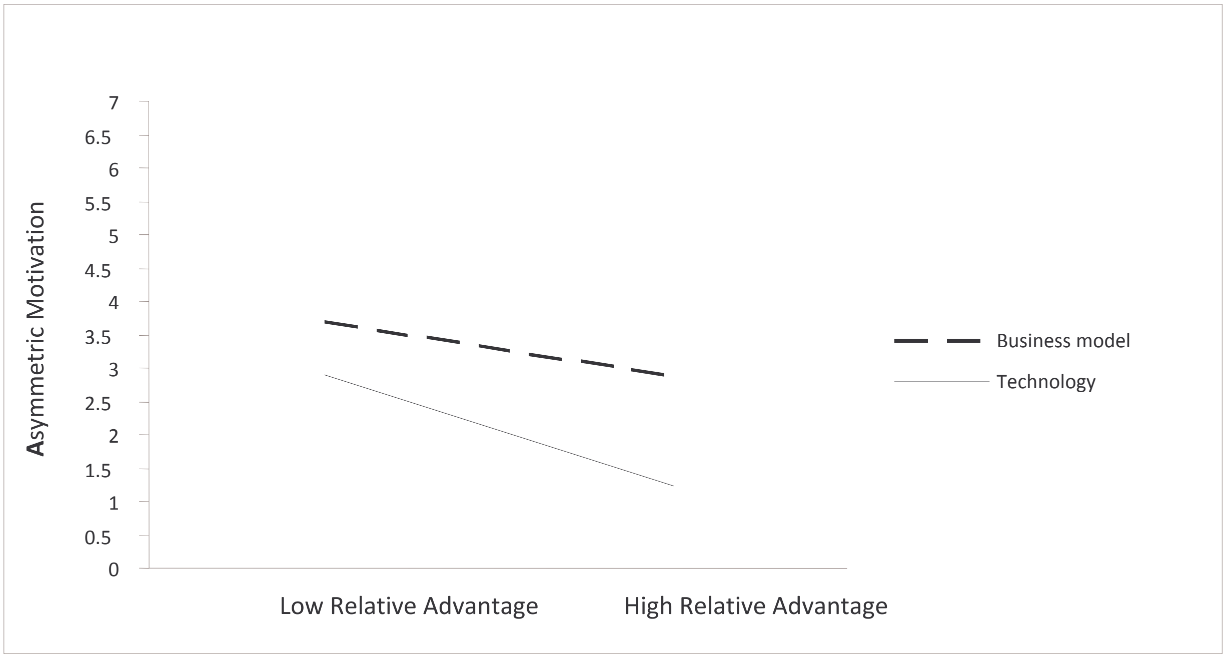
Pr > F <.0001, Adjusted r^2= 0.41, Pr > ChiSq 0.0015,
Dependent Variable AM
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	2.68***	0.07	0	0
H1: C_CATEGORY	-0.60***	0.07	-0.63	1.0
H1: C_RA	-0.31***	0.07	-0.33	1.1
H1: CATEGORYxRA	-0.11*	0.07	-0.11	1.0

*** p<0001, *p<0.1

Figure 7.1 displays the graphical representation of the coefficient slops of the interaction and moderator for the relationship between independent variable (IV) Relative Advantage (RA) and dependent variable (DV) Asymmetric Motivation (AM). It shows the negative effect of RA is significant on AM for the technology, but somewhat insignificant for the business model.

Figure 7.1: Difference between Technology & Business Model in RA & AM[46]



Corroborating the statistical results, we have seen in the case studies that technological innovations are typically pure low-cost innovations that emerge in markets that may not attract large incumbent's attention at least in the innovation's introduction life-cycle stages. But perhaps due to the country's specific market dynamics in the airlines and insurance industries, the experiences of Innovation 5 and Innovation 4 demonstrated that disruptors that began with a low-cost business models moved upward instantly into hybrid models.

[46] The interaction effect graph is plotted by entering the slope coefficients of (a) the intercept, (b) IV, (c) moderator and (d) interaction in a given excel worksheet. First, the categorical innovation (moderators) are assigned values as Technology = 1 and business model = -1. Second, the worksheet has a given formula that calculates the values of these variables, and that plots the moderator and interaction slopes on a graph. For example, the Business Model (low level of moderator -1) is calculated by the following formula: (Intercept = IV slope) x (IV low score + Moderator slope) x (Moderator low score + Interaction slope) x (IV low score x Moderator low score). For instance, for Figure 7.1 (Difference between Technology and Business Model in RA & AM) the calculation for the BM slope is made as follows: (2.68 + 0.31) x (-2 + 0.60) x (-1 + 0.11) x (-2 x -1).

H2: ***The effect of Asymmetric Motivation (AM) on Innovation Growth (IG) will vary across the two types of innovation.***

Differing with the second-order hypothesis, there is no statistically significant different between the two groups of innovation on the hypothesized relationship (see Table 7.12 below).

H3: The relationship between Value Chain Configuration (VC) and Continuous Innovation (CI) will vary across the types of innovation.

Contrary to the second-order hypothesis (H3), the interaction coefficient slop does not show a significant statistical difference between the two types of innovations (see Table 7.12 below)

H4: The effect of Continuous Innovation (CI) on Innovation Growth (IG) will vary across the two types of innovation.

This hypothesis is rejected failing to show a significant statistical difference between the two groups of innovation (see Table 7.12). However, although the statistical results show no statistically significant difference on the effect of continuous innovation on firm's innovation growth, in the previous case study chapter we observe that technological and non-technological innovators differ in the way they configure innovative value chains and, accordingly how they pursue value innovation. Most market-driven innovators capitalize on direct models. A direct firm performs most of the value creation activities inside and controls its own distribution channels. In non-technological environments such as the insurance and airlines industries, this permits the innovator to interact directly with consumers and control the downstream process of getting its innovation to market.

In contrast, technology innovators configure a distributed value chain. A firm with a distributed model focuses on performing one or few core activities in the value chain, and partners with other firms that perform the rest of the activities in the value chain. In technological environments, this model has the best advantage in getting the innovation to market faster compared to fully integrated traditional corporations that control all the chain linkages of innovation processes from the research and development (R&D) center to distribution channels (Chesbrough, 2006).

H5: ***The effect of Constraint on Innovation Growth (IG) will vary across the two types of innovation.***

Rejecting the second-order hypothesis, there is no significant difference between technology and business model innovations with respect to this hypothesis. Yet again, although the statistics show no significant difference between technology and business model innovations, a closer qualitative investigation of the case studies demonstrate that the two types of innovating firms face considerably different nature of problems. Typically, emerging disruptive technological innovations such as the V-mobile are significantly confined in terms of compatibility with existing complementary technologies, and inherent technical and functional limitations. Dewar and Dutton (1986: 1422) observed that radial or disruptive technological innovations evolve through a period of technological ferment until a dominant standard emerged.

Moreover, the finding of the present study suggests that start-up technological disruptors that launch a potentially disruptive innovation are less likely to be backed by major investors probably due to uncertain markets during the early disruptive innovation life-cycle. Particularly, this is more evident in South Africa where there seems to be no robust innovation policies and capital venture market to support start-up innovators. Interestingly, we find that technological innovators seem to partner with established companies that own major brands and distributions channels to take their innovation to market. Therefore, they adopt a distributed model as a means to overcome resource constraints. The disadvantage of this model is that the innovators compromise the opportunity to learn first-hand from final users.

Conversely, we observe that most market-driven innovations appear to encounter developing economies' specific market related problems, for instance, lack of customer affordability and accessibility to modern innovations. However, due to massive investment requirements to create and develop new companies in non-technological industries such as insurance and airlines, and subsequently the major backing needed for uninterrupted investment in human resources, branding and marketing, we find that disruptive market-driven companies are launched by major established companies.

H6: ***The effect of Competition on Innovation Growth (IG) will vary across the two types of innovation.***

Confirming this hypothesis, Table 7.2 indicates that competition has a positive effect on innovation growth (IG) for the business model, but not for technology (H6: C_COMP $\beta = 0.24$, $p<0.01$). The t-test result of the difference between the means of dependent variables (IG) of the two sample groups supports the regression outcome at 5% significance level. As can be seen in Figure 7.2, there are remarkably strong positive effect of competition on innovation growth for the business model, but not at all for the technology group.

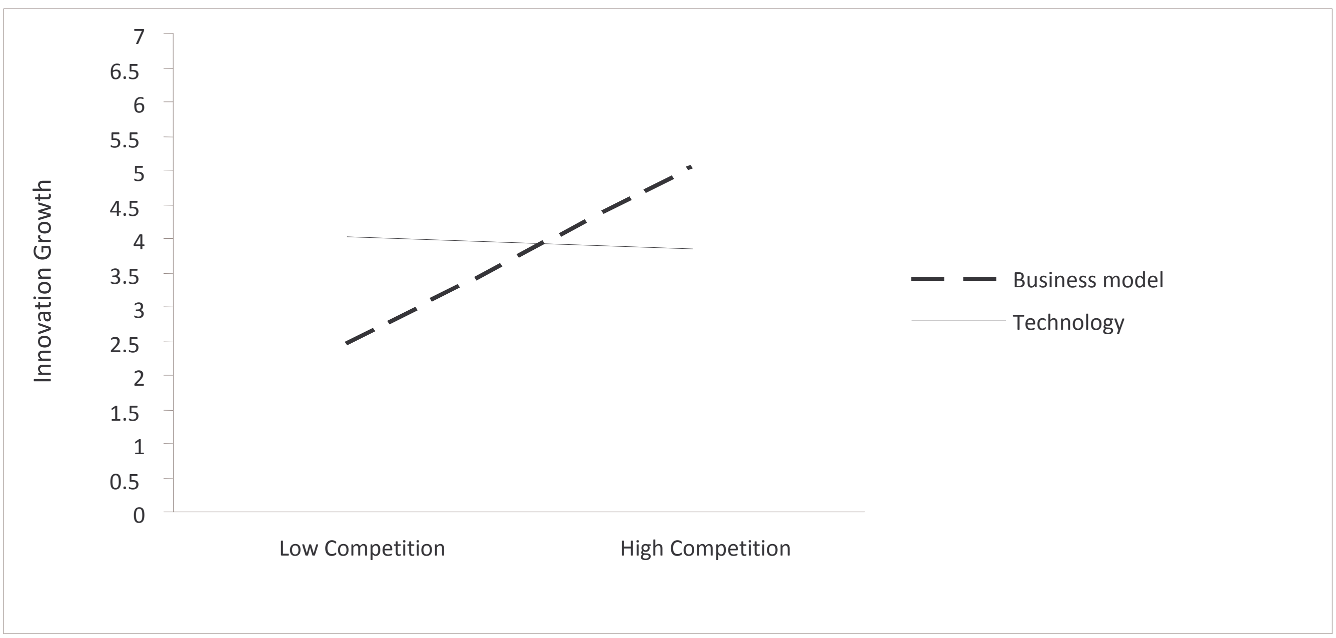
Table 7.2: PROC REG Tech vs. BM H6: COMP - IG

Pr > F <.0001, Adjusted r^2= 0.48, Pr > ChiSq 0.3408, Dependent Variable AM
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	3.85***	0.11	0	0
H6: C_CATEGORY	0.09	0.14	0.07	2.27
H2: C_AM	0.13	0.13	0.10	1.83
H4: C_CI	0.33 ***	0.09	0.30	1.27
H5: C_CONST	-0.68***	0.11	-0.46	1.19
H6: C_COMP	0.22**	0.09	0.22	1.67
H6: CATEGORYxCOMP	-0.24***	0.09	-0.2	1.22

***p<0.01, **p<..05

Figure 7.2: Difference between Technology & Business Model in Competition & GI



The case studies insights support the survey result depicted in Figure 7.2. It has been observed that start-up disruptive technological innovators are relatively more driven by *technology-push* factors rather than by competitive forces, for instance, relying on community of experts through open sources or via user interaction in exclusive web channels. The founder and executive director of MXit, a technology start-up company said this:

> *You know one of our slogans is that "WE DO NOT COMPETE, WE CREATE[47]." So we look at the landscape quite differently to many other companies. I think in the history of MXit, its very young; its only three years old, we've really only once looked at what our competitors need and made a small adjustment to our software – only once. The rest of the time we have got our vision and that is to get 200 million users as soon as possible and to build a lifestyle company around that. So what our competitors do is almost like we don't care. We have got enough creativity I think, and coming from our user base to create something that will be very desirable.*

Although competition may surface at a later stage of the technology life-cycle, at present the core purpose is to address technical and functional challenges. Supporting our finding, some scholars earlier observed that intense competition is less likely to emerge in uncertain markets until a dominant technological design emerges that provides stable platform for competition (Gatignon, Tushman, Smith & Anderson, 2004: 1107; Roberson, 1967: 15).

In the non-technological environments, innovating firms face a varying degree of competition intensity that is contingent to the nature of innovation, innovation life-cycle and a firm's context. Some disruptors in industries such as the insurance and airlines are characterized by intense competition possibly due to the small size of the domestic middle-market. The historical wide

[47] This slogan appears in the company's website as "Our philosophy: We don't compete, we create" http://www.mxitlifestyle.com/about-us.

disparities in fiscal capacity among the population in South Africa seem to delimit the competition among disruptors in the rather thinner middle market, compared to developed economies that are characterized relatively by narrower gap in economic structure.

Even though competition is certainly important to drive the growth of an emerging disruptive niche market, the qualitative study outcomes suggest that due to lack of clear and strong government's competition policies, coupled with the globalization and deregulation, the existing fierce competition will probably have strong erosion effect on the disruptors business model in later growth or mature stages of disruption innovations.

The case studies provide evidences to corroborate the above argument. Despite its huge potential for extending banking to the previously un-banked market segments, the cell-phone banking has been increasingly moved to the middle market due to problems of low-end consumer affordability, accessibility and lack of education in terms self-service technology and customer value concept. Similarly, the LCCs have struggled to extend travel services to the previously un-flown customers due to customer accessibility problems such as credit card and Internet.

Expressing the concern around the lack of well-informed regulations and dynamic competition policies in the airlines industry, another manager commented as follows:

> *What we would like to challenge the industry bodies in general is that you have got two problems; there is no barrier of entry into the airline industry. I could start-up an airline tomorrow without buying an airplane. I can sell tickets for six months and get the cash in*

the bank and then start operating. There is no protection for the consumer, and that is one of the problems we have. So barrier to entry in terms of regulations should be resolved. And that, in itself, will protect those carriers that are currently operating and help them grow. We have seen airlines that start and fail in this country, purely because they haven't been managed properly. And who usually loses? The consumer.

The second part of it is that there is most certainly unfair bias (of competition) towards large corporations and government owned bodies. The large companies or state owned monopolies were required by the competition law to separate legally their spinoffs companies, but (we) don't for one minute believe they are. In our minds they are still been driven largely by their parent companies (taking unfair advantage).

H7: ***The relationship between strategy and innovation growth (IG) will vary across the two types of innovation.***

The above analysis convincingly suggest that in highly competitive and relatively small size markets such as South Africa, the need to strategize is not only vital to maximize revenues but also to overcome innovation challenges and constraints. In order to explore the uniqueness of individual firm strategy, the seventh hypothesis (H7) with respect to the relationship between strategy and a disruptor's firm growth, is investigated using the case studies approach.

In the previous chapter we saw that successful innovators have three strategic components in common at a system-level; (a) a well-defined innovation process (b) focus on human resources (HR) (development and motivation), and (c) nurturing eco-system from the beginning. Having these qualities in common among all successful innovating firms, there are three key dissimilarities between technological and business model innovators with regard to strategy, as summarized in Table 7.3.

Table 7.3: Differences between Technological and Business Model Innovations in Strategy

Bases of distinctions	Technological innovation	Business model innovations
1. Locus of innovation	Product innovations	Process and market innovations
2. Firm-specific strategic capabilities	- First mover advantage - Network economies of scale	- Hybrid models: building strong brand and building strategic positioning - Low-cost models: developing competencies aimed at cost minimization and increasing volume
3. Competitive strategy	- Emergent strategy - Technology-push	- A forward-looking strategy - Competitive drive

1) Locus of innovation. Firms with technological innovations focus on product improvement, for instance, continuous innovation of successive versions of software or information technology products. In contrast, firms with market-driven business model innovations primarily concentrate on process and market innovations.

2) Firm-specific strategic capabilities: In both types of innovations, the prevalent open access to Internet-based information technologies and the generic nature of designs and principles of direct business models make it difficult for innovating firms to protect their innovation using codified knowledge and Intellectual Property (IP). Two components that seem to be critical for value capture and sustainability in technological innovations are *first mover advantage* and *network economies of scale*. Information technology (IT) innovations, such as instant mobile messenger and V-mobile, seem to possess the characteristics of high velocity globalization and network economies of scale that can be achieved through remote terminals, breaking down time and

space barriers, although these innovations have still to resolve some technical and resources problems (Evans and Wurster, 1997: 14).

With market-driven business models, such as airlines, banking and insurance, it may require massive investments to achieve world-scale mass production, global reach and economies of scale, probably because offering these services require physical presence where production and consumption takes simultaneously. For capturing value, hybrid firms emphasize heavily on building a brand and building a strategic position around their brands. Low-cost firms with market-driven business models focus on either minimizing cost and/or increasing volume through innovative distribution channels.

c) Competitive strategy: Pioneering technological companies did not seem to have a clear idea about strategy when developing their innovations. A technological firm seems to be driven more by technology-push (internal motives) rather than by competitive pressures. An innovator start-up begins by developing a technology and proceeds to develop a business model, with less regard to strategy in the initial stage. In due course, strategy *emerges* as the innovator begins to face competition (Magretta, 2002: 92; Mintzberg, 1994: 111).

On the other hand, firms with market-driven business model innovations seem to have clearly thought about their strategy when they develop their innovations. It is a *forward-looking* (planned) strategy development process, although in reality the original strategy changes tremendously. Perhaps this is because most of disruptive market-driven business model innovations emerge when a once radical or disruptive technology matures, and competition through business model reinvention becomes a new avenue of growth. Thus, because firms with non -technological market-driven business model innovations introduce their innovations in mature industry structure, they may have the opportunity to analyze the existing industry forces and formulate a strategic position from the beginning (Shafer et. al., 2005: 203; Moore, 2004: 88; Porter, 1985: 32).

7.3 Incumbent's Model: Enabling Disruptive Business Model Innovation

Stressing the present study principle that the emergence of a potentially disruptive niche market does not, by its very nature, lead to disruptive innovation, this section examines, from the incumbent's perspective, the moderating effects of the dichotomous innovation categories on all hypothetical factors that are assumed to cause disruptive innovation, and on hypothetical enabling determinants for disruptive innovation in the varying contexts of technology and non-technological environments. The incumbent's conceptual model hypothesizes that disruptive innovation is the function of (H8) disparity, (H9) conflict and (H10) incumbent's entrepreneurial dilemma.

H8: ***The effect of Disparity on Disruptive Innovation (DI) will vary across the two types of innovation.***

Consistent with the firm-level findings in Chapter six, the moderated regression shows no significant relationship between the disparity and DI on both types of innovation. Thus rejecting the second-order hypothesis, there is no significant difference between the dichotomous innovations on this particular relationship, holding other factors constant (see Table 7.4 CATEGORY B = -0.03263).

Table 7.4: PROC REG Tech vs. BM H8: DISP - DI

Pr > F <.0001, Adjusted r^2= 0.6061, Pr > ChiSq 0.2167 , Dependent Variable DI
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	3.66***	0.07	0	0
C_CATEGORY	0.14*	0.08	0.13	1.35
C_DISPARITY	-0.02	0.07	-0.02	1.08
C_CONFLICT	0.14**	0.07	0.14	1.28
C_DILLEMA	0.75***	0.07	0.76	1.68
CATEGORYxDISPARITY	-0.033	0.07	-0.03	1.14

***p<.01, **p<.05, * p<.10

H9: ***The effect of Conflict on Disruptive Innovation will vary across the two types of innovation.***

Similarly, the results of aggregated first-order will be maintained. There is no statistically relevant difference between the two types of innovation with respect to the effect of conflict on disruptive innovation (see Table 7.5. CATEGORYxCONFLICT B = -0.06).

Table 7.5: PROC REG Tech vs. BM H9: CONF - DI

Pr > F <.0001, Adjusted r^2 = 0.6081, Pr > ChiSq 0.3301, Dependent Variable DI
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	3.64***	0.072	0	0
C_CATEGORY	0.13	0.083	0.11	1.38
C_DISPARITY	-0.03	0.07	-0.03	1.14
C_CONFLICT	0.16*	0.06	0.16	1.24
C_DILLEMA	0.72***	0.08	0.74	1.96
CATEGORYxCONFLICT	-0.06	0.068	-0.06	1.32

***p<.01, **p<.05, * p<.10

H10: ***The effect of Dilemma on Disruptive Innovation (DI) will vary across the two types of innovation.***

Consistent with the results at firm level in Chapter six, the results indicate a strong positive correlation between the dilemma factor and disruptive innovation in both types of innovation. Rejecting the second-order hypothesis, the moderated regression result shows no significant statistical difference on the direction of the hypothesized relationships between the dichotomous innovations (see Table 7.6 CATEGORY x DILLEMA B = 0.11).

Table 7.6: PROC REG Tech vs. BM H9: DILLEMA - DI

Pr > F <.0001, Adjusted r^2 = 0.6086, Pr > ChiSq 0.1303, Dependent Variable DI
Parameter Estimates

Variable	Parameter Estimate	SE	β	VIF
Intercept	3.73***	0.09	0	0
C_CATEGORY	0.20**	0.09	0.17	1.94
C_DISPARITY	-0.01	0.07	-0.01	1.09
C_CONFLICT	0.16**	0.06	0.16	1.27
C_DILLEMA	0.83***	0.11	0.85	3.94
CATEGORYxDILLEMA	0.11	0.13	0.09	3.16

***p<.01, **p<.05, * p<.10

With respect to the causes of disruptive innovation, we see that predictor variable disparity seems to have no significant effect on disruptive innovation on both types of innovation. In contrast, the predictor variables conflict and dilemma have significant impact on DI on both types of innovation. But the interaction effect coefficient slops do not reveal any statistically significant differences on the effects of these three factors on disruptive innovation between the two groups of innovation. Across the two types of innovation, the statistical results suggest that the higher the dilemma the higher the impact of disruptive innovation on incumbent's business model. Alternatively the lower the dilemma incumbents managers face, the lower the disruptive impact.

However, although the moderation regression analysis could not capture the differences, the case studies findings reveal interesting differences between high-tech and low-tech incumbents in the way they were affected by disruptive innovation.

Table 7.7: Time Lags in Organizational Responses to Potentially Disruptive Innovations

Innovation	Year of introduction	Respondent incumbents	Year of response	Time lags in response (years)	Type of organizational response
HD insurance model	1998	The largest short-term insurance corporation in SA	2008	10	Second business model via new company
HD airlines model	2001	The largest airlines corporation in SA	2006	5	Second business model via new company
IMS – MXit	2005	Two largest MNOs in SA	2007	2	Integration
Mobile VoIP	2006	The largest MNO in SA	2008	2	Second business model in existing organizational structure
M- banking	2005	1. One major bank 2. All the "Big Four" banks	2005	0	1. Second business model via new company 2. Integration

Table 7.7 reveals different time lags in response to potentially disruptive innovations in the four industries. From this table it can be seen that the time lags to respond to disruptive innovation taken by low-tech incumbents affected by disruptive market-driven hybrid models (10 and 5 years) are much longer compared to incumbents facing potentially disruptive technologies (only 2 years). (We exclude the mobile banking since it has not affected banks which have easily

integrated it). This may suggest that low-tech incumbents faced relatively higher degree of dilemma, and therefore the disruptive effect was relatively higher. On the other hand, high-tech firms appear to mitigate the dilemma and resolve the conflict by taking appropriate strategic response to deal with disruptive innovation. Therefore, the disruptive effect was relatively lower. This study finds suggest that technological firms tend to have the skills to anticipate and to be entrepreneurial to disruptive technological innovation compared to firms facing non-technological disruptive innovation. Next, we conduct the investigation to explore the strategic approaches incumbents used to respond to disruptive innovation. The next hypotheses test the interaction effect on the variables that predict an incumbent's performance in enabling disruptive innovation. It is hypothesized that incumbent's performance (IP) is a function of business model separation, organization isolation, senior management involvement and the outside CEO factor.

H11: ***The effect of Business Model Separation on Incumbent's Performance (IP) will vary across the two types of innovation.***

Table 7.8: PROC REG Tech vs. BM H8: BM SEP - IP

Pr > F <.0001, Adjusted r^2= 0.57, Pr > ChiSq 0.0.0424, Dependent Variable IP
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	4.23***	0.11	0	0
C_CATEGORY	0.26**	0.13	0.19	2.44
C_BM_SEPARATION1	0.02	0.10	0.03	5.13
C_ORG_SEPARATION	0.87***	0.10	0.73	1.88
C_INVOLVEMENT	0.23***	0.09	0.22	1.39
C_CEO_FACTOR1	0.00	0.07	0.01	2.52
CATEGORYxBM_SEPARATION1	0.17***	0.06	0.18	1.12

***p<.01, **p<.05

Proving the second-level hypothesis, Table 7.8 indicates that the interaction statistic difference test between the two innovations with regard to the relationship between business model (BM) separation and IP shows significant statistical difference (Table 7.8: CATEGORYxBM_SEPARATION1 B = 0.17, p<0.01).

Figure 7.3 shows quite opposite relationships between the BM separation and IP across the two categories of innovation. While there seems to be a slightly positive correlation between BM separation and IP in Technology, there is an opposite down word negative slop in market-driven Business Model.

Figure 7.3: Difference between Technology & Business Model in BM. SEP. & IP

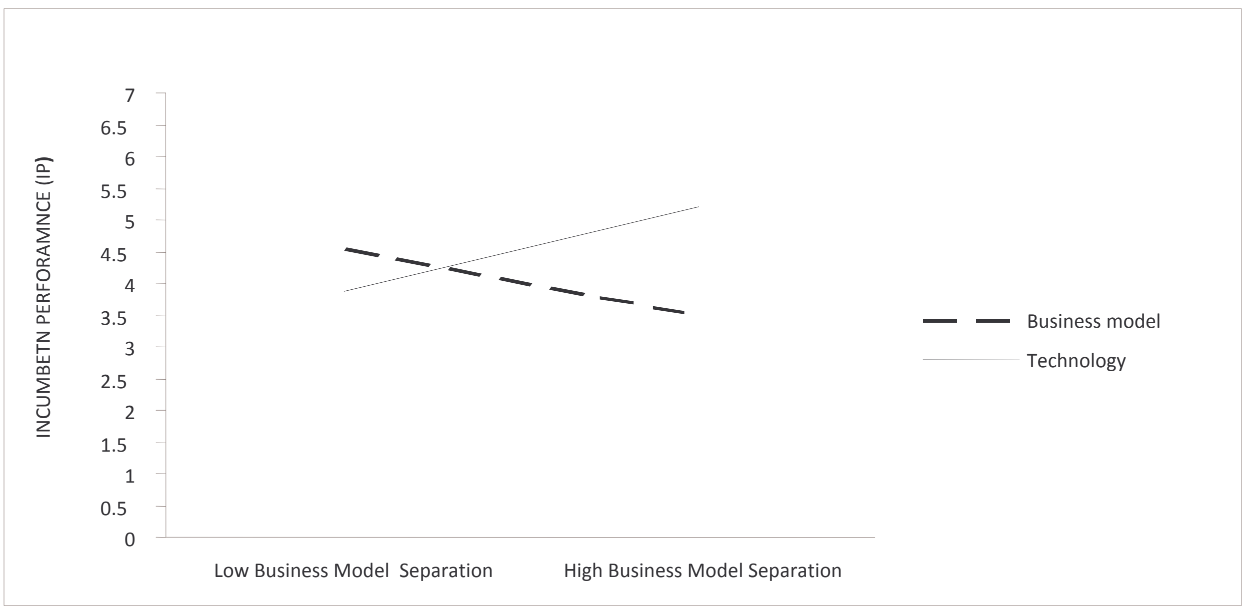


Figure 7.3 suggests that high-tech incumbents firms are likely to create a separate business model to manage a disruptive innovation. But this cannot be generalized across the three low-tech industries (banking, insurance and airlines). For instance, most incumbents in airlines and

insurance industries appear to introduce a separate business model due to the high conflict between disruptive and their broker-based traditional business models. On the contrary, most South African banks have easily integrated the mobile banking as additional channel within their full-service business models. This strategy appears to be in line with their previous experience on online banking, which they had easily integrated that otherwise, has been disruptive to airlines and insurance companies.

H12: ***The effect of Organizational Separation on Incumbent's Performance (IP) in enabling disruptive innovation will vary across the two types of innovation.***

In the survey, leaving out respondents that indicated their firms had integrated the innovation (namely the banking industry), sample respondents that replied their companies had created a separate business model to deal with disruptive innovation were further asked whether the corporations isolated the disruptive business unit is a separate company to manage disruptive innovation. The moderated regression result shows that consistent with the first-order result, both types of incumbents (high-tech and low-tech) are likely to isolate the disruptive unit in a separate organization. There is no significant statistic difference between the two, thus rejecting our hypothesis that the two types of incumbents vary on this aspect (see Table 7.9 CATEGORYxORG_SEPARATION B = 0.04, p= 0.6178).

Table 7.9: PROC REG Tech vs. BM H8: ORG_SEP - IP

Pr > F <.0001, Adjusted r^2= 0.55, Pr > ChiSq 0.0299, Dependent Variable IP

Parameter Estimates

Variable	B	SE	β	VIF
Intercept	4.1***	0.09	0	0
C_CATEGORY	0.27**	0.13	0.19	2.44
C_BM_SEPARATION1	-0.01	0.10	-0.01	5.08
C_ORG_SEPARATION	0.92***	0.10	0.77	1.85
C_INVOLVEMENT	0.23***	0.09	0.22	1.42
C_CEO_FACTOR1	0.04**	0.07	0.05	2.62
CATEGORYxORG_SEPARATION	0.04	0.09	0.03	1.22

Consistent with the case study finding, Table 7.9 shows that strategic organizational responses to *potentially* disruptive innovation vary depending on the firm's context and specific innovation characteristics, rather than on the dichotomous innovation category (technology vs. non-technology). While the mobile incumbents integrate the new business model in an existing organization, airlines and insurance industries create a separate company. South African banks and MNOS have integrated mobile banking and instant mobile messaging technology without changing their traditional business models.

13: ***The effect of Senior Management Involvement (SMI) on Incumbent's Performance (IP) in enabling disruptive innovation will vary across the two types of innovation.***

Confirming the second-level hypothesis, Table 7.10 of the moderated regression analysis result shows that the effect of Senior Management Involvement (SMI) on IP is positive for the technology group, but not for the business model group (Table 7.10:

CATEGORYxINVOLVMENT B = 0.32, p<.01). The Student *t* distribution (t-test) test also supports this result at 1% significant level (p<.01).

Table 7.10: PROC REG Tech vs. BM H8: INV - IP

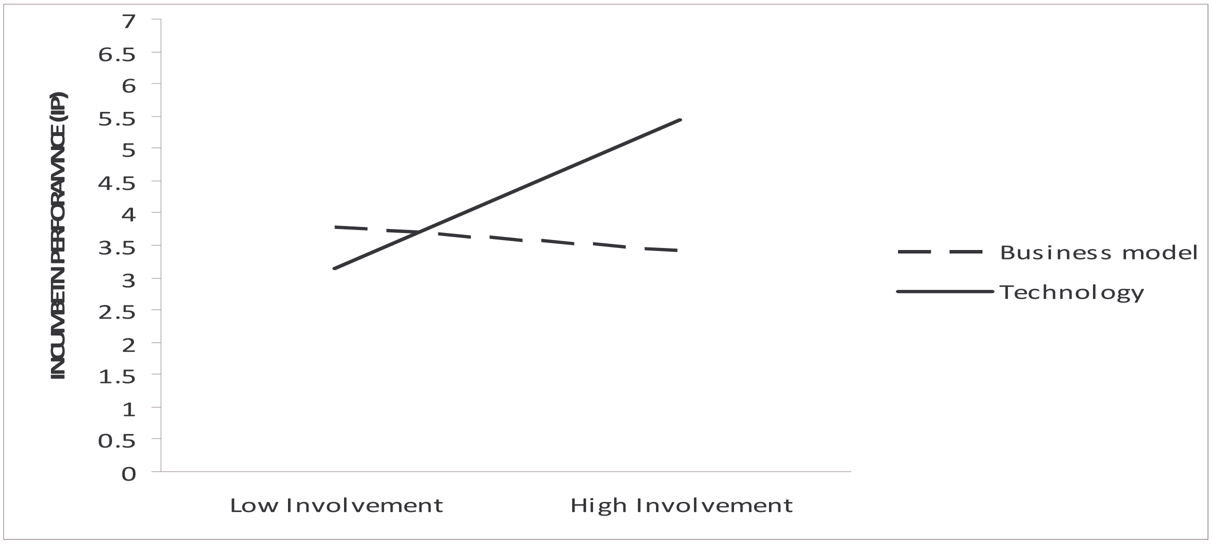
Pr > F <.0001, Adjusted r^2= 0.59, Pr > ChiSq 0.2335, Dependent Variable IP
Parameter Estimates

Variable	B	SE	β	VIF
Intercept	3.94***	0.09	0	0
C_CATEGORY	0.34***	0.13	0.25	2.51
C_BM_SEPARATION1	0.11	0.11	0.16	5.82
C_ORG_SEPARATION	0.82***	0.10	0.69	1.98
C_INVOLVEMENT	0.23***	0.09	0.18	1.45
C_CEO_FACTOR1	-0.05	0.07	-0.07	2.84
CATEGORYxINVOLVEMENT	0.32***	0.09	0.23	1.27

***p<.01

Figure 7.4 demonstrates an opposite direction of the moderators' effect on this relationship. Supporting H13, there is a strong positive relationship between senior management involvement and IP in technological firms. On the contrary, there seems to be no significant relationship in firms dealing with market-driven business model innovations.

Figure 7.4: Difference between Technology & Business Model in Involvement & IP



H14: ***The effect of the outside hired CEO on IP will vary across the two types of innovation.***

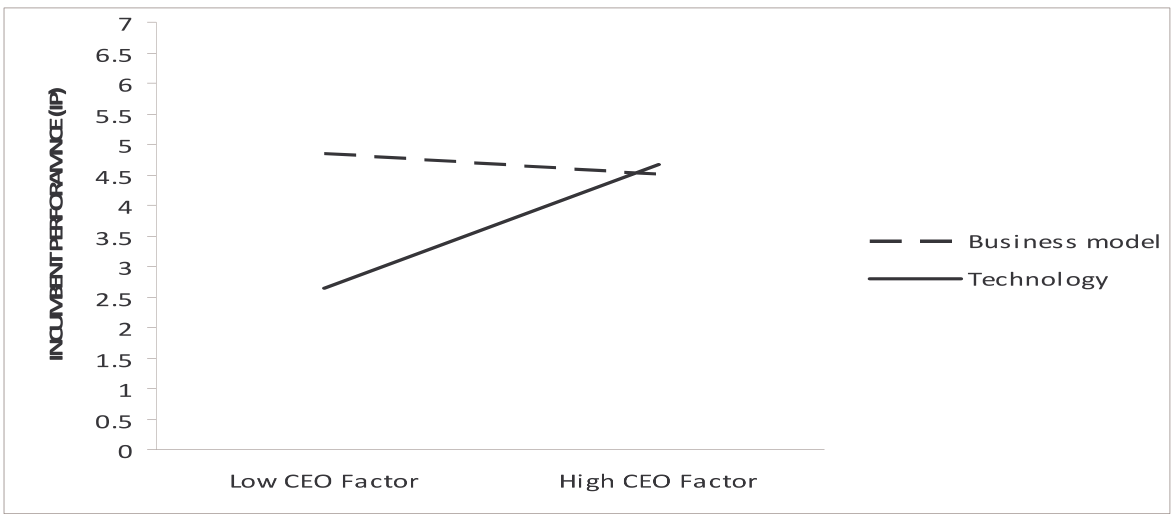
Accepting the second-order hypothesis, Table 7.11 indicates that the effect of outside hired CEO on incumbent's performance in enabling disruptive innovation is significant for the technology, but not for the business model category (Table 7.11 CATEGORYxCEO_FACTOR1 B = 0.15, p<.01). Figure 7.5 demonstrates a strong positive relationship between the outside hired CEO and IP in high-tech industries, whereas this relationship is almost non-existent in low-tech industries environment.

Table 7.11: PROC REG Tech vs. BM H8: CEO_FACTOR – IP

Pr > F <.0001, Adjusted r^2= 0.5774, Pr > ChiSq 0.0234, Dependent Variable IP
Parameter Estimates

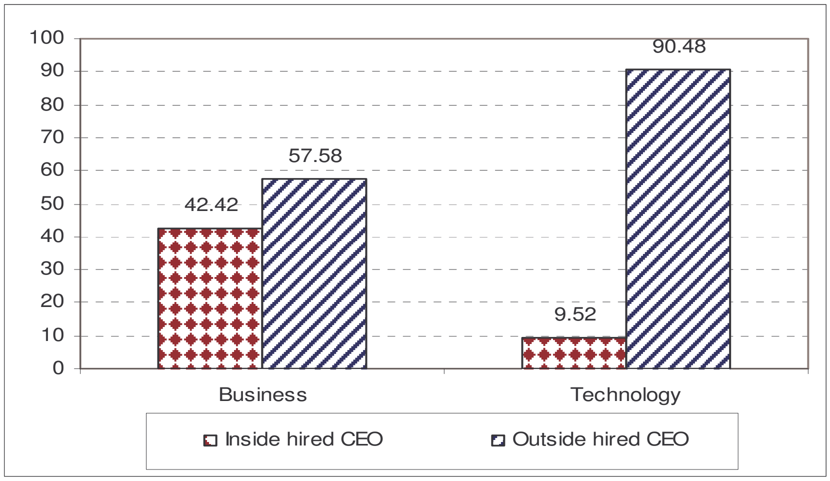
Variable	B	SE	β	VIF
Intercept	4.16***	0.09	0	0
C_CATEGORY	-0.51*	0.30	-0.37	12.82
C_BM_SEPARATION1	-0.08	0.10	-0.11	5.36
C_ORG_SEPARATION	0.84***	0.10	0.71	1.95
C_INVOLVEMENT	0.24**	0.09	0.18	1.45
C_CEO_FACTOR1	0.11	0.07	0.16	2.58
CATEGORYxCEO_FACTOR1	0.15***	0.05	0.56	10.00

Figure 7.5: Difference between Technology & Business Model in CEO Factor & IP



Furthermore, Figure 7.6 indicates some significant association between the source of recruitment of a CEO and the dichotomous categorization of innovations. The majority of incumbent firms (90.48%) in technological environment hired external CEO compared to non-technological incumbent firms (57.58%) that hired outside CEO to manage disruptive innovation ($\chi2$ p<.05).

Figure 7.6: The CEO factor: Technological vs. Business Model Innovations



Our qualitative investigations reveal that hiring outside CEO is seen as the most critical source of innovation. Most incumbents hire outside CEOs who were previously the founders or managers of pioneering disruptors in order to appropriate the disruptive technology. However, there seem to be no common patterns among all incumbent firms dealing with market-driven business model innovations.

7.4 Emergent Typologies for Categorizing Disruptive Innovations

Table 7.12 below presents a summary of the 14 second-order hypotheses results and conclusions. The conclusions are reached through triangulation of the statistical results with case studies and further referring to established theories. When the statistic difference tests show no significant differences, we reject the hypothesis that the two groups of innovation are the same and the outcome can be replicated across the two types of innovations. On the other hand, when there are statistically different outcomes, we reject the *null* hypothesis that the two groups of innovation are the same and the outcome cannot be replicated across the two types of innovations.

Table 7.12: Second -Order Hypothesis Testing, Findings and Conclusions

	Second-order hypothesis	Support/reject second-order hypothesis	Interaction effect slope coefficient *B*	Replication
H1	*The relationship between Relative Advantage (RA) and Asymmetric Motivation (AM) will vary across the two types of innovation.*	Marginally supported	-0.11*	No
H2	*The effect of Asymmetric Motivation (AM) on Innovation Growth (IG) will vary across the two types of innovation.*	Rejected	0.12	Yes
H3	*The relationship between Value Chain Configuration (VC) and Continuous Innovation (CI) will vary across the types of innovation.*	Rejected	0.03	Yes
H4	*The effect of Continuous Innovation (CI) on Innovation Growth (IG) will vary across the two types of innovation.*	Rejected	-0.05	Yes
H5	*The effect of Constraint on Innovation Growth (IG) will vary across the two types of innovation*	Rejected	-0.16684	Yes
H6	*The effect of Competition on Innovation Growth (IG) will vary across the two types of innovation.*	Strongly supported	0.24***	No
H7	*The relationship between strategy and innovation growth (IG) will vary across the two types of innovation.*	Supported	A firm-specific application.	Yes
H8	*The effect of Disparity on Disruptive Innovation (DI) will vary across the two types of innovation.*	Rejected	-0.03	Yes
H9	*The effect of Conflict on Disruptive Innovation will vary across the two types of innovation.*	Rejected	-0.06	Yes
H10	*The effect of Dilemma on Disruptive Innovation (DI) will vary across the two types of innovation.*	Rejected	0.11	Yes
H11	*The effect of Business Model Separation on Incumbent's Performance (IP) will vary across the two types of innovation.*	Supported	0.17***	No
H12	*The effect of Organizational Separation on Incumbent's Performance (IP) in enabling disruptive innovation will vary across the two types of innovation.*	Rejected	0.04	Yes
H13	*The effect of Senior Management Involvement (SMI) on Incumbent's Performance (IP) in enabling disruptive innovation will vary across the two types of innovation.*	Strongly supported	0.32***	No
H14	*The effect of the outside hired CEO on IP will vary across the two types of innovation.*	Strongly supported	0.15***	No

***p<.01, **p<.05, *p<.1

As stated in the research methodology chapter (Chapter 4), although the statistical outcomes are relevant for interpretation, a caution needs to be made that the moderated regression statistic different test is sensitive to sample size. The case studies qualitative findings will be considerably applied to draw the final conclusions of this thesis.

7.4.1 The Emergent Model for the Entrant

Based on the conceptual models, statistical analysis presented in Table 7.7 and insights generated from the case studies, this study proposes typologies for categorizing business model evolutions for technological and non-technological disruptive business model innovations. From an entrant perspective, Table 7.13 suggests ten modes of business model innovation based on (i) the relationships between relative advantage (RA) and asymmetric motivation (ii) value chain configuration (VC) and continuous innovation (CI) and CI (ii) the constraint factor (iii) the competition factor and (iii) strategy.

Table 7.13: Entrant's Model: Emerging Patterns of Business Models Evolutions

Entrant	RA & AM		VC & CI		The Constraint Factor		The Competition Factor		Strategy	
	Low-cost	Hybrid	Distributed	Direct	Un-supported	Supported	Technology-push	Competition-driven	Emergent	Forward-looking
Technology	v		v		v	v	v		v	
Market-Driven Business Model		v		v		v		v		v

I. RA and AM: Table 7.12 indicates a marginally significant negative correlation between RA and AM for technology, but not for market-driven business model group (B = -0.11, p<.1). Consistent with the hypothesized negative relationship between relative advantage (RA) and asymmetric motivation (AM), disruptive technological innovations emerge as low-end innovations that do not primarily appeal to the mainstream customer or incumbents' revenue model, thus creating sufficient condition for AM. On the other hand, market-driven business model innovations do not seem to create adequate condition for AM. Two contextual reasons explain why non-technological innovations evolve into hybrid models.

Firstly, from a developing economy context perspective, the country's wide gap in fiscal capacities and economic structure, market-driven innovating firms seem to target the middle markets (FSM 6 & 7) who own the means and knowledge to access innovations. In absence of intermediaries and lack of physical presence in markets, direct players invest considerably on branding and marketing thus in an effort to acquire and retain customers from the highly competitive middle market, eventually adding up some costs to their value chain.

Secondly, there are industry specific cost characteristics that moderate lower cost advantage of the innovator. For example, in the airlines industry there are three factors that may moderate the low-cost business models' lower cost advantage. First, compared to developed countries, the South African LCCs do not have the benefit of low cost advantage emanating from using a secondary airport. Second, when a variable input cost amount to a significant portion of cost structure and this cost is highly unstable, it affects the innovator's lower-cost advantage. For example, the biggest cost of LCC which makes about 50% - 60% is fuel. Worldwide, the sharp increase of oil price during 2008 had put considerable pressure on airlines cost structure requiring them to find ways to cover costs.

Third, when an industry is naturally characterized by high fluctuation in demand and supply it affects the innovator's lower cost advantage. The airlines industry is characterized by high CAPEX and OPEX cost structure, perishable nature of service (cost always incur whether or not people fly) and wide fluctuation of demand and capacity. These cost drivers put pressure on incumbent airlines to use the revenue management model to lower prices to adjust demand in low demand seasons. These three factors in some ways affect both the innovating firm's and the incumbent's lower cost advantage. The network carriers have been cutting some of the value added options to save costs. Whilst the LCCs that started out as pure low-cost models, have been adding up other services in order to cover costs.

Because of the above reasons, market-driven business model innovations appear to evolve quickly into hybrid business models. A hybrid model refers to a business model that combines elements from both of the two worlds; the low-cost and premium models (Francies et. al., 2005: 2). The above analysis suggests that, from entrant's perspective, there are two basic variations with regards to how innovators construct their value innovations (1) a pure low-cost or (2) a hybrid model. This classification appears to correlate with the dichotomous categorization of technology vs. non-technology and business model classification of low-cost vs. hybrid models.

Despite being not strictly low-cost business models, how hybrid business model innovations create a dilemma (despite the non-existence of a strong economical asymmetric motivation) and eventually cause disruptive innovation seems to be not fully understood. Our findings suggest two possible explanatory factors why non-technological market-driven hybrid business models may cause dilemma and disruption. First, incumbent managers tend to ignore emerging market-driven models possibly due to the size of the domestic market. In the airlines industry, for example, the main source of revenue for traditional network carriers is international travel market. Although, they serve the domestic market with full capacity, they do not consider it as the main driver of their full-service business models. Commenting on the size of the domestic market, one manager said as follows:

> *South Africa is still largely a restricted travel market. If you take for example how many people in South Africa travel versus how many people in India travel, I mean its just mind blowing. We don't have the volume to support more and more players in the market.*

Similarly, the major insurance incumbents' revenue models are driven by the commercial market (B2B), while serving the middle personal market (B2C) as a second priority. Probably for this reason, some leading incumbents did not take seriously the emergence of market-driven hybrid direct models in the middle business-to-consumer domestic market, as explained by a senior manager:

> *If you look at how profitable personal business is versus commercial and corporate both in terms of volume and value, you would understand the prioritization within the business. Even if I loose a large part of my personal business it won't be as significant as risking my commercial and corporate relationships because of it.*

The insight emerging from this analysis is that, despite the existence of strong asymmetric motivation in emerging disruptive technological innovations, technological incumbents appear to mitigate dilemma and respond to latent disruptive innovation quite early. On the contrary, despite the non-existence of a strong economical asymmetric motivation, non-technological firms seem to a face relatively higher the dilemma and disruptive impact. This may suggest that the concept of asymmetric motivation alone cannot help us to understand the process of disruptive innovation.

II. VC and CI: Table 7.12 shows no statistically significant difference on the relationship between VC and CI across the two types of innovation. This means that both types of innovators configured fundamentally different value chain and created capabilities for continuous innovation. However, the case study investigation explains some relevant typology to associate the categorization of innovation into dichotomous technological vs. market-driven with the classification of value chains into direct vs. distributed. The very disintermediation and "going direct" is the core source of innovation in market-driven hybrid models. A firm with a direct model performs most of the downstream value creation activities inside and controls its own distribution channels. While direct hybrid models go to market directly by cutting intermediaries, major backing from established large corporations allows them to source (outsource) assets and capabilities, coordinate and process activities on the upstream value chains.

Technological innovators are likely to adopt a distributed model. A firm with a distributed model focuses on performing one or few core activities in the value chain, mostly on the upstream position, and partners with other firms that perform the remaining activities in the value chain, usually in the downstream activities such as distribution and marketing. While this model is arguably an efficient innovation model with a better speed-to-market capabilities (Chesbrough, 2003), we find that innovating firms also adopt this model to circumvent critical resource and capabilities shortages. Therefore, when a technological innovator is located on the upstream value chain, which is the case with most innovators, it will likely compromise the prospect to interact with customers directly and get first-hand consumer insights.

III. The constraint factor: While both types of innovating firms face significant constraints with no statistically significant differences among them, the qualitative investigation reveals the two types of innovations face different nature and degree of constraints. Technological start-up innovators can be referred to as un-supported innovators. In their early product life-cycle disruptive technological innovations evolve through a period of technological ferment until a dominant standard emerges (Dewar and Dutton, 1986: 1422). As a result, they are less likely to find capital ventures or major investors to back their innovations, especially during their early un-certain market periods. Particularly, this is more evident in South Africa where there seems to be no robust innovation policies and capital venture markets to support start-up innovators. As a result, they seem to overcome some constraints by partnering with established firms that possess required resources such as distribution channels and brands, in effect creating a distributed model.

Due to massive investment requirements to create and develop new companies in non-technological industries such as insurance and airlines, and subsequently the need for uninterrupted investment in human resources, branding and marketing, we find that disruptive market-driven companies are launched by major established companies that allow them to configure direct and hybrid models.

Therefore, there seems to be some associations between the types of constraints, choice of a business model and categorization of innovation into the dichotomous technology and market-driven business model innovations. Because of significant constraints in terms of compatibility with existing complementary technologies, inherent technical, functional and capital limitations, emerging disruptive technological innovations are pure low-cost, distributed and un-supported business models. Generally, market-driven innovations are hybrid, direct and supported models.

IV. The Competition factor: Table 7.12 shows that a strong effect of competition for market-driven low-tech firms, while the hypothesized relationship is almost non-existent in high-tech innovators (B = 0.24, p = 0.0068). In latent disruptive technological innovation phenomenon, intense competition is less likely to emerge in uncertain markets until a dominant technological design emerges that provides a stable platform for competition. The innovation tend to be technology-push rather than driven by competition (Gatignon et. al., 2004: 1107; Roberson, 1967: 15).

We find that firms with hybrid market-driven business models tend to have higher competitive pressures compared to firms with technological innovations. In non-technological market-driven business model innovations, even though competition is certainly a key driver for growth of an emerging disruptive niche market, our qualitative study outcomes suggest that the existing fierce competition, lack of clear and strong government's competition policies, coupled with the globalization and deregulation, will probably have some erosion effect on the disruptors revenues in later growth or mature stages of disruptive innovations.

V. Strategy and innovation: In developing economies setting, in both types of innovations, the prevalent open access to procedures, designs and principles in creating innovation would seem to make the use of codified knowledge and Intellectual Property (IP) less useful as strategic assets to protect innovations. For example, the ideas and basic principles of information technology innovations such as VoIP mobile and instant mobile messaging are open source in nature. In similar manner, the basic ideas and principles of developing market-driven low-cost business models can be openly studied from developed economies experiences.

A technological start-up firm seems to begin by developing a technology and proceeds to develop a business model, with less regard about developing a sustainable competitive strategic advantage in the initial stage. In the evolutionary process, technological innovators characteristically capture rent if they are successful to achieve the *first mover advantage*, which in turn creates *network economies of scale* (Evans and Wurster, 1997: 14). However, in rapidly changing technological landscape, they maintain these advantages through continuous product innovation in a form of releasing successive versions of the original innovation. This strategy can be referred to as *emergent strategy* (Magretta, 2002: 92; Mintzberg, 1994: 111).

Firms with market-driven business model innovations seem to have a *forward-looking* (planned) strategy development process, although in reality the original strategy changes tremendously. The fact that most market-driven disruptive business model innovations emerge in a mature industry, when once a radical or disruptive innovation matures and competition through business model innovation becomes a key means of circumventing industry barriers, innovators are likely to have the opportunity to analyze industry forces. In sustaining competition advantage, the locus of innovation is often on continuous process and business model innovation (Moore, 2004: 88; Porter, 1985: 32; Shafer et. al. 2005: 203).

7.4.2 The Emergent Model for the Incumbent

From the incumbent's perspective, the conceptual model emphasizes that first understanding the causes and processes of disruptive innovation is fundamental for developing strategic approaches to enable disruptive innovation. It was hypothesized that disruptive innovation was a function of three factors; disparity, conflict and dilemma. A potentially disruptive innovation may evolve in a disparate trajectory in the form of radical product, new competencies, new customers and/or new revenue model long before it makes inroads into an established market (Gilbert, 2003: 32). This disparate trajectory in terms of radical product design, core competencies, market focus or business models, *per se*, does not seem to have significant effect on causing disruptive innovation across the two types of innovation. Table 7.14 summarizes key emerging insights for the differences between technological and non-technological incumbents with regards to disruptive innovation enabling approaches.

Table 7.14: Incumbent's Model: Emerging Patterns of Disruptive Innovation

Incumbents	The dilemma factor		Business model separation or integration	Organizational separation or integration	The CEO factor	Incumbent's performance (IP)			
						Synergy		Market performance	
	Anticipation	Time lags				Mean result	t-test p-value for mean value	Mean result	t-test p-value for mean value
Technology	High	Short	Separation	Separation within existing organization structure	Outside	4.385	0.85	4.249	0.84
Market-Driven Business Model	Low	Long	Separation & integration	Separation (airlines & insurance) Integration (banks)	Outside & Inside	4.175		4.381	

Table 7.14 explains that technological firms are likely to have higher anticipation ability to emerging disruptive innovation relative to non-technological market-driven firms. As a result, the time lags taken by firms in responding to potentially disruptive innovation is shorter in technological firms compared to non-technological firms. One of key decision criteria for both

business model and organization separation or integration is whether the firm's value chain is horizontally or vertically structured. In technological environment, firms are likely to separate both the business model and the organization in a separate company regardless whether their value chain is horizontally distributed or vertically integrated. In non-technological environment, firms with horizontally distributed value chain are likely to separate both the business model and the organization. In contrast, firms with vertically integrated value chain are more likely to integrated the business model within the existing organizational structure. However, despite the different approaches, the t-test paired difference statistic test of the two groups shows no significant differences in the mean scores of the two manifest variables (a. achieving synergy and b. disruptive market performance) that constitute the construct variable "incumbent performance in enabling disruptive innovation". Table 7.14 indicates that the mean scores for the variable "synergy" for technology and business model are equally about 4 with t-test p-value 0.85. Similarly, the mean values for the variable "disruptive market performance" for technology and business model are again about 4 with no significant t-test difference 0.84.

I. Dilemma and disruptive innovation: The most important cause of disruptive innovation seems to be the dilemma factor across both types of innovation, with no statistical difference between them (see Table 7.12). The higher the dilemma incumbents managers face, the higher the negative impact of disruptive innovation on incumbents business model. Proving this relationship statistically, the qualitative examination reveals that high-tech incumbent firms seem to possess the capability to anticipate latent disruptive innovation and respond relatively quickly long before the technology becomes disruptive. On the other hand, low-tech incumbents appear to face higher dilemma and, as a result, higher disruption. The difference between these two types of firms is management's ability to anticipate, willingness to take risk initiative and to cannibalize existing source of revenue. Thus, the lower the dilemma, the lower the disruptive impact of an innovation to an incumbent's business model (Christensen, 2006: 46; Henderson and Clark, 1990: 27).

II. Business model separation or integration strategy: Statistically the difference between the two types of firms on the issue of separation or integration is significant (see Table 7.12). The study outcome shows common patterns among high-tech incumbents with regards to creating a new SBU (within existing organizational structure) to manage a disruptive innovation relative to low-tech industries. Still, organizational strategies on this aspect may depend on the nature of specific innovation and idiosyncrasies peculiar to specific industry, rather than purely depending whether an innovation is technological or non-technological. In technological environments, for instance, MXit users use massive data at very low tariff, which creates a bottleneck on the MNO's network capacity, blocking and interfering with cellular voice and SMS traffic. This led many managers to believe that instant mobile messaging (MXit) would be disruptive to MNOs SMS technology.

Over time, as the market of MXit becomes clearer, the MNOs found that IMS was not disruptive to their traditional source of revenue. Instead, it created a new source of revenue for them. As MXit users use the MNO's network to send more messages more efficiently, the bigger the data, the more the revenue for incumbents. The mobile industry is characterized by massive network economies of scale; when the network works to the maximum capacity it becomes more efficient. If the traffic becomes heavy on the network, MNOs can expand the capacity by adding more towers and other required infrastructure. Having said that, the specialist start-up MXit has grown remarkably adding many related product lines to its original technology in a rather short time since its introduction. It can only be seen in future whether the incumbents' integration strategy will be considered as the best possible option in retrospect.

Again in technological environments, the case study of VoIP mobile points out that when managers predict that a certain technology will be disruptive to their main established source of revenue, technological incumbents are likely to adopt a separation strategy. The Internet based VoIP-mobile has the potential to displace the GPRS/3G GSM cellular voice calls technology. In addition to the nature of technology, as we have seen in our case studies chapter Innovation 2 uses a fundamentally different business model compared to the traditional mobile industry. MNOs charge their subscribers per minute for cellular voice calls. The start-up company distributes its V-mobile voice call services through voice over IT terminators (intermediaries) for a flat license fee for about ZAR10 (USD$1.3) per subscriber per month. In addition, customers have to pay for the Internet data tariff to the network provider.

Therefore, recognizing this disruptive technology, the major incumbent responded quickly by introducing a separate SBU. Yet, "disruption is a process, not an event" that may take months or years or decades before an innovation becomes disruptive (Christensen, 2006: 46). Whether the specialist start-up or the MNO incumbent is poised to surf on the next disruptive growth of V-mobile market can only be seen in future.

In non-technological industries, the question of separation or integration strategy seems to be correlated with the vertical or horizontal types of industry's value chain structure. The insurance and airlines' value chains are horizontally distributed in which they rely profoundly on intermediation for their major source of income. On the contrary, the bank industry' value chain is vertically integrated. Hence, banks are likely to integrate the same innovation model within their full-service traditional business model that otherwise, has been disruptive to airlines and insurance companies. This study suggests that in vertically integrated low-tech industries, integration strategy seems tot be the best possible action. But as our case studies show incumbents such as banks could still create a separate company for political and national economic reasons.

III. Organizational separation: In both types of innovation, there is a strong statistical correlation between the organizational separation strategy and incumbent's performance for enabling disruptive innovation. There is no statistically significant difference between the technological and non-technological firms. When an innovation is identified as disruptive, incumbents in the mobile industries are more likely to create a separate business unit within an existing organization to manage the disruptive innovation. The insurance and airlines incumbents are likely to create a separate company to manage the disruptive business model. Banks, however, are likely to integrate a potentially disruptive innovation within existing business unit and organizational structure. Note that this finding must be read in conjunction with the first-order conclusion that states organizational separation does not, in the literal sense, mean an obsolete disconnection of the new spinoff company from the parent company. There is a common pattern of some sort of weak linkages at the upstream value chains among all firms that launch a separate disruptive organization.

IV. Senior management involvement: Table 7.12 shows that, supporting the second-order hypothesis (H13), there is a strong positive relationship between senior management involvement and IP in high-tech firms, but not in low-tech industries ($\beta = 0.32$, $p = 0.0013$). In technological firms, senior corporate managers tend to be significantly involved in supporting the disruptive unit. Stressing the importance of senior management involvement in addressing internal political infighting and conflicts between the managers of disruptive unit and the traditional units, one director for the new disruptive unit commented as follows:

> *We can see it straight away (conflict between managers), because the existing business sees us as a threat to their business. And obviously there's personal ego's involved and so yes… absolutely… its… its not easy. So the new venture is very much in the limelight with the senior management of the company, but it is (also) very much seen as a threat to middle management in the other side of the business.*

For non-technological environments, despite the statistical insignificant difference result, the personal face-to-face interviews with some top level managers reveal that the senior corporate mangers involvement is critical. One manager for a spinoff expressed his frustration in regard to the lack of attention and support from the top level management for the new venture:

> *It (the conflict of interest) is one of the problems. You must just remember that you are actually not central. If you are not central you are not on their list of priorities. If you are not on the list of priorities, you have to just fight. I am going to write a book one day on innovation, okay. And it is going to be written in a font this big,*

*and say, "**If you are not at the core of the business that you are innovating for, do not do it**".*

V. The CEO Factor: Statistically, second-order H14 is strongly supported in technological firms with regards to the relationship between hiring an outside CEO and incumbent's performance in enabling disruptive innovation (see Table 7.12, $\beta = 0.15$, $p = 0.0049$). Technological firms are likely to hired outside CEO to manage the disruptive innovation. But there is no shared pattern in low-tech industries. In technological firms, the externally hired CEO is seen as the vital source of enabling disruptive innovation. Technological firms are found to hire CEOs who were previously the founders and directors of pioneering disruptive companies that inflicted or predicted to affect the incumbent. In non-technological firms, while insurance and banks follow the same strategy of hiring an outside CEO, airlines incumbents believe hiring internal CEO is the best strategy to enable disruptive innovation. As one manager commented, what was most important for the airlines incumbent was the quick learning curve and leveraging the expertise of the parent company:

I don't think that is the determining criteria (hiring an outsider). What is important is that an entrepreneurial mindset. So, that's the more important one than rather an outsider CEO. I don't think that makes a difference. Especially if you want to put something up quickly, and it must work quickly. You cannot really afford to have a too long learning curve. You just have to make sure the two are separate to make a healthy competition between the two companies (traditional and disruptive models).

VI. Incumbents performance in enabling disruptive innovation: This study hypothesized that incumbent's performance in enabling disruptive innovation is the function of business model and organizational separation, senior management involvement and hiring outside CEO. The above analysis shows that the two types of incumbent firms significantly differ in their approaches to disruptive innovation. In future studies, there is a need to investigate whether these different approaches lead to different incumbents' performance in enabling disruptive innovation across the two types of innovation.

In chapter four, it was stated that incumbent's performance in enabling disruptive innovation should have been ideally measured by assessing objective monetary measures including market share gained from the disruptive market. In this study, it has been difficult to obtain and correlate the exact financial data with incumbent's performance in the disruptive market due to issues of confidentiality and other complex market dynamics. By consulting published researches, this item is measured by quantifying managers' opinion on the performance of the incumbent in dealing disruptive innovation The quantified opinions of the surveyed managers suggest that, despite the different approaches, the t-test paired difference statistic test shows no significant differences in the mean scores of the two manifest variables that constitute the construct variable "incumbent performance in enabling disruptive innovation". Table 7.14 indicates that the mean scores for the variable "synergy" for technology and business model are equally about 4 with t-test p-value 0.85. Similarly, the mean values for the variable "disruptive market performance" for technology and business model are again about 4 with no significant t-test difference 0.84. (Markides and Charuitou, 2004; Venkatraman and Ramanujam, 1986; Dess and Robinson, 1984).

7.5 Conclusions

The premise for the study's second research question is that technological and non-technological market-driven disruptive innovations vary in business model evolutions, competitive and disruptive effects and the associated managerial implications. This study concludes that technological and non-technological market-driven disruptive innovations have both similarities and differences.

The two types of innovation follow similar business model evolution patterns and exhibit similar disruptive effects on incumbents established business models. This thesis also reveals a number of differences. Consistent with the hypothesis and established literature, during the introduction stage of the innovation life-cycle, disruptive technological innovation's value propositions are inferior enough to cause asymmetric motivation (Christensen and Raynor, 2003). Transaction cost theory that defines the cost of production and delivery of goods and services seems to explain the cause of asymmetric motivation in technological environments (Adner, 2002; Reinganum, 1983). A disruptive technology and traditional business models have fundamentally different cost-structure and pursue different margin models.

In contrast, transaction economic theory alone does not seem to explain fully the evolution of hybrid market-driven non-technological disruptive innovations. The disruptive and traditional models are not strictly dissimilar when we compare them merely in terms of economic models. Our findings suggest two important reasons for causing possible disruption on the part of incumbents; (a) the size of the domestic market, and (b) the distinction of personal versus commercial, and international versus national markets as in the insurance and airlines industries case studies in South Africa demonstrate.

Paradoxically, although technological innovations appear to have created economic asymmetric motivation, incumbent firms seem to have learned how to identify the early pointers of latent disruptive technology and take appropriate strategic measures to respond long before the technology becomes disruptive. Non-technological hybrid market-driven disruptive innovations do not seem to create sufficient condition for economical asymmetric motivation. Yet they seem to cause relatively higher degree of dilemma and, as a result higher disruptiveness impact.

On the question of enabling strategies, while all firms seem to follow the organizational isolation strategy to manage disruptive innovation, there seems to be significant senior management involvement in high-tech firms compared to low-tech firms. But, the decision on hiring inside or outside CEO seems to be contingent on industry circumstances rather than on the nature of the two types of innovation. By triangulating the statistical results with case studies, this chapter has identified key patterns and suggested frameworks of typologies for recognizing evolutions of disruptive technology from non-technological market-driven innovations.

CHAPTER EIGHT: CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

8.1 Introduction

Chapter one identified two research questions and presented the objective of this study from the perspectives of both theory and practice. The first question is: How should established companies reinvent their business models to enable internally or externally induced disruptive innovations? The secondary question is: What are the differences between disruptive technology and disruptive market-driven (non-technological) business model innovations. The overall objective of this thesis is to contribute, both theoretically and empirically, to the advancement of knowledge through the systematic comprehension of disruptive innovation phenomena in South Africa.

This thesis reiterates that the notions of disruptive innovation and a business model are multi-dimensional, complex and dynamic in nature. This study has tried to simplify these complexities by following a rigorous and systematic research methodology to address its research questions. First, in chapter two an extensive theoretical examination of the literature was carried out on the topics of disruptive innovation and a business model. Following the literature investigation and establishing the two research gaps, chapter three presented two conceptual models. The first conceptual model proposes seven hypotheses that determine a proactive evolution of a potentially disruptive business model innovation from an entrant's perspective. The second conceptual model puts forward another seven hypotheses for enabling disruptive innovation from an incumbent's perspective.

Chapter four outlined the research methodology. Disruptive innovation is un-common phenomena. The rarity and dynamic nature of this innovation arguably makes a firm-level case study method the preferred approach to study disruptive innovation phenomena. While a multi-case studies method has been used to study disruptors at a firm-level, a survey-based quantitative method has been utilized to identify common patterns at a system-level and innovation dichotomy level (technology vs. non-technological market-driven innovations) (Adner, 2002; Chesbrough and Rosenbloom, 2002; Macher and Richman, 2004).

Following the structure of the conceptual models, chapter five discussed five case studies consisting of two technological and three market-driven business model innovations in four South African industries. Chapter six examined the two conceptual models at a system-level by testing the fourteen hypotheses empirically. The purpose of chapter six is to indentify common patterns that can be replicated or generalized across the population of the study. Chapter seven investigated the same two models by dividing the innovations into two groups; *technology* vs. *market-driven* business model innovations, and then by subjecting each innovation to the same hypothesis and statistical frame. The objective of chapter seven is to discover differences between the two types of innovations. This chapter draws together the outcomes of preceding chapters and proceeds with conclusions, implications and recommendations.

8.2 Conclusions

8.2.1 First-Order: The Proactive Process of Disruptive Business Model Innovation

From an entrant's perspective, the first conceptual model hypothesizes that disruptive innovation creates and grows a niche market in a disparate trajectory to the established main market long before it becomes disruptive. To examine this hypothesis, two theoretical assumptions of disruptive innovation must be met.

First, RA is negatively related to AM. Somewhat consistent with the first hypothesis, mainstream customers' negative perception of relative advantage (RA) of emerging innovation is likely to cause asymmetric motivation (AM) during the introduction of a potentially disruptive innovation. This may be inferred from the paradoxical nature of a potentially disruptive innovation. Initially, a potentially disruptive innovator may begin by discovering low-end customer value propositions that are perceived significantly as *negative* in overall RA compared to similar traditional product, when measured by the mainstream customers. This creates AM where entrants target a low-end or previously un-served market that is good enough to generate low-margin for them, but that may not be encouraging incumbents to counter-attack.

Second, VC is positively related to CI. As hypothesized, continuous innovation is found to be a function of new value chain that creates capabilities for consumer-insights, speed-to-market and lower cost advantage. Initially, a business model innovation may begin by gaining new consumer insight. Alternatively, a dramatic redesign of the end-to-end value chain or value network that allows the innovator to take its innovation to market faster than existing traditional value chains may create a disruptive value.

Conversely, a fundamental deconstruction of traditional value chains that brings about fundamental difference in transaction costs of producing and distributing goods or services can create a potentially disruptive business model. But one of these changes must propel dramatic changes in the other two factors eventually. When these three factors reinforce each other around a sustainable strategy, in successive and evolutionary adaptation to endogenous and exogenous innovation enabling or disabling forces, a model can function as a dynamic system for continuous innovation (Govindarajan and Gupta, 2001).

Having met these two basic tests, the conceptual model hypothesizes that a potentially disruptive innovation's growth is a function of asymmetric motivation, continuous innovation, constraints, competition and strategy. Rejecting one of the hypotheses, the absence of incumbent's reaction (or presence of asymmetric motivation) during the introductory life-cycle of disruptive innovation does not play a significant role in stimulating a latent disruptive niche market. From an insurgent perspective, the most critical factor for creating and growing a potentially disruptive niche market is the innovator's intrinsic ability to create and sustain continuous innovation, rather than the lack of retaliation from established incumbents.

Moreover, a caveat must follow that not all low-end innovations that emerge in a low-end or previous market, and that do not motivate established large incumbents' revenue models, will ultimately become disruptive. As the case of the mobile banking suggests, some innovations are typical Bottom of the Pyramid (Bo) innovations that have a long way to go even to address the massive challenges of the low-end market itself (Prahalad, 2006).

Excluding the AM factor, the empirically emerging insights suggest that a potentially disruptive business model innovation is a process that evolves in a complex interplay between constant innovation, constraints, competition and innovator's strategy.

Constraints negatively impact on the evolution of disruptive business model. The constraints comprise capital and skilled labor shortages, technical hurdles, poverty and education. On the other hand, competition, especially among the new entrants themselves, appears to have some positive effect on innovation. From an innovator perspective, in resource scarce, challenging and highly competitive domestic market such as South Africa, the innovating firm's managerial ability to acquire, integrate, coordinate and develop generic and firm-specific strategic resources is critical for creating and scaling-up a niche market, and capturing and sustaining value for long-term survival.

This study finds that because of the open source nature of information technology innovations, and because of open principles and designs of market-driven business model innovations, enterprise firms are less likely to benefit from the use of patents or intellectual property to protect and capture the growth of their innovations. The finding of this research suggests that, in such open environments, promising disruptors are more likely to rely on continuous innovation as the only source of survival. The case study investigation reveals three fairly common key firm-specific strategic capabilities that differentiate successful innovators from others; a well-defined innovation process, focus on human resources (HR), and nurturing eco-system from the beginning.

Summarizing the entrant's model, the imperative for creating and growing a potentially disruptive niche market are configuring a fundamentally different value chain, pursuing continuous innovation through deliberate internal strategic processes, and developing generic and firm-specific strategic capabilities to overcome disabling forces and sustain a long-term differential advantage. Still, the growth of a potentially disruptive niche market does not, *by its very nature*, lead to disruptive innovation. A mainstream market disruption occurs only when the innovator's business model makes it inroad into the incumbent's mainstream market and displaces the incumbent fully or partially (Gilbert, 2003; Rafi and Kamps, 2003).

8.2.2 First-Order: The Enabling Process of Disruptive Innovation

From an incumbent perspective, the conceptual model for enabling disruptive innovation is built from two parts. The first part emphasizes that understanding the causes of disruptive innovation is fundamental for developing strategic approaches to enable disruptive innovation. It was hypothesized that disruptive innovation was a function of three factors; disparity, conflict and dilemma.

A potentially disruptive innovation may evolve in a disparate trajectory in the form of radical product, new competencies, new customers and/or new revenue model long before it attacks an established market. But the result of this study shows that managers' perception or misperception of this disparity does not seem to have significant effect on causing disruptive innovation. The real-time conflict between the two disparate models, and the dilemma it causes, are found to cause disruptive innovation. The implication of this finding is that the incumbent senior management's competency in absorbing the dilemma and finding creative ways to prevent the conflict plays considerable role in enabling disruptive innovation, and thus eliminating a dire consequence of disruptive innovation on an incumbent's established business model.

The second part hypothesized that incumbent's performance in enabling disruptive innovation depends on creating a separate business model, creating a new organization, significant senior management involvement and hiring outside CEO. As hypothesized, the empirical findings show that, first, when established organizations identify the signs of latent disruptive innovation, or they are affected by disruptive innovation and decide to respond, they are likely to create a separate business unit (either under the existing organization structure or in a separate company), with somewhat loose linkages at the upstream supply chains. The second common pattern is a significant level of senior management involvement in disruptive spinoff companies at higher strategic levels. The third general pattern is that most incumbents are likely to hire outside CEO to manage the disruptive business unit. Nevertheless, the aggregate outcome for the questions of integration or separation of a business unit and the hiring inside or outside CEO to manage a disruptive unit does not give the accurate picture of the relative differences across firms. These two questions are more accurately investigated at the second-order study by disaggregating the data into dichotomous innovation categories.

8.2.3 Second-Order: The Proactive Process of Disruptive Business Model Innovation

The purpose of the second-order examination was to investigate the differences or similarities between *technological* and *market-driven business model* innovations using the same conceptual models and hypotheses.

From the entrant perspective, consistent with the hypothesis and established literature, this study finds that disruptive technological innovation's value propositions are low enough to cause asymmetric motivation during the introduction stage of the innovation life-cycle. This causal relationship is underpinned by transaction cost theory. A start-up disruptor and large established incumbent have fundamentally different cost-structure and, thus pursue very different margin levels.

In hybrid market-driven innovations, differences in transaction costs and revenue models alone do not seem to explain fully the evolution of disruptive business model innovation. Incumbents do not appear to be paralyzed merely by economically disparate models. In fact hybrid market-driven models begin life in middle markets that are not entirely perceived unattractive by incumbents' measure. Theoretically, this would lead us to believe that established incumbents are likely to react aggressively when a start-up disruptor sets foothold in a mainstream market. Empirically, this was not the case.

Our findings suggest two important reasons for causing possible disruption on the part of incumbents; (a) the size of the domestic market, and (b) the distinction of personal versus commercial, and international versus national markets as in the insurance and airlines industries case studies in South Africa demonstrate.

An intriguing finding of this study which needs a very careful reading is the following conclusion:

- Technological innovations seem to have created economic asymmetric motivation, which is theoretically a necessary condition for disruptive innovation (Adner, 2002; Christensen and Raynor, 2003; Reinganum, 1983). Contrary to the hypothesized expectation, technological incumbents appear to react promptly and aggressively to prevent future disruption on their very core-existence. Incumbent firms seem to have the capability to identify the early signals of latent disruptive technology and take appropriate strategic measures to respond long before the technology becomes disruptive.
- Non-technological hybrid market-driven disruptive innovations do not seem to create sufficient condition for economical asymmetric motivation, theoretically which is not a necessary condition for disruptive innovation. Contrary to the hypothesized expectation, non-technological incumbents are found to be paralyzed and disrupted considerably by this type of innovation.

From the incumbent's perspective, statistically speaking, technological firms are likely to create a new business model to manage a disruptive innovation. However, incumbents' response to potentially disruptive innovation depends on the nature of innovation and idiosyncrasies peculiar to specific industry. In the technological domain, as the case study of MXIt demonstrates, some innovations may appear disruptive at a glance, while later they turn out to create a new avenue of revenue for incumbents. In the non-technological sector, the question of integration or separation of a disruptive innovation seems to be correlated with the value chain structure of a certain industry, i.e. whether it is a horizontal or a vertical value chain.

Nevertheless, in both sectors, when managers sense the signs of real disruptive innovation or their companies are hit by disruptive innovation, most firms are likely to adopt a separation strategy. Technological firms seem to have the ability to anticipate and respond long before a technology becomes disruptive. Yet, "disruption is a process, not an event" that may take months or years or decades before an innovation becomes disruptive (Christensen, 2006: 46). Whether a specialist start-up like Innovator 2 or an agile MNO incumbent that responded to this technology, is poised to surf on the next disruptive growth of VoIP-mobile market can only be seen in future.

The statistical outcome shows that consistent with the hypothesis, in technological firms, senior corporate managers tend to be significantly involved in supporting a disruptive innovation. In non-technological environments, there is no significant association between senior management's involvement and incumbent spinoff's performance to enable disruptive innovation. A caution here follows that according to our personal face-to-face interviews with some top level managers, senior mangers involvement is critical to champion and support the disruptive unit even in non-technological environments. However, a further study seems necessary to find out whether non-technological market-driven disruptive spinoff companies launched by major corporations need a relatively higher degree of autonomy compared to disruptive technological spinoffs.

Technological firms are found to hire CEOs who were previously the founders and directors of pioneering disruptive companies that inflicted or predicted to affect the incumbent. In non-technological firms, while insurance and banks follow the same strategy of hiring an outside

CEO, airlines incumbents believe hiring internal CEO is the best strategy to enable disruptive innovation.

In conclusion, generally speaking disruptive technology and market-driven business model innovations are distinct phenomena and have different managerial implications. Having said this, a careful scrutiny within the five types of innovations suggest that disruptive innovation is a relative phenomenon. It affects firms in different ways and firms respond to it differently depending on the nature of innovation and firm specific contexts (Christensen, 2006: 48).

8.3 Theoretical and Managerial Implications

8.3.1 Theoretical Implications

With the academic shift of research focus from a technology to a business model, many scholars developed different useful theories and frameworks to address the problem of managing disruptive business model innovation. However, few studies have attempted to address the question of how industry incumbents strategic processes in reinventing a second business model to enable disruptive innovation (Markides and Charitou, 2004; O'Reilly and Tushman, 2004; Christensen and Overdorf, 2000). In particular, with the emerging understanding that disruptive innovation is a function of conflict between traditional and disruptive business models, a careful scrutiny of the literature seems to suggest that systematic studies that examine disruptive innovation from both sides, i.e, from a disruptor pioneering firm and an incumbent firm perspectives seems to be rare.

The first contribution of this study is that, by linking the emerging field of study of business model innovation (Govindarajan and Gupta, 2001; Holmstrom et. al., 2001; Kim and Mauborgne, 1999) with disruptive innovation theory (Christensen and Raynor, 2003; Christensen, 1997), it is felt that this thesis has developed an integrated two phased namely, proactive and reactive models, for guiding business model innovation from an entrant perspective, and strategic reinvention processes to enable disruptive innovation from an incumbent perspective.

From a pioneering disruptor perspective, the evolutionary (proactive) model describes that a business model innovation is a continuous innovation process that evolves through dynamic interaction of market ideas, internal capabilities and processes that convert this idea into customer value, value chains that take this customer value to market with speed-to-market abilities and lower cost factors. A business model evolves over time in successive adaptations to both constraints and competitive forces that shape the evolution and direction of the business model's trajectory. Therefore, it is not *a priori* concept that can be implemented right away with a well-thought out business plans. From the entrant perspective, this study discovers ten modes of business models that emerge in response to constraints and competitive forces, and depending on the nature of innovation.

Extant literature maintains that a distributed model is arguably an efficient innovation model compared to an integrated model (Chesbrough, 2003). This study adds value to this argument by empirically establishing that innovating firms also adopt this model to circumvent critical resource and capabilities shortages. In effect, they may compromise the possibility to interact directly with the final user and gain consumer insights.

From an incumbent firm perspective, the current academic understanding is that disruptive innovation is primarily a function of conflict between disparate business models (Christensen, 2006: Markides, 2006). This study extends this view by empirically establishing the link between incumbent's entrepreneurial dilemma and disruptiveness. We emphasize that senior management's willingness or unwillingness, competence or incompetence to embrace disruptive innovation is one of the key factors that cause disruptive innovation. The findings of this study strongly suggest that incumbent firms are able to anticipate and prevent disruption of their established business models and markets by taking entrepreneurial risk early before an innovation becomes disruptive.

When established organizations identify early signs of disruptive innovation, or when they are already affected by it, they take different strategic approaches to deal with disruptive innovation depending on the nature of innovation, industry structure and firm's context. Technological as well as non-technological incumbents that have horizontally distributed value chains are likely to create a separate organization to manage distribution innovation.

Many academic observers have witnessed the disruption of many vertically integrated large corporations and, as a result a transition from vertical to horizontal structure in many technological and manufacturing industries (Tapscott et. al., 2001; Clark and Clegg, 2000; Hamel, 2000; 1998; Evans and Wurster, 1997; Grove, 1996). On the contrary, vertically integrated non-technological industries, such as the bank industry, seem to be less affected by market-driven disruptive innovations that otherwise have been disruptive to the insurance and airlines industries. This seems to be an interesting finding that needs further investigation.

In disruptive innovation studies, the question underpinning the notions of senior management involvement and autonomy is the source and background of a CEO. Chesbrough and Rosenbloom's (2002) argue that incumbent's senior management often applies their preexisting values and mindsets in the form of appointing internal managers when they pursue disruptive innovation, but end up creating a *similar* business model, rather than a disruptive one. Beyond supporting this argument, a unique finding of this study is that an external CEO is viewed as a major strategic source of innovation. Using deep pockets, established firms hire external CEOs who were founding members or managing directors of pioneering start-ups and who had a good knowledge of the disruptive market and the way a business model works in that market.

The second contribution of this study is that it expands the understanding of the concept of relativity in disruptive innovation theory. To the researcher's knowledge, this study is probably the first study that attempts to re-examines the questions surrounding disruptive innovation theory in relation to its theoretical generalizations and literal replication by studying the problems at the second level of analysis, i.e., by questioning whether the same conceptual models can apply across technology and non-technological innovations.

The third contribution of this study is that it has created frameworks of typologies by using descriptive categorization schemes. The categorization of innovations into technological and market-driven business model innovations seems to be associated with the classification of innovations into “low-cost” vs. “hybrid” and into “direct” vs. “distributed” models.

Firms that introduce low-cost innovations appear to be technological firms that face constraints including capital, technical and uncertain markets. The disintermediation or “going direct” appears to be a key source of innovation for hybrid market-driven innovations. Major backing from established corporations allows them to invest in branding and marketing that could function in place of intermediaries.

A caveat must follow here that not all market-driven business model innovations are supported by major corporations and evolve into “hybrid” models. Nevertheless, the finding of this study suggests that disruptive market-driven business models may need to be hybrid in order to target the middle markets in economies such as South Africa where wide gap in financial capacities determine the path and destiny of innovation.

The literature review of this study reveals that disruptive innovation research is predominantly focused on developed economies, although this study evidently shows that disruptive innovation phenomena are not always restricted to developed economies. Contextually, this is the first comprehensive multi-industries based disruptive innovation study in South Africa as far as the researcher knows.

8.3.2 Managerial Implications

From managerial implications point of view, this study may provide a platform for developing models taking into consideration the nature of innovation and firm's special circumstances. From an insurgent's perspective, the proactive model developed by this study may be applied to guide entrepreneurial undertaking for introducing a potentially disruptive innovation. For the entrant, the second incumbent's model of this study may help to predict incumbent's dilemma and probable retaliatory moves and select the best proactive strategic course of action to attack the incumbent's established market.

However, although success depends on the innovator's ability to strategize, change constraints and competitive pressures into innovation opportunities, there are major constraints beyond the control of entrepreneur firms. The findings of this study suggest that the lack of capital venture markets, national innovation clusters, R&D centers and government policies and regulations with regards to innovation need an urgent government attention.

From an incumbent's perspective, by looking at the entrant's proactive framework, managers will be able to sense, detect and monitor latent and emerging disruptive innovations. From the incumbent's model, managers can understand the processes and causes of disruptive innovation. Understanding this will assist them to take the best possible strategic approaches to enable disruptive innovation. Therefore, the two frameworks developed in this thesis can provide basis for developing managerial models for introducing a potentially disruptive innovation and for developing intervention strategies to respond to disruptive innovation.

8.4 Recommendations for Further Research

The notions of business model and disruptive innovation are multi-dimensional, complex, dynamic, evolutionary and revolutionary in nature that certainly demand multi-method researches and longitudinal studies. A cross-sectional research, such as the one contained here, has a number of limitations. Chapter 4 highlighted the methodological and study limitations. The following are recommendations to address some of the limitations and research gaps uncovered by this study:

1. The empirical conclusions of this study can be reproduced from the sample to the study's target population, i.e., the four South African services industries. This thesis does not claim that its findings can be, as is, universally replicated, i.e., the results are contingent. Further research in other continents and regions can raise the literal and theoretical replications of this study, particularly with respect to anomalies between technology and market driven business model innovations.

2. The South African situation revealed in this study subtly implies that in developing economies the trajectory of disruptive innovation is likely to be affected by a relatively high level of constraints and intensity of competition in small domestic markets, among others. Developing economies such as South Africa are characterized by lack of capital venture markets, migration of skilled labor, high un-employment rate and low level of education. In the future, a comparative study between developed and developing economies on the topic of disruptive innovation will add value to the strategic management literature.

3. This thesis finds that the issue of creating synergy between disparate models appears far too complex and ever challenging for managers. On average, incumbents that launched a second business model via a new business unit or company have retained some sorts of integration through the parent company's top management involvement at strategic level and/or by linking the disparate models at upstream value chains. This issue has not been fully addressed here. A dedicated research on the problem of creating synergy between disparate models could be an interesting contribution to theory and practice of strategic management.

4. "Disruptive innovation is process, not an event" that may take a number of years (Christensen, 2006: 46). In a cross-sectional survey based study, it was unavoidable to investigate the past and present events and to rely on surveyed managers' opinions on predictions about the possible future. This probably causes some errors and biases in this thesis. A longitudinal study will be necessary to continue this research and follow the paths and evolution of the innovations studied in this study.

5. This study is primarily industry research. The topics of relative advantage and asymmetric motivations are exclusively studied from a firm perspective. The multi-dimensional nature of disruptive business model innovation requires a study of user adoption determinant factors with respect to a potentially disruptive innovation. Due to time and resource limitation this dimension of research is missing from this research. This thesis recommends future research to complement this study from a market

perspective that examines determinants of a potentially disruptive innovation adoption in low-end markets and factors that determine mainstream customer switching behaviors from traditional to disruptive innovation.

6. Finally, an interesting trend observed in this study is the potential of disruptive innovation to affect other substitute industries beyond the home industries. For instance, it is believed that the LCC disruptive innovation has disrupted about 15% market share of the long-haul bus industry in South Africa. Although not disruptive innovation, the mobile banking has displayed an imminent disruption to the informal financial services in the informal economy. This would be an interesting topic for future study.

8.5 Limitations of the Study and the Research Design

As discussed, any systematic study that attempts to construct an innovation model must meet the reliability and validity tests. Govindarajan and Koppalle (2006: 196) argue that extant research has yet to establish an appropriate construct validity scale or a psychometrically valid assessment for the construct of disruptiveness of an innovation. Realizing this, it is important to highlight the potential limitations of this study's empirical methodology.

First, because of the dynamic, evolutionary and multi-dimensional natures of the concepts of disruptive innovation and business model, quantitative methods may not be adequate to study disruptive phenomena, if used alone. Because of the rarity of disruptive innovation phenomena in South Africa, and hence geographical limitation (empirical study is limited only to South Africa), the survey data may not be large enough for a strong generalization of the results, especially at the second level (technology vs. business model) (Kline, 2005; Hoyle and Kenny, 1999). In an effort to minimize the above two shortcomings, this study used both case study and quantitative methods (Voelpel et. al., 2005; Macher and Richman, 2004; Chesbrough and Rosenbloom, 2002; Hamel, 2000; Tripsas and Gavetti, 2000).

Second, one of the well-known drawbacks of convenience sampling is self-selection. There is a possibility that the sample includes only respondents with a strong interest or familiarity with the concept of disruptive innovation. In addition, although the multi-dimensional nature of disruptive innovation would have required multi-dimensional views, particularly of final users, due to time and research method limitations, the study is based predominantly on managers' views. Thus, it does not include customers' views, particularly in investigating the causal relationships of relative advantage (RA) of new value propositions and asymmetric motivation (AM) variables (Cooper and Schindler, 2001).

Third, the construct of "disruptive innovation" could have been ideally measured by assessing a particular disruptive firm's growth and its disruptive impact on the incumbent's traditional business model and market by objective monetary measures including market share gained by a disruptor and, as a consequence, market share lost by disrupted company. In this thesis, it has been problematic obtaining the financial measures from the two opposite sides and correlating them due to a number of powerful forces including the global financial crises and oil price that affected considerably many industries market shares during the period of writing this thesis. By consulting published studies, the growth or disruption are measured by relying on reported sources on the growth of firms in terms of market share and customers, and quantifying managers' opinion as a measures of growth (or effectiveness) or disruption (Markides and Charuitou, 2004; Venkatraman and Ramanujam, 1986; Dess and Robinson, 1984). In this regard, a possible bias may arise where managers self-report a growth or disruption based on subjective estimation, or without having full information, or provide possibly incorrect information.

Fourth, as common to all strategic management research, in the broader context of the actual empirical data analysis and case studies undertaken, and the subsequent systematic process for theoretical model development, this study attempts to investigate disruptive innovation phenomena *ex post* for developing a theoretical framework *ex ante* supposedly to inform future strategic management practices. While this may be useful in an environment where competitive and technological dynamics remain relatively unchanged, in rapidly and unpredictably changing business environments, the usefulness of retrospective analysis for developing a predictive framework will probably entail some potential limitations (Danneels, 2004: 248; Sanchez, 1997: 942).

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APPENDIX A

Questionnaire
PhD Thesis on Disruptive Innovation

Questionnaire No.	
Position of interviewee	
Name of the company	
Date of interview	

EXAMPLE OF DISRUPTIVE INNOVATION

Disruptive innovation is a technology or a business model innovation which over time displaces previously established comparable product or business model in traditional markets. The introduction of mobile phones relative to landlines is an example of disruptive technological innovation.

A good example of disruptive business model innovation is the introduction of Southwest's low-cost carrier (LCC) business model relative to network carriers' full-service business model in the early 1970s in the USA. At the time of its introduction, the mainstream passengers did not see value in Southwest's low-cost, no-frills flying services relative to conventional premium services. However, over time many mainstream passengers switched to LCCs. By May 2003, Southwest had the largest market share in the US airlines industry. World wide, the LCC business model has been rapidly accepted by leisure and price sensitive business travelers who value the cheaper, simpler, and more convenient value propositions. Because of conflicts in markets and business models, many industry incumbents responded by introducing their own LCC models.

This research attempts to investigate how business organizations adapt to technological or business model disruptive innovation.

Have you witnessed any company that has introduced an innovation into your industry in terms of a business model or technology that appeared to you different compared to what was ordinary in your industry? If more than one, please mention the innovation that had the biggest impact on the industry or your company.				
		Yes/No	If yes, how long ago?	If yes, please describe the nature of innovation
1	Business model innovation	Yes/No		
2	Technology innovation	Yes/No		
3	Other			

Section 1

1. Please rate the relative advantages of the innovation's value propositions compared to existing established product/service's value propositions
.

	Value proposition attributes	Very least advantage	Lesser advantage	Somewhat lesser	Equal advantage	Somewhat better	Better advantage	Very great
1	Price advantage	1	2	3	4	5	6	7
2	Ease of use	1	2	3	4	5	6	7
3	New technology advantage	1	2	3	4	5	6	7
4	Quality advantage	1	2	3	4	5	6	7
5	Brand recognition advantage	1	2	3	4	5	6	7
6	Other	1	2	3	4	5	6	7

Section 2

2. Indicate the most appropriate situation when the innovation was introduced into the South African market.

		Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Some what agree	Agree	Strongly agree
1	The innovation was introduced initially into a low-end market which was not financially attractive to established competitors	1	2	3	4	5	6	7
2	It was not initially attractive to mainstream customers in the main market	1	2	3	4	5	6	7
3	It was introduced into previously un-served market	1	2	3	4	5	6	7
4	It was introduced into a small niche market that we did not believe it was big enough to accommodate another new competitor	1	2	3	4	5	6	7
5	Other	1	2	3	4	5	6	

Section 3

3. How different do you think is the innovation's value chain (new business model) compared to the industry's traditional value chain in terms of the following?

	Components	Very similar	Similar	Somewhat similar	The same	Somewhat different	Different	Very different
1	Production processes (activities in production)	1	2	3	4	5	6	7
2	Supply channels	1	2	3	4	5	6	7
3	Distribution channels	1	2	3	4	5	6	7
4	Marketing and sales	1	2	3	4	5	6	7
5	Other	1	2	3	4	5	6	7

4. In your opinion, how effective do you think is the innovation's value chain in terms of the following?

		Very ineffective	Ineffective	Somewhat ineffective	Neither effective nor ineffective	Somewhat effective	Effective	Very effective
1	Cost advantage	1	2	3	4	5	6	7
2	Other							

5. In your opinion, how effective do you think is the innovation's value chain in terms of the following?

		Very ineffective	Ineffective	Somewhat ineffective	Neither effective nor ineffective	Somewhat effective	Effective	Very effective
1	Gaining consumer insight	1	2	3	4	5	6	7
2	Speed to market for new products or services	1	2	3	4	5	6	7
3	Other	1	2	3	4	5	6	7

Section 4

6. Please assess how difficulty would you think the following constraints could affect the innovating company in its effort to develop and scale up its innovation in South Africa.
.

		Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	Lack of access to capital or resources (finance, skilled labor, technology, equipment)	1	2	3	4	5	6	7
2	Customer lack of accessibility (shortage of business infrastructure)	1	2	3	4	5	6	7
3	Customers lack of affordability (large population with low income and/or low education)	1	2	3	4	5	6	7
4	Lack of clear government or industry regulations	1	2	3	4	5	6	7
5	Incompatibility of the innovation with existing complementary devices	1	2	3	4	5	6	7
6	Other							

Section 5

7. How big do you think is the number of competitors that have already introduced this innovation in South Africa?

		Very small	Small	Somewhat small	Same as expected	Somewhat big	Big	Very big
1	The number of new competitors	1	2	3	4	5	6	7
2	Other	1	2	3	4	5	6	7

8. Please rate how important were the following factors in stimulating the growth of this innovation's market in South Africa?

	Factors	Not important at all	Unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Important	Very important
1	Competition among new competitors with new business models	1	2	3	4	5	6	7
2	Competition from traditional competitors	1	2	3	4	5	6	7
	Other	1	2	3	4	5	6	7

9. Please answer the following questions relative to what you had expected when the innovation/new business model was introduced.

		Very small	Small	Somewhat small	Same as expected	Somewhat big	Big	Very big
1	How big is the market share the innovation/new business model has achieved to date?	1	2	3	4	5	6	7
2	How big do you think the market share of all new competitors (with the new business model) is at this point?	1	2	3	4	5	6	7
3	How big do you think the growth potential of this innovation in future?	1	2	3	4	5	6	7
4	Other	1	2	3	4	5	6	7

Section 6

10. Relative to established comparable product, please evaluate how different is the innovation.

		Very similar	Similar	Somewhat similar	Same	Somewhat different	Different	Very different
1	How different was the innovation compared to your company's previously existing core product or service design?	1	2	3	4	5	6	7
2	How different was the innovation compared to your previously existing core competencies (knowledge, technology, processes)?	1	2	3	4	5	6	7
3	How different was the innovation to your mainstream customers in the industry?	1	2	3	4	5	6	7
4	How different was the innovation compared to your previously established main revenue model in the industry?	1	2	3	4	5	6	7
5	Other…………………… …………………………	1	2	3	4	5	6	7

11. Please indicate your agreement/disagreement regarding what your company's stand was at the time when the innovation emerged in the market.

		Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	We did not respond at that time because it was difficult to anticipate the impact of the innovation on our main market	1	2	3	4	5	6	7
2	We did not respond at that time because we did not believe the innovation was the right way to do business in the industry	1	2	3	4	5	6	7
3	We did not respond at that time because there was a risk of cannibalizing existing product/service	1	2	3	4	5	6	7
4	We did not respond at that time because our management was not willing to embrace the innovation	1	2	3	4	5	6	7
5	We did not respond at that time because the innovation was not appealing to our main customers	1	2	3	4	5	6	7
6	We did not respond at that time because we would risk losing our main partners (distributors)	1	2	3	4	5	6	7
7	We did not respond at that time because our company did not have the required capabilities	1	2	3	4	5	6	7
8	Other……………………………….							7

12. Did your company respond to this innovation in any way?

Yes ☐ No ☐ No response ☐

If your answer is yes, please answer all the rest questions.

13. Please indicate the month and year the innovation was introduced.

Month________________ Year____________ No response ☐

14. How did your company introduce the innovation? Please tick the appropriate answer.

1	By introducing a separate business unit via a new company	
2	By introducing a separate business unit in an existing company	
3	By integrating the innovation in an existing business model	
4	Other/ No response/ Not applicable	

15. If your company introduced the innovation in a separate business unit, please rate how important you think the following factors were in creating a separate business model.

		Not important at all	Unimportant	Somewhat unimportant	Neither important nor unimportant	Somewhat important	Important	Very important
1	Risk of cannibalizing (destroying) previously established products/services	1	2	3	4	5	6	7
2	Risk of lowering your profit from high-margin to low-margin activities	1	2	3	4	5	6	7
3	Risk of degrading existing quality of products or services	1	2	3	4	5	6	7
4	Risk of damaging the company's image	1	2	3	4	5	6	7
5	Risk of damaging relationships with existing distribution channels	1	2	3	4	5	6	7
6	Risk of defocusing from our strategic positioning in our main market	1	2	3	4	5	6	7
7	Other……………… ……………	1	2	3	4	5	6	7

16. If your company introduced the innovation in a separate business unit, please tick the most appropriate answer applicable.

1	The CEO of the new company was a member of the parent company's management	
2	The CEO was hired from outside (was not a member of the established parent company)	
3	Other/ Not applicable/ No response	

17. If your company introduced the innovation in a separate business unit/company, to what degree is the management of the parent company involved in supporting the new unit/company in the following aspects?

		Not at all	Very little	Little	Same as expected	A fair amount	Much	Very much
1	Taking risk initiatives to embrace disruptive innovation	1	2	3	4	5	6	7
2	Championing the disruptive venture	1	2	3	4	5	6	7
3	Resolving managerial conflicts between the new unit and existing units	1	2	3	4	5	6	7
4	Screening and approving projects for the new unit	1	2	3	4	5	6	7
5	Setting strategic direction	1	2	3	4	5	6	7
6	Setting annual budget for the new unit	1	2	3	4	5	6	7
7	Exercising overall financial control	1	2	3	4	5	6	7
8	Other……………………………	1	2	3	4	5	6	7

18. If your company introduced the innovation in a separate business unit, how different are the following components of the new unit from the parent company's organization

	Components	Very similar	Similar	Somewhat similar	Same	Somewhat different	Different	Very different
1	Brand	1	2	3	4	5	6	7
2	Marketing and sales	1	2	3	4	5	6	7
3	Distribution	1	2	3	4	5	6	7
4	Production processes/activities	1	2	3	4	5	6	7
5	Supply processes/activities	1	2	3	4	5	6	7
6	Firm identity	1	2	3	4	5	6	7
7	Organizational culture	1	2	3	4	5	6	7
8	Management	1	2	3	4	5	6	7
9	Other	1	2	3	4	5	6	7

19. If your company introduced the innovation in a separate business unit while maintaining the traditional business unit, please indicate your agreement/disagreement with the following statements regarding the sharing of activities or resources between the new business unit and the corporate company's traditional business unit(s).

		Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	The sharing has enhanced the competitive advantage of both new business unit (new company and the traditional business or corporate company)	1	2	3	4	5	6	7
2	Other………………………………	1	2	3	4	5	6	7

Section 7

20. If your company responding by introducing a disruptive unit/company, please indicate how effective has your organization been in the following:

		Very ineffective	Ineffective	Somewhat ineffective	Neither effective nor ineffective	Somewhat effective	Effective	Very effective
1	By introducing the innovation in a new business unit/company, we have become part of the disruptive market	1	2	3	4	5	6	7
2	Other…………………… ……………..	1	2	3	4	5	6	7

21. Please answer the following questions relative to what you had expected when the innovation/new business model was introduced.

		Very small	Small	Somewhat small	Same as expected	Somewhat big	Big	Very big
1	How big do you think the market share of all new competitors (with the new business model) is at this point?	1	2	3	4	5	6	7
2	How big do you think the market share your company or other incumbent(s) from the industry lost as the consequence of this innovation's growth?	1	2	3	4	5	6	7
3	How big do you think the market share other incumbent(s) from other industry lost as the consequence of this innovation's growth?	1	2	3	4	5	6	7
4	How big is the threat this innovation poses to existing traditional business models in the industry in future?	1	2	3	4	5	6	7
5	Other………………………	1	2	3	4	5	6	7

Thank you very much for taking time to give this valuable information. This information is used only for academic purposes.

FULL CONFIDENTIALITY IS GUARANTEED

If you would like to receive a copy of a summary of this research findings, please contact Mr Solomon Habtay via Solomon.Habtay@wits.ac.za or call 011 717 8085.

APPENDIX B

Open Questionnaire
PhD Thesis on Disruptive Innovation

Questionnaire No.	
Position of interviewee	
Name of the company	
Place of interview	
Date of interview	
Time started	
Time finished	

1. How did your company discover the idea for the innovation?

2. What were the most important market drivers/opportunities that gave you an insight into this innovation?

3. What are the key differences of your new customer value propositions compared to traditionally existing product or offerings in the industry?

4. Please describe the general profile of your target market and your strategic position compared to a major industry incumbent's target market and its position?

5. Have you attracted or targeted customers who were not historically part of the traditional market?

6. Was the market your company targeted financially attractive to traditional large competitors?

7. How do you describe the key differences of your value-chain compared to the industry's traditional value chain?

8. What distribution approach or channels do you use to reach the final user?

9. How different is your new business model from the traditional existing industry's business models?

10. What were the major constraints for your innovations? And how did you overcome them?

11. What are your company's three most important strategic capabilities for capturing the value your company created and sustaining competition in the long-run?

12. When you first developed your innovation, did you think about a strategy?

13. What was your strategy for the innovation? And how has this changed over time?

14. Relative to what you had expected when the innovation was introduced, how fast do you think the innovation's market share has grown?

15. How big is your market share at present in this new market?

16. How long did it take your company to achieve this market share?

17. Do you describe your innovation as disruptive? How? (If yes, go to the next questions)

18. How big do you think the market share lost my major incumbents from the established market as a result of your innovation?

19. How did the industry incumbents respond to your innovation?

20. Do you foresee that in future the major incumbents will abandon the market being attacked by the innovation?

Thank you very much for taking your time to give us this valuable information. This information is used only for academic purposes.

FULL CONFIDENTIALITY IS GUARANTEED

APPENDIX C: LIST OF INTERVIEWS CONDUCTED

AIRLINES INDSUTRY			
No.	**Interviewee position**	**Date**	**Duration/Hours**
1	Senior Executive Manager	05-06-08	1:00
2	Head of Corporate Strategy & Planning	03-07-08	2:30
3	Manager: Operations	07-07-08	1:00
4	Senior Manager	08-07-08	2:00
5	Manager: Strategy & planning	20-07-08	2:00
6	Senior Manager	02-0808	1:00
7	Manager: Sales and marketing	22-08-08	2:00
8	HR Manager	18-08-08	1:30
9	General Manager: Operations	21-08-08	2:00
10	Training Manager	23-09-08	1:00
11	Executive Manager: Sales & Marketing	24-09-08	2:00
12	Manager: Group Budget & Forecasting	25-08-08	2:00
13	Executive Manager	28-09-08	1:30
INSURANCE INDUSTRY			
14	Marketing director	02-09-08	2:00
15	CEO	01-09-08	1:00
16	CEO	04-09-08	1:00
17	Vice President: Client markets	18-09-08	1:30
18	Executive Manager	29-09-08	1:30
19	Manager: Innovation hub	30-09-08	2;30
20	Senior Manager	02-10-08	1:30
21	Strategy & Innovation Manager	02-10-08	1:30
22	Head of Marketing	08-10-08	2:00
23	Managing Director	04-11-08	1:30
MOBILE & IT INDUSTRY			
24	Chief Corporate Officer	06-08-08	1:00
25	Senior Manager: Leadership & Talent Management	14-08-08	1:00
26	Executive Head: Networks	20-08-08	2:00
27	Senior Manager: Strategic Investments	18-09-08	1:30
28	Managing Director	29-05-08	2:00
29	Executive Head: Networks Services	02-10-08	1:00
30	CEO	02-10-08	2:00
31	Senior Manager: Marketing & Support Services	06-10-08	2:00
32	Managing Executive: Product & Development	10-09-08	2:00

APPENDIX D

DISRUPTIVE INNOVATION MODEL

The UNIVARIATE Procedure
Variable: RA

Moments			
N	114	**Sum Weights**	114
Mean	16.7719298	**Sum Observations**	1912
Std Deviation	5.03269855	**Variance**	25.3280546
Skewness	-0.0465252	**Kurtosis**	-0.5831916
Uncorrected SS	34930	**Corrected SS**	2862.07018
Coeff Variation	30.0066754	**Std Error Mean**	0.47135541

Basic Statistical Measures			
Location		**Variability**	
Mean	16.77193	**Std Deviation**	5.03270
Median	17.00000	**Variance**	25.32805
Mode	17.00000	**Range**	23.00000
		Interquartile Range	7.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	35.58234	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.988436	**Pr < W**	0.4435
Kolmogorov-Smirnov	**D**	0.065752	**Pr > D**	>0.1500
Cramer-von Mises	**W-Sq**	0.065388	**Pr > W-Sq**	>0.2500
Anderson-Darling	**A-Sq**	0.394245	**Pr > A-Sq**	>0.2500

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	28
99%	27
95%	25
90%	23
75% Q3	20
50% Median	17
25% Q1	13
10%	10
5%	9
1%	6
0% Min	5

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
5	41	25	71
6	37	26	1
7	81	26	101
7	80	27	17
9	113	28	14

```
Stem Leaf                     #          Boxplot
  28 0                        1             |
  27 0                        1             |
  26 00                       2             |
  25 000                      3             |
  24 0000                     4             |
  23 000000                   6             |
  22 00000                    5             |
  21 0000                     4             |
  20 0000000000              10          +-----+
  19 000000000                9          |     |
  18 0000                     4          |     |
  17 0000000000000           13          *-----*
  16 000000                   6          |  +  |
  15 0000000                  7          |     |
  14 00000000                 8          |     |
  13 00000                    5          +-----+
  12 00000000                 8             |
  11 00000                    5             |
  10 000                      3             |
   9 000000                   6             |
   8                                        |
   7 00                       2             |
   6 0                        1             |
   5 0                        1             |
     ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: RA

```
                      Normal Probability Plot
  28.5+                                          ++*
      |                                        +*
      |                                       **
      |                                     **+
      |                                   ***+
      |                                  ***+
      |                                 **++
      |                                *++
      |                              ***+
      |                             ***+
      |                            **+
      |                          ****
      |                          **+
      |                         **+
      |                       ***
      |                       **
      |                     ***
      |                    ***
      |                   **
      |                ****
      |                ++
      |              **+
      |            *++
   5.5+*          ++
       +----+----+----+----+----+----+----+----+----+----+
            -2        -1        0        +1        +2
```

The UNIVARIATE Procedure
Variable: AM

Moments			
N	114	**Sum Weights**	114
Mean	10.7807018	**Sum Observations**	1229
Std Deviation	3.85295834	**Variance**	14.845288
Skewness	0.57068115	**Kurtosis**	-0.2962887
Uncorrected SS	14927	**Corrected SS**	1677.51754
Coeff Variation	35.739402	**Std Error Mean**	0.36086261

Basic Statistical Measures			
Location		**Variability**	
Mean	10.78070	**Std Deviation**	3.85296
Median	10.00000	**Variance**	14.84529
Mode	9.00000	**Range**	16.00000
		Interquartile Range	5.00000

Note: The mode displayed is the smallest of 2 modes with a count of 15.

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	29.87481	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.954978	**Pr < W**	0.0007
Kolmogorov-Smirnov	**D**	0.132917	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.229421	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	1.42114	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	21
99%	20
95%	18
90%	17
75% Q3	13
50% Median	10
25% Q1	8
10%	6
5%	5
1%	5
0% Min	5

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
5	104	18	41
5	89	19	35
5	82	20	20
5	68	20	26
5	60	21	30

```
Stem Leaf                   #         Boxplot
  21 0                      1           0
  20 00                     2           |
  19 0                      1           |
  18 000                    3           |
  17 000000                 6           |
  16 0                      1           |
  15 0000000                7           |
  14 00000                  5           |
  13 000000000              9        +-----+
  12 00000000               8        |     |
  11 00000000               8        |     |
  10 000000000000000       15        *--+--*
   9 000000000000000       15        |     |
   8 00000000               8        +-----+
   7 000000000              9           |
   6 000000000              9           |
   5 0000000                7           |
     ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: AM

```
                    Normal Probability Plot
   21.5+                                          *
       |                                   * * ++
       |                                   *  ++
       |                                ** +++
       |                             **** ++
       |                             * +++
       |                           ***++
       |                          **+
   13.5+                           ***+
       |                        ***
       |                      ***
       |                    ****
       |                  ****
       |                ***+
       |              ****
       |           *****+
    5.5+*  * ** **+++
       +----+----+----+----+----+----+----+----+----+----+
           -2       -1        0       +1       +2
```

The UNIVARIATE Procedure
Variable: VC

Moments			
N	114	**Sum Weights**	114
Mean	20.5964912	**Sum Observations**	2348
Std Deviation	4.38565501	**Variance**	19.2339699
Skewness	-1.2300955	**Kurtosis**	2.67381909
Uncorrected SS	50534	**Corrected SS**	2173.4386
Coeff Variation	21.2932143	**Std Error Mean**	0.41075423

Basic Statistical Measures			
Location		**Variability**	
Mean	20.59649	**Std Deviation**	4.38566
Median	21.00000	**Variance**	19.23397
Mode	24.00000	**Range**	24.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	50.1431	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.91895	**Pr < W**	<0.0001
Kolmogorov-Smirnov	**D**	0.098057	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.233058	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	1.710718	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	28
99%	28
95%	26
90%	26
75% Q3	24
50% Median	21
25% Q1	18
10%	16
5%	13
1%	4
0% Min	4

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
4	44	26	101
4	41	26	113
8	37	27	1
10	26	28	92
12	39	28	104

The UNIVARIATE Procedure
Variable: VC

```
Stem Leaf                     #           Boxplot
  28 00                       2              |
  27 0                        1              |
  26 000000000                9              |
  25 0000000                  7              |
  24 000000000000000         15           +-----+
  23 0000000                  7           |     |
  22 00000000000             11           |     |
  21 000000000000            12           *-----*
  20 0000000000              10           |  +  |
  19 0000000000              10           |     |
  18 000000                   6           +-----+
  17 0000000000              10              |
  16 0000                     4              |
  15 00                       2              |
  14 00                       2              |
  13 0                        1              |
  12 0                        1              |
  11                                         |
  10 0                        1              |
   9
   8 0                        1              0
   7
   6
   5
   4 00                       2              0
     ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: VC

```
                         Normal Probability Plot
28.5+                                              +++  *  *
    |                                           ++   *
    |                                         ***** *
    |                                       ***
    |                                    *****+
    |                                   **++
    |                                 ***++
    |                               ***++
    |                             ***++
    |                           ***++
    |                         ***++
    |                       ****++
16.5+                        ** ++
    |                    * ++
    |                  **++
    |                 *+
    |               ++*
    |             ++
    |          +++  *
    |+
    |      *
    |
    |
    |
 4.5+*  *
     +----+----+----+----+----+----+----+----+----+----+
         -2       -1        0       +1       +2
```

The UNIVARIATE Procedure
Variable: CI

Moments			
N	114	**Sum Weights**	114
Mean	15.0526316	**Sum Observations**	1716
Std Deviation	3.63571786	**Variance**	13.2184443
Skewness	-0.7470679	**Kurtosis**	0.56958749
Uncorrected SS	27324	**Corrected SS**	1493.68421
Coeff Variation	24.1533704	**Std Error Mean**	0.34051618

Basic Statistical Measures			
Location		**Variability**	
Mean	15.05263	**Std Deviation**	3.63572
Median	15.50000	**Variance**	13.21844
Mode	18.00000	**Range**	18.00000
		Interquartile Range	5.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	44.20533	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.942536	**Pr < W**	<0.0001
Kolmogorov-Smirnov	**D**	0.133328	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.240439	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	1.612153	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	21.0
99%	20.0
95%	20.0
90%	19.0
75% Q3	18.0
50% Median	15.5
25% Q1	13.0
10%	10.0
5%	9.0
1%	3.0
0% Min	3.0

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
3	41	20	25
3	37	20	27
8	44	20	40
8	38	20	101
9	95	21	92

```
Stem Leaf                  #     Boxplot
  21 0                     1        |
  20 00000000              8        |
  19 000000000000         12        |
  18 000000000000000000   18     +-----+
  17 000000                6     |     |
  16 000000000000         12     |     |
  15 0000000               7     *--+--*
  14 000000000000000      15     |     |
  13 00000000              8     +-----+
  12 00000000              8        |
  11 00000                 5        |
  10 0000000               7        |
   9 000                   3        |
   8 00                    2        |
   7
   6
   5
   4
   3 00                    2        0
     ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: CI

```
                       Normal Probability Plot
   21.5+                                 +++     *
       |                             **** ** *
       |                         ******
       |                      ******+
       |                     ** +++
       |                   ****++
       |                  **++
       |               ****+
       |              ***++
   12.5+               ***+
       |           **+
       |        ****
       |       **++
       |     **++
       |   +++
       |  ++
       | +
       |
    3.5+*    *
        +----+----+----+----+----+----+----+----+----+----+
           -2       -1       0      +1       +2
```

The UNIVARIATE Procedure
Variable: Const

Moments			
N	114	**Sum Weights**	114
Mean	23.0701754	**Sum Observations**	2630
Std Deviation	4.51491001	**Variance**	20.3844124
Skewness	-0.399024	**Kurtosis**	-0.2025435
Uncorrected SS	62978	**Corrected SS**	2303.4386
Coeff Variation	19.5703323	**Std Error Mean**	0.42286007

Basic Statistical Measures			
Location		**Variability**	
Mean	23.07018	**Std Deviation**	4.51491
Median	24.00000	**Variance**	20.38441
Mode	24.00000	**Range**	22.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	54.55747	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.977975	**Pr < W**	0.0569
Kolmogorov-Smirnov	**D**	0.116671	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.169597	**Pr > W-Sq**	0.0138
Anderson-Darling	**A-Sq**	0.91965	**Pr > A-Sq**	0.0201

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	33
99%	31
95%	30
90%	29
75% Q3	26
50% Median	24
25% Q1	20
10%	17
5%	15
1%	12
0% Min	11

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
11	70	30	57
12	44	30	73
13	16	31	28
14	37	31	42
14	14	33	64

```
Stem Leaf                      #           Boxplot
  33 0                         1              |
  32                                          |
  31 00                        2              |
  30 0000                      4              |
  29 0000000                   7              |
  28 0000                      4              |
  27 000000                    6              |
  26 00000000000              11           +-----+
  25 00000000000              11           |     |
  24 000000000000000          15           *-----*
  23 00000000                  8           |  +  |
  22 00000000                  8           |     |
  21 00000                     5           |     |
  20 0000000                   7           +-----+
  19 00                        2              |
  18 00000000000              11              |
  17 000                       3              |
  16 0                         1              |
  15 000                       3              |
  14 00                        2              |
  13 0                         1              |
  12 0                         1              |
  11 0                         1              |
     ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: Const

```
                    Normal Probability Plot
33.5+                                          +++*
    |                                       ++
    |                                     ++* *
    |                                   ** *
    |                                 ****
    |                               **++
    |                              ***
    |                            ****
    |                           ***+
    |                         ****++
    |                        ***+++
22.5+                          **++
    |                     **++
    |                    ***+
    |                   +*+
    |                 *****
    |               **+
    |              +*
    |             ***
    |          +*+*
    |        ++*
    |      ++*
11.5+*
     +----+----+----+----+----+----+----+----+----+----+
          -2   -1    0   +1   +2
```

The UNIVARIATE Procedure
Variable: Comp

Moments			
N	114	**Sum Weights**	114
Mean	12.1491228	**Sum Observations**	1385
Std Deviation	4.07068618	**Variance**	16.5704859
Skewness	-0.3644337	**Kurtosis**	-0.1444053
Uncorrected SS	18699	**Corrected SS**	1872.46491
Coeff Variation	33.506009	**Std Error Mean**	0.38125469

Basic Statistical Measures			
Location		**Variability**	
Mean	12.14912	**Std Deviation**	4.07069
Median	13.00000	**Variance**	16.57049
Mode	13.00000	**Range**	18.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	31.86616	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.972442	**Pr < W**	0.0187
Kolmogorov-Smirnov	**D**	0.10033	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.125696	**Pr > W-Sq**	0.0497
Anderson-Darling	**A-Sq**	0.851037	**Pr > A-Sq**	0.0284

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	21
99%	20
95%	18
90%	17
75% Q3	15
50% Median	13
25% Q1	9
10%	7
5%	3
1%	3
0% Min	3

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
3	101	19	4
3	93	19	40
3	88	20	15
3	83	20	17
3	80	21	14

```
Stem Leaf                  #        Boxplot
 21 0                      1          |
 20 00                     2          |
 19 00                     2          |
 18 0000                   4          |
 17 00000                  5          |
 16 0000000000            10          |
 15 0000000000            10       +-----+
 14 000000000000          12       |     |
 13 0000000000000         13       *-----*
 12 000000000              9       |  +  |
 11 000000000              9       |     |
 10 0000000                7       |     |
  9 0000000                7       +-----+
  8 0000000000            10          |
  7 00000                  5          |
  6 0                      1          |
  5                                   |
  4                                   |
  3 0000000                7          |
    ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: Comp

```
                      Normal Probability Plot
 21.5+                                          +++*
     |                                       *+*
     |                                     *+*
     |                                   ****
     |                                  ***
     |                                ****
     |                              ****+
     |                             ***++
     |                           ***++
 12.5+                            **+++
     |                        **++
     |                       **++
     |                      ***
     |                    *****
     |                   ***+
     |                  *++
     |                 ++
     |               +++
  3.5+*   *+** **
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1        0        +1        +2
```

The UNIVARIATE Procedure
Variable: IG

Moments			
N	114	**Sum Weights**	114
Mean	12.1491228	**Sum Observations**	1385
Std Deviation	3.99830153	**Variance**	15.9864152
Skewness	0.1175955	**Kurtosis**	-0.8596209
Uncorrected SS	18633	**Corrected SS**	1806.46491
Coeff Variation	32.9102076	**Std Error Mean**	0.37447525

Basic Statistical Measures			
Location		**Variability**	
Mean	12.14912	**Std Deviation**	3.99830
Median	12.00000	**Variance**	15.98642
Mode	11.00000	**Range**	16.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	32.44306	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.971661	**Pr < W**	0.0160
Kolmogorov-Smirnov	**D**	0.086782	**Pr > D**	0.0343
Cramer-von Mises	**W-Sq**	0.119327	**Pr > W-Sq**	0.0640
Anderson-Darling	**A-Sq**	0.835199	**Pr > A-Sq**	0.0316

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	20
99%	20
95%	19
90%	18
75% Q3	15
50% Median	12
25% Q1	9
10%	7
5%	6
1%	5
0% Min	4

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
4	64	19	14
5	82	19	101
5	38	19	107
6	76	20	28
6	75	20	92

```
Stem Leaf                    #        Boxplot
  20 00                      2           |
  19 0000000                 7           |
  18 00000                   5           |
  17 00000                   5           |
  16 00000000                8           |
  15 000000                  6        +-----+
  14 00000000                8        |     |
  13 00000000000            11        |     |
  12 00000000                8        *--+--*
  11 000000000000000        15        |     |
  10 00000                   5        |     |
   9 0000000000             10        +-----+
   8 000000000               9           |
   7 00000                   5           |
   6 0000000                 7           |
   5 00                      2           |
   4 0                       1           |
     ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: IG

```
                     Normal Probability Plot
 20.5+                                          ++*  *
     |                                     ****+**
     |                                   ***+++
     |                                 ** ++
     |                              ***+++
     |                             **++
     |                           **++
     |                        ***+
 12.5+                          ***+
     |                     ****
     |                    **+
     |                 ****
     |              ****
     |            ***
     |      * ****+
     |   * *  ++
  4.5+*     +++
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

Note that the statistics on variables from Disparity through to IP (Incumbent Performance) covers data only from 88 respondents. But the SAS 9.2 software assigns the missing value as "1". Therefore, the number of observations "N" is indicated as 114.

The UNIVARIATE Procedure

Variable: Disparity

Moments			
N	114	**Sum Weights**	114
Mean	19.1754386	**Sum Observations**	2186
Std Deviation	4.23689153	**Variance**	17.9512498
Skewness	0.00020814	**Kurtosis**	-0.314744
Uncorrected SS	43946	**Corrected SS**	2028.49123
Coeff Variation	22.0954087	**Std Error Mean**	0.39682125

Basic Statistical Measures			
Location		**Variability**	
Mean	19.17544	**Std Deviation**	4.23689
Median	19.00000	**Variance**	17.95125
Mode	18.00000	**Range**	19.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	48.32261	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.98417	**Pr < W**	0.1994
Kolmogorov-Smirnov	**D**	0.077918	**Pr > D**	0.0879
Cramer-von Mises	**W-Sq**	0.09092	**Pr > W-Sq**	0.1488
Anderson-Darling	**A-Sq**	0.548427	**Pr > A-Sq**	0.1597

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	28
99%	28
95%	26
90%	25
75% Q3	22
50% Median	19
25% Q1	16
10%	14
5%	12
1%	9
0% Min	9

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
9	91	27	57
9	37	27	95
11	62	27	110
11	39	28	14
11	26	28	19

```
Stem Leaf                     #         Boxplot
  28 00                       2            |
  27 000                      3            |
  26 000000                   6            |
  25 0000                     4            |
  24 00000                    5            |
  23 000000                   6            |
  22 0000                     4         +-----+
  21 000000000000            12         |     |
  20 00000000                 8         |     |
  19 00000000000             11         *--+--*
  18 00000000000000          14         |     |
  17 0000000000              10         |     |
  16 00000000                 8         +-----+
  15 00000000                 8            |
  14 000                      3            |
  13 000                      3            |
  12 00                       2            |
  11 000                      3            |
  10                                       |
   9 00                       2            |
     ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: Disparity

```
                 Normal Probability Plot
    28.5+                                         +*+ *
        |                                 * **
        |                               *****+
        |                              ***+++
        |                             ***++
        |                            **++
        |                           **++
        |                         ****
        |                        **+
        |                       ***
        |                     ****
        |                    ***+
        |                  ***+
        |                 ****+
        |                **++
        |               **+
        |             **+
        |           **+*
        |          ++
     9.5+*++*
        +----+----+----+----+----+----+----+----+----+----+
          -2       -1        0       +1       +2
```

The UNIVARIATE Procedure
Variable: Dillema

Moments			
N	114	**Sum Weights**	114
Mean	27.1754386	**Sum Observations**	3098
Std Deviation	8.65795007	**Variance**	74.9600994
Skewness	0.88048318	**Kurtosis**	-0.2117238
Uncorrected SS	92660	**Corrected SS**	8470.49123
Coeff Variation	31.8594676	**Std Error Mean**	0.81089132

Basic Statistical Measures			
Location		**Variability**	
Mean	27.17544	**Std Deviation**	8.65795
Median	25.00000	**Variance**	74.96010
Mode	21.00000	**Range**	35.00000
		Interquartile Range	10.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	33.51305	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.902722	**Pr < W**	<0.0001
Kolmogorov-Smirnov	**D**	0.134331	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.673265	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	4.08598	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	49
99%	47
95%	45
90%	42
75% Q3	31
50% Median	25
25% Q1	21
10%	18
5%	17
1%	14
0% Min	14

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
14	39	45	15
14	37	46	5
16	87	46	23
16	47	47	29
16	38	49	14

```
Stem Leaf                     #          Boxplot
  48 0                        1             0
  46 000                      3             0
  44 0000                     4             |
  42 0000000                  7             |
  40 000                      3             |
  38 0                        1             |
  36 000                      3             |
  34 0                        1             |
  32 0000                     4             |
  30 000000                   6          +-----+
  28 0000000000              10          |     |
  26 000000000000            12          |  +  |
  24 000000000                9          *-----*
  22 000000000000            12          |     |
  20 00000000000000000000000 23          +-----+
  18 0000000                  7             |
  16 000000                   6             |
  14 00                       2             |
     ----+----+----+----+---
```

The UNIVARIATE Procedure
Variable: Dillema

```
                     Normal Probability Plot
49+                                                *
  |                                          ** *++
  |                                       ***  ++
  |                                    ****   ++
  |                                    **   +++
  |                                    *  ++
  |                                   * ++
  |                                   *++
  |                                  +**
  |                                ++**
  |                              ++***
  |                            ++***
  |                          ++**
  |                         +***
  |                    ********
  |                 ****++
  |     ** ***     ++
15+*  *        +++
   +----+----+----+----+----+----+----+----+----+----+
     -2    -1     0    +1    +2
```

The UNIVARIATE Procedure
Variable: DI

Moments			
N	114	**Sum Weights**	114
Mean	14.6666667	**Sum Observations**	1672
Std Deviation	4.84387519	**Variance**	23.4631268
Skewness	0.27831018	**Kurtosis**	-0.9393634
Uncorrected SS	27174	**Corrected SS**	2651.33333
Coeff Variation	33.0264217	**Std Error Mean**	0.45367048

Basic Statistical Measures			
Location		**Variability**	
Mean	14.66667	**Std Deviation**	4.84388
Median	14.00000	**Variance**	23.46313
Mode	12.00000	**Range**	19.00000
		Interquartile Range	7.00000

Note: The mode displayed is the smallest of 2 modes with a count of 10.

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	32.3289	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.959815	**Pr < W**	0.0017
Kolmogorov-Smirnov	**D**	0.103757	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.195519	**Pr > W-Sq**	0.0060
Anderson-Darling	**A-Sq**	1.291641	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	26
99%	24
95%	23
90%	21
75% Q3	18
50% Median	14
25% Q1	11
10%	8
5%	8
1%	7
0% Min	7

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
7	57	23	22
7	41	24	19
7	38	24	23
7	37	24	28
8	101	26	29

```
Stem Leaf                  #          Boxplot
  26 0                   1              |
  25                                    |
  24 000                   3              |
  23 000                   3              |
  22 0000                  4              |
  21 000000                6              |
  20 00000000              8              |
  19 0                   1              |
  18 0000000000           10            +-----+
  17 0000                  4           |     |
  16 000000000             9           |     |
  15 00000                 5           |     |
  14 00000000              8           *--+--*
  13 0000000               7           |     |
  12 0000000000           10           |     |
  11 00000000              8           +-----+
  10 0000000               7              |
   9 00000000              8              |
   8 00000000              8              |
   7 0000                  4              |
    ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: DI

```
                      Normal Probability Plot
26.5+                                         +*
    |                                     ++
    |                                   **+*
    |                                 **++
    |                               ***++
    |                              ***++
    |                            *** ++
    |                            *+++
    |                         ***+
    |                         **+
    |                        ***
    |                       **
    |                      ***
    |                     ***
    |                   ***
    |                  ***
    |                 ***
    |               ****
    |           *****+
 7.5+*  * **  ++
     +----+----+----+----+----+----+----+----+----+----+
        -2      -1       0      +1       +2
```

The UNIVARIATE Procedure
Variable: Conflict

Moments			
N	114	**Sum Weights**	114
Mean	26.0877193	**Sum Observations**	2974
Std Deviation	7.27532063	**Variance**	52.9302903
Skewness	0.35610587	**Kurtosis**	-1.3601141
Uncorrected SS	83566	**Corrected SS**	5981.12281
Coeff Variation	27.8879137	**Std Error Mean**	0.68139621

Basic Statistical Measures			
Location		**Variability**	
Mean	26.08772	**Std Deviation**	7.27532
Median	24.00000	**Variance**	52.93029
Mode	18.00000	**Range**	25.00000
		Interquartile Range	13.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	38.28568	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.893232	**Pr < W**	<0.0001
Kolmogorov-Smirnov	**D**	0.186579	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.767642	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	4.587946	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	40
99%	39
95%	38
90%	37
75% Q3	33
50% Median	24
25% Q1	20
10%	18
5%	18
1%	16
0% Min	15

Extreme Observations			
Lowest		Highest	
Value	**Obs**	**Value**	**Obs**
15	81	38	84
16	50	39	15
18	108	39	18
18	106	39	24
18	104	40	22

The UNIVARIATE Procedure
Variable: Conflict

```
 Stem Leaf                  #   Boxplot
   40 0                     1      |
   39 000                   3      |
   38 0000                  4      |
   37 00000                 5      |
   36 00000                 5      |
   35 0                     1      |
   34 000000                6      |
   33 00000                 5   +-----+
   32 000                   3   |     |
   31 000000                6   |     |
   30 0000                  4   |     |
   29 00                    2   |     |
   28 00000                 5   |     |
   27 00                    2   |     |
   26 00                    2   |  +  |
   25 0                     1   |     |
   24 000                   3   *-----*
   23 00                    2   |     |
   22 00000000              8   |     |
   21 000                   3   |     |
   20 0000000000000000     16   +-----+
   19 0000000               7      |
   18 000000000000000000   18      |
   17                              |
   16 0                     1      |
   15 0                     1      |
      ----+----+----+----+
```

The UNIVARIATE Procedure
Variable: Conflict

```
                    Normal Probability Plot
40.5+                                          +    *
    |                                       +** *
    |                                    ***
    |                                 ***++
    |                               *** +
35.5+                                   *  +
    |                             ** ++
    |                           *** +
    |                           *  +
    |                         ** ++
30.5+                            ** +
    |                        * +
    |                       **+
    |                      *+
    |                     +*
25.5+                        + *
    |                    + *
    |                  ++ **
    |                 +  **
    |                +  *
20.5+                  +*****
    |              ***
    |  ** *********
    |             +
    |  *         +
15.5+*            ++
    +----+----+----+----+----+----+----+----+----+----+
       -2      -1       0      +1      +2
```

The UNIVARIATE Procedure
Variable: Involvement

Moments			
N	114	**Sum Weights**	114
Mean	29.3859649	**Sum Observations**	3350
Std Deviation	7.56155714	**Variance**	57.1771464
Skewness	0.17305357	**Kurtosis**	-1.3317067
Uncorrected SS	104904	**Corrected SS**	6461.01754
Coeff Variation	25.7318661	**Std Error Mean**	0.70820471

Basic Statistical Measures			
Location		**Variability**	
Mean	29.38596	**Std Deviation**	7.56156
Median	28.00000	**Variance**	57.17715
Mode	35.00000	**Range**	28.00000
		Interquartile Range	13.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	41.4936	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.922	**Pr < W**	<0.0001
Kolmogorov-Smirnov	**D**	0.1746	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.594201	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	3.485413	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	44
99%	43
95%	41
90%	40
75% Q3	35
50% Median	28
25% Q1	22
10%	21
5%	19
1%	18
0% Min	16

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
16	33	42	26
18	35	42	27
19	44	43	20
19	36	43	73
19	28	44	74

```
Stem Leaf                     #           Boxplot
 44 0                        1              |
 42 0000                     4              |
 40 00000000                 8              |
 38 000000                   6              |
 36 0000                     4              |
 34 00000000000000000000000  23          +-----+
 32 000                      3           |     |
 30 00000                    5           |     |
 28 00000000                 8           *--+--*
 26 00000                    5           |     |
 24 00000000                 8           |     |
 22 0000000000000            13          +-----+
 20 00000000000000000000     20             |
 18 00000                    5              |
 16 0                        1              |
    ----+----+----+----+---
```

The UNIVARIATE Procedure
Variable: Involvement

```
                      Normal Probability Plot
45+                                            ++   *
  |                                         *+** *
  |                                      ******
  |                                    ***++
  |                                   **++
  |                                ******
  |                                * +++
31+                                  **+
  |                              ***
  |                           ++**
  |                         +++***
  |                        ++****
  |                    *********
  |  * ** * +++
17+*       ++
   +----+----+----+----+----+----+----+----+----+----+
        -2       -1       0      +1      +2
```

The UNIVARIATE Procedure
Variable: Org_separation

Moments			
N	114	**Sum Weights**	114
Mean	35.1315789	**Sum Observations**	4005
Std Deviation	9.40392797	**Variance**	88.4338612
Skewness	0.24416047	**Kurtosis**	-1.3120971
Uncorrected SS	150695	**Corrected SS**	9993.02632
Coeff Variation	26.767735	**Std Error Mean**	0.88075855

Basic Statistical Measures			
Location		**Variability**	
Mean	35.13158	**Std Deviation**	9.40393
Median	34.00000	**Variance**	88.43386
Mode	24.00000	**Range**	30.00000
		Interquartile Range	20.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	39.88787	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.89795	**Pr < W**	<0.0001
Kolmogorov-Smirnov	**D**	0.162439	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.473559	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	3.652084	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	53
99%	52
95%	50
90%	49
75% Q3	44
50% Median	34
25% Q1	24
10%	24
5%	24
1%	24
0% Min	23

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
23	54	50	23
24	114	51	18
24	113	51	28
24	112	52	17
24	111	53	19

```
Stem Leaf                    #        Boxplot
  52 00                      2           |
  50 0000                    4           |
  48 0000000000             10           |
  46 00000000                8           |
  44 000000                  6        +-----+
  42 000000                  6        |     |
  40 0000                    4        |     |
  38 0000                    4        |     |
  36 00000                   5        |     |
  34 000000000000           12        *--+--*
  32 000000000               9        |     |
  30 0000000                 7        |     |
  28 00                      2        |     |
  26 000                     3        |     |
  24 0000000000000000000000000000000    31     +-----+
  22 0                       1           |
     ----+----+----+----+----+----+-
```

The UNIVARIATE Procedure
Variable: Org_separation

```
                     Normal Probability Plot
53+                                        +++ *  *
  |                                    +* **
  |                                 ******
47+                                 ****++
  |                              *** ++
  |                             ** ++
41+                               **++
  |                           **+
  |                          +**
35+                           ****
  |                       ***
  |                      +**
29+                       ++*
  |                   ++ **
  |  * ** ************
23+*                  ++
   +----+----+----+----+----+----+----+----+----+----+
       -2       -1        0        +1       +2
```

The UNIVARIATE Procedure
Variable: IP

Moments			
N	114	**Sum Weights**	114
Mean	8.18421053	**Sum Observations**	933
Std Deviation	2.77971728	**Variance**	7.72682813
Skewness	0.364762	**Kurtosis**	-0.8514009
Uncorrected SS	8509	**Corrected SS**	873.131579
Coeff Variation	33.9643911	**Std Error Mean**	0.26034438

Basic Statistical Measures			
Location		**Variability**	
Mean	8.184211	**Std Deviation**	2.77972
Median	7.000000	**Variance**	7.72683
Mode	6.000000	**Range**	12.00000
		Interquartile Range	5.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	31.43609	**Pr > |t|**	<.0001
Sign	**M**	57	**Pr >= |M|**	<.0001
Signed Rank	**S**	3277.5	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.900854	**Pr < W**	<0.0001
Kolmogorov-Smirnov	**D**	0.231366	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	0.948879	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	5.312473	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	14
99%	14
95%	13
90%	12
75% Q3	11
50% Median	7
25% Q1	6
10%	6
5%	5
1%	2
0% Min	2

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
2	81	13	73
2	63	13	84
4	46	13	88
4	9	14	74
5	52	14	91

DISRUPTIVE INNOVATION MODEL

The UNIVARIATE Procedure
Variable: IP

```
Stem Leaf                                      #   Boxplot
  14 00                                        2      |
  13                                                  |
  13 000000000                                 9      |
  12                                                  |
  12 000000                                    6      |
  11                                                  |
  11 0000000000000                            13   +-----+
  10                                               |     |
  10 000000000                                 9   |     |
   9                                               |     |
   9 0000000000                               10   |     |
   8                                               |     |
   8 00000                                     5   |  +  |
   7                                               |     |
   7 000000000                                 9   *-----*
   6                                               |     |
   6 0000000000000000000000000000000000000000000  43   +-----+
   5                                                  |
   5 0000                                      4      |
   4                                                  |
   4 00                                        2      |
   3                                                  |
   3                                                  |
   2                                                  |
   2 00                                        2      |
     ----+----+----+----+----+----+----+----+---
```

The UNIVARIATE Procedure
Variable: IP

```
                          Normal Probability Plot
14.25+                                     +*  *
     |                                 +
     |                            *****+**
     |                              ++
     |                          ***++
     |                           ++
     |                       *****+
     |                         ++
     |                     ***++
     |                      ++
     |                    ***
     |                    +
 8.25+                     +**
     |                 ++
     |               ++ ***
     |              ++
     |        **************
     |            ++
     |      ***    ++
     |         ++
     |    **   ++
     |       +
     |     ++
     |    ++
 2.25+*  *+
     +----+----+----+----+----+----+----+----+----+----+
         -2       -1        0       +1       +2
```

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 5 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	2.93874763	1.92959674	0.5877	0.5877
2	1.00915088	0.48937664	0.2018	0.7896
3	0.51977425	0.21498116	0.1040	0.8935
4	0.30479308	0.07725893	0.0610	0.9545
5	0.22753416		0.0455	1.0000

2 factors will be retained by the MINEIGEN criterion.

Factor Pattern			
		Factor1	**Factor2**
RA1	**RA1**	0.77257	0.37041
RA2	**RA2**	0.86733	0.14683
RA3	**RA3**	0.62171	0.58147
RA4	**RA4**	0.80516	-0.44124
RA5	**RA5**	0.74486	-0.56354

Variance Explained by Each Factor	
Factor1	**Factor2**
2.9387476	1.0091509

Final Communality Estimates: Total = 3.947899				
RA1	RA2	RA3	RA4	RA5
0.73407507	0.77382569	0.72463586	0.84297055	0.87239134

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 4 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	2.33930454	1.62640747	0.5848	0.5848
2	0.71289707	0.13318056	0.1782	0.7631
3	0.57971651	0.21163462	0.1449	0.9080
4	0.36808188		0.0920	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
AM1	**AM1**	0.74563
AM2	**AM2**	0.81671
AM3	**AM3**	0.82413
AM4	**AM4**	0.66117

Variance Explained by Each Factor
Factor1
2.3393045

Final Community Estimates: Total = 2.339305			
AM1	**AM2**	**AM3**	**AM4**
0.55595794	0.66701973	0.67918390	0.43714298

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 4 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	2.40127949	1.51832676	0.6003	0.6003
2	0.88295274	0.46889319	0.2207	0.8211
3	0.41405955	0.11235133	0.1035	0.9246
4	0.30170822		0.0754	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
VC1	**VC1**	0.88843
VC2	**VC2**	0.59628
VC3	**VC3**	0.75091
VC4	**VC4**	0.83220

Variance Explained by Each Factor
Factor1
2.4012795

Final Communality Estimates: Total = 2.401279			
VC1	**VC2**	**VC3**	**VC4**
0.78930878	0.35555120	0.56386883	0.69255068

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 3 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	2.07823555	1.44416437	0.6927	0.6927
2	0.63407117	0.34637790	0.2114	0.9041
3	0.28769328		0.0959	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
CI1	**CI1**	0.74130
CI2	**CI2**	0.90111
CI3	**CI3**	0.84659

Variance Explained by Each Factor
Factor1
2.0782355

Final Communality Estimates: Total = 2.078236		
CI1	**CI2**	**CI3**
0.54952600	0.81199496	0.71671459

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 5 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	2.02247072	1.03408025	0.4045	0.4045
2	0.98839046	0.13442291	0.1977	0.6022
3	0.85396755	0.14636592	0.1708	0.7730
4	0.70760163	0.28003198	0.1415	0.9145
5	0.42756964		0.0855	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
Const1	**Const1**	0.69586
Const2	**Const2**	0.80732
Const3	**Const3**	0.43925
Const4	**Const4**	0.66614
Const5	**Const5**	0.49980

Variance Explained by Each Factor
Factor1
2.0224707

Final Communality Estimates: Total = 2.022471				
Const1	**Const2**	**Const3**	**Const4**	**Const5**
0.48422109	0.65176985	0.19294287	0.44373785	0.24979905

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 3 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	1.84005400	0.98212013	0.6134	0.6134
2	0.85793387	0.55592175	0.2860	0.8993
3	0.30201213		0.1007	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
Comp1	**Comp1**	0.54469
Comp2	**Comp2**	0.90455
Comp3	**Comp3**	0.85156

Variance Explained by Each Factor
Factor1
1.8400540

Final Communality Estimates: Total = 1.840054		
Comp1	**Comp2**	**Comp3**
0.29668774	0.81821072	0.72515554

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 3 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	1.52973380	0.46993706	0.5099	0.5099
2	1.05979673	0.64932726	0.3533	0.8632
3	0.41046947		0.1368	1.0000

2 factors will be retained by the MINEIGEN criterion.

Factor Pattern			
		Factor1	**Factor2**
IG1	**IG1**	0.85914	-0.28414
IG2	**IG2**	0.88433	0.16819
IG3	**IG3**	0.09782	0.97508

Variance Explained by Each Factor	
Factor1	**Factor2**
1.5297338	1.0597967

Final Communality Estimates: Total = 2.589531		
IG1	**IG2**	**IG3**
0.81885898	0.81033001	0.96034155

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 4 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	2.29738286	1.45808883	0.5743	0.5743
2	0.83929403	0.34475565	0.2098	0.7842
3	0.49453838	0.12575364	0.1236	0.9078
4	0.36878473		0.0922	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
Disparity1	**Disparity1**	0.70099
Disparity2	**Disparity2**	0.77802
Disparity3	**Disparity3**	0.84808
Disparity4	**Disparity4**	0.69387

Variance Explained by Each Factor
Factor1
2.2973829

Final Community Estimates: Total = 2.297383			
Disparity1	**Disparity2**	**Disparity3**	**Disparity4**
0.49138510	0.60531353	0.71923541	0.48144883

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 6 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	3.87890959	3.24527928	0.6465	0.6465
2	0.63363031	0.16239493	0.1056	0.7521
3	0.47123538	0.06032763	0.0785	0.8306
4	0.41090776	0.06792757	0.0685	0.8991
5	0.34298019	0.08064342	0.0572	0.9563
6	0.26233677		0.0437	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
Conflict1	**Conflict1**	0.84603
Conflict2	**Conflict2**	0.74144
Conflict3	**Conflict3**	0.84688
Conflict4	**Conflict4**	0.77766
Conflict5	**Conflict5**	0.79553
Conflict6	**Conflict6**	0.81154

Variance Explained by Each Factor
Factor1
3.8789096

Final Communality Estimates: Total = 3.878910					
Conflict1	**Conflict2**	**Conflict3**	**Conflict4**	**Conflict5**	**Conflict6**
0.71576152	0.54972824	0.71720977	0.60475627	0.63286418	0.65858961

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 7 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	4.40847251	3.53125854	0.6298	0.6298
2	0.87721397	0.25274166	0.1253	0.7551
3	0.62447231	0.26209014	0.0892	0.8443
4	0.36238217	0.06573894	0.0518	0.8961
5	0.29664323	0.05647745	0.0424	0.9385
6	0.24016578	0.04951574	0.0343	0.9728
7	0.19065004		0.0272	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
Dillema1	**Dillema1**	0.82985
Dillema2	**Dillema2**	0.79610
Dillema3	**Dillema3**	0.86987
Dillema4	**Dillema4**	0.71735
Dillema5	**Dillema5**	0.75353
Dillema6	**Dillema6**	0.88495
Dillema7	**Dillema7**	0.68105

Variance Explained by Each Factor
Factor1
4.4084725

Final Community Estimates: Total = 4.408473						
Dillema1	**Dillema2**	**Dillema3**	**Dillema4**	**Dillema5**	**Dillema6**	**Dillema7**
0.6886539 7	0.6337810 0	0.7566724 6	0.5145913 1	0.5678137 9	0.7831294 3	0.4638305 4

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 4 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	2.51321940	1.89284495	0.6283	0.6283
2	0.62037446	0.03665910	0.1551	0.7834
3	0.58371535	0.30102456	0.1459	0.9293
4	0.28269079		0.0707	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
DI1	**DI1**	0.83695
DI2	**DI2**	0.87042
DI3	**DI3**	0.71445
DI4	**DI4**	0.73801

Variance Explained by Each Factor
Factor1
2.5132194

Final Communality Estimates: Total = 2.513219			
DI1	**DI2**	**DI3**	**DI4**
0.70049202	0.75762881	0.51043576	0.54466281

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components

Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 7 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	3.69647118	2.53101188	0.5281	0.5281
2	1.16545929	0.47835815	0.1665	0.6946

Eigenvalues of the Correlation Matrix: Total = 7 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
3	0.68710115	0.08721649	0.0982	0.7927
4	0.59988466	0.04372606	0.0857	0.8784
5	0.55615860	0.39633457	0.0795	0.9579
6	0.15982402	0.02472292	0.0228	0.9807
7	0.13510111		0.0193	1.0000

2 factors will be retained by the MINEIGEN criterion.

Factor Pattern			
		Factor1	**Factor2**
Involvement1	**Involvement1**	0.70952	0.08929
Involvement2	**Involvement2**	0.86055	0.06287
Involvement3	**Involvement3**	0.84676	0.07471
Involvement4	**Involvement4**	0.76255	-0.51501
Involvement5	**Involvement5**	0.71991	-0.52548
Involvement6	**Involvement6**	0.64757	0.46012
Involvement7	**Involvement7**	0.46520	0.62839

Variance Explained by Each Factor	
Factor1	**Factor2**
3.6964712	1.1654593

Final Communality Estimates: Total = 4.861930						
Involvement1	**Involvement2**	**Involvement3**	**Involvement4**	**Involvement5**	**Involvement6**	**Involvement7**
0.51138994	0.74449699	0.72257872	0.84670795	0.79439957	0.63106417	0.61129312

DISRUPTIVE INNOVATION MODEL

The FACTOR Procedure
Initial Factor Method: Principal Components

Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 8 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	4.60643393	3.22664140	0.5758	0.5758
2	1.37979253	0.81730322	0.1725	0.7483
3	0.56248931	0.04864960	0.0703	0.8186
4	0.51383972	0.19352965	0.0642	0.8828
5	0.32031006	0.04879574	0.0400	0.9229
6	0.27151432	0.07372716	0.0339	0.9568
7	0.19778716	0.04995421	0.0247	0.9815
8	0.14783296		0.0185	1.0000

2 factors will be retained by the MINEIGEN criterion.

Factor Pattern			
		Factor1	**Factor2**
Org_separation1	**Org_separation1**	0.69578	-0.57800
Org_separation2	**Org_separation2**	0.87543	0.03750
Org_separation3	**Org_separation3**	0.89593	0.14003
Org_separation4	**Org_separation4**	0.74839	0.49110
Org_separation5	**Org_separation5**	0.54896	0.58055
Org_separation6	**Org_separation6**	0.71469	-0.40851
Org_separation7	**Org_separation7**	0.75086	-0.46455
Org_separation8	**Org_separation8**	0.78564	0.25256

Variance Explained by Each Factor	
Factor1	**Factor2**
4.6064339	1.3797925

Final Communality Estimates: Total = 5.986226							
Org_separation1	**Org_separation2**	**Org_separation3**	**Org_separation4**	**Org_separation5**	**Org_separation6**	**Org_separation7**	**Org_separation8**
0.81819817	0.76778840	0.82229700	0.80126161	0.63839725	0.67766341	0.77960251	0.68101811

The FACTOR Procedure
Initial Factor Method: Principal Components
Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 2 Average = 1				
	Eigenvalue	**Difference**	**Proportion**	**Cumulative**
1	1.71342326	1.42684653	0.8567	0.8567
2	0.28657674		0.1433	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern		
		Factor1
IP1	**IP1**	0.92559
IP2	**IP2**	0.92559

Variance Explained by Each Factor
Factor1
1.7134233

Final Communality Estimates: Total = 1.713423	
IP1	**IP2**
0.85671163	0.85671163

APPENDIX E

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (NON MEDICAL)
R14/49 Habtay

RETROSPECTIVE ACKNOWLEDGEMENT **PROTOCOL NUMBER H1 10247**

PROJECT Business model reinvention for enabling disruptive innovation

INVESTIGATORS Mr S Habtay

DEPARTMENT Strategic Management (Marketing)

DATE CONSIDERED 13.05.2011

DECISION OF THE COMMITTEE* Retrospective acknowledgement granted

NOTE:

DATE 29.04.2011 **CHAIRPERSON** ....
(Professor R Thornton)

cc: Supervisor : Prof G Garzarelli

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 a completion of a yearly progress report.**

Signature

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES