

**ENABLING INDUSTRY INFLECTION AND
CORPORATE INNOVATION:
UTILISING COMPLEXITY THINKING FOR INNOVATIVE
STRATEGIC MANAGEMENT**

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Declaration

I, the undersigned, hereby declare that the work contained in this assignment is my own original work and that I have not previously, in its entirety or in part, submitted it at any university for a degree.

Abstract

In the new economy, many industries - more specifically those that can be replaced electronically - are generally believed to be in peril of strategic inflection points. Scrutiny of available researches on the drivers of discontinuity indicates that some strategic inflection points can be foreseen, but many cannot be anticipated, because initially inflection points emerge very small, and can often be missed, but then they suddenly strike hard without warning. A strategic point of inflection occurs when existing ways of doing business and industry structure subtly but profoundly change.

This study proposed to review the application of the complexity theory to strategic management for enabling industry inflection and corporate innovation. The study describes a couple-phased complexity approach for enabling industry inflection. The first phase starts by building organisational fitness through designing complex adaptive systems, internal to the organisation, and nurturing healthy co-evolution with external key players. The application of “communities of practice” into complex adaptive systems of organisational design is demonstrated as an essential means to drive the organization to the edge of chaos through which new businesses may evolve that can potentially trigger an inflection point.

The co-evolutionary approach is explained as a process to develop patterns of co-adaptation with key players, whereby co-adapters collaborate to adapt effectively, although they still remain free to compete for a prime-movership position. This is hypothetically postulated to be space transition at the edge of chaos at the socio-cultural business system level, where active members, driven by the moving self-organization, engage in exploratory dialogue to explore space possibilities for systemic innovations.

The second phase is described in four strategic stages for enabling industry inflection and corporate innovation. The strategic inflection point begins with a definition of a customer value proposition. This leads to the co-experimentation stage where co-creators jointly experiment with diverse new business models comprising a variety of customer value propositions that appeal to different segments. The success of new business model may cause industry inflection, subsequently leading to the third stage where the inflection point creates uncertainty to both the co-creators and their competitors, because the final success of a proactive strategic inflection point depends on the market dynamics.

The salient conclusion of this study is that the complexity theory does not guarantee the complete success of a proactive strategy for enabling industry inflection. An inflection point can barely result from a deliberate strategic process only. Neither is a strategic inflection point a function of perfectly unexplainable market factors. Recommendations have been provided for further research to address, among others, the conceptual gap between the scientific analysis and the non-linear assumption of the complexity theory.

Opsomming

Daar word in die hedendaagse ekonomie algemeen aanvaar dat baie nywerhede – in die besonder dié wat elektronies vervang kan word – gevaar loop van strategiese invalspunte. Noukeurige ondersoek van beskikbare navorsing oor die aanvoorders van diskontinuiteit dui daarop dat sommige strategiese invalspunte verwag kan word, maar baie kan nie geantisipeer word nie, aangesien invalspunte aanvanklik baie klein voorkom, en dan dikwels misgekyk kan word, maar dan slaan hulle vinnig toe, sonder waarskuwing. 'n Strategiese invalspunt kom voor wanneer bestaande maniere van sake doen en die struktuur van die industrie subtiel, maar wesenlik verander.

Met hierdie navorsing is beoog om 'n oorsig te kry van die toepassing van die kompleksiteitsteorie op strategiese bestuur ten einde geleentheid te verskaf vir industrie-inflexie en korporatiewe innovering. Die navorsing beskryf 'n aantal gefaseerde kompleksiteitsbenaderings om industrie-inflexie aan te help. Die eerste fase begin met die opbou van organisatoriese geskiktheid deur die ontwerp van komplekse aanpasbaarheidstelsels wat intern aan die organisasie is en deur die kweek van gesonde ko-evolusie met eksterne sleutelrolspelers. Die toepassing van “algemeen aanvaarde praktyk” in komplekse aanpasbaarheidstelsels van organisatoriese ontwerp word gedemonstreer as 'n essensiële middel om die organisasie tot op die rand van chaos te dryf waardeur nuwe ondernemings kan ontwikkel wat moontlik 'n invalspunt kan veroorsaak.

Die ko-evolutionêre benadering word verduidelik as 'n proses om patrone vir ko-adaptasie met sleutelrolspelers te ontwikkel, waardeur medebewerke saamwerk om doeltreffend aan te pas, alhoewel hulle steeds vry is om vir 'n posisie as hoofkragbron mee te ding. Daar word hipoteties gepostuleer dat dit paradigmitiese oorgang op die rand van chaos op die sosio-kulturele sakevlak is, waar aktiewe lede, gedryf deur die vinnig bewegende self-organisasie, betrokke raak by verkennende dialoog om die paradigmitiese moontlikhede vir sistemiese innovering te verken.

Die tweede fase word in vier strategiese stadia beskryf om industrie-inflexie en korporatiewe innovering moontlik te maak. Die strategiese invalspunt begin met 'n definisie van 'n aanbieding van kliëntwaarde. Dit lei tot die ko-eksperimentele stadium waar medeskeppers gesamentlik eksperimenteer met diverse nuwe sakemodelle wat bestaan uit variasies op

aanbiedings van kliëntwaarde wat vir verskillende segmente aanloklik is. Die sukses van 'n nuwe sakemodel kan moontlik industrie-inflexie veroorsaak, wat dan lei tot die derde stadium waar die invalspunt onsekerheid skep vir die medeskeppers en hulle mededingers, aangesien die finale sukses van 'n proaktiewe strategiese invalspunt van die markdinamiek afhanklik is.

Die belangrikste gevolgtrekking na aanleiding van hierdie navorsing is dat die kompleksiteitsteorie nie die algehele sukses van 'n proaktiewe strategie verseker om industrie-inflexie te bemagtig nie. 'n Invalspunt kan beswaarlik slegs uit 'n doelbewuste industrie-inflexie voortspruit. Die strategiese invalspunt is ook nie 'n funksie van volkome onverklaarbare markfaktore nie. Aanbevelings word gemaak vir verdere navorsing wat aandag kan gee aan, onder andere, die konseptuele gaping tussen die wetenskaplike analise en die nie-lineêre aanname van die kompleksiteitsteorie.

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The frustrations and anxieties one feels when adapting to a different environment while coping with higher qualities of education will only be contained and become powerful instruments if that person is inspired. My heartfelt gratitude goes to Prof M. Leibold for inspiring me during my studies at the University of Stellenbosch.

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CHAPTER I

INTRODUCTION

1.1 Overview

In a world of turbulent change, many organisations have learned that the only way to survive is to adapt to change; not in the form of traditional reactionary change, but in the form of proactive, innovative change. Perhaps, given the competitive pressures and other complex influences confronting many business organisations today, the field of strategic management has been forced to adopt a proactive approach to the subject of change. A considerable amount of research has been undertaken to understand how and why change occurs for the purpose of developing theoretical frameworks to guide business organizations in enabling to adapt to change, and, in more proactive strategy thinking, to bring it about consciously.

One of the major contributing insights into the theory of change comes from the emerging sciences of chaos and complex adaptive systems. The central construct chaos theory states that almost undetectable small changes in initial conditions may lead to large amplifications of the effect of the change (Rosenhead, 1998). The oft-quoted imagery regarding this is the assertion that the flapping of a butterfly's wing can in due course decisively affect weather on a global scale.

From the field of social studies, Gladwell (2000) provides an in-depth analysis into how modern change happens the way it does. He discovers three principles of change:

- contagiousness;
- little causes can have big effects, and
- change happens not gradually but at one dramatic moment to affect all at once, and that moment is called the "Tipping Point."

In the industry context, Prahalad and Oosterveld (1999) describe the origins of change that lead to discontinuity, a radical industry transformation. According to these authors, the following, among others, are key drivers contributing to discontinuity:

Digital convergence: The integration of computing, software and telecommunication capabilities and the emergence of the Internet are disintegrating, reshaping or converging many industries ranging from finance and banking to food processing.

Deregulation, privatisation and globalisation: A wide variety of industries are being deregulated and privatised, accelerating the speed of globalisation. Digitalisation and globalisation are breaking down national and organisational barriers, and rapidly transforming the business landscape.

If one views the above three approaches in combination, i.e.

- i) the assumption of the chaos theory that small change can have a big effect (Rosenhead, 1998);
- ii) the postulation of ‘tipping point’ theory that change happens not gradually but at one dramatic moment affecting all at once (Gladwell, 2000), and
- iii) the origins of discontinuity interacting simultaneously and interdependently (Prahalad & Oosterveld, 1999), then one could conclude that these all point to the so called “inflection point”, the point where industry dynamics can fundamentally change at any stage (Grove, 1996). This study attempts to understand how an inflection point occurs and what strategic management theories or frameworks are appropriate in dealing with industry inflection.

It seems that the rate of change has been a critical parameter in determining the validity and significance of strategic management models. The slow change of the industrial era of much of the 19th and 20th centuries allowed traditional strategic management models to work well, enabling firms to be in control of their own future. However, many writers (Youngblood, 1997; Pascal, 1999; Clarke & Clegg, 2000) argue that the highly uncertain and unpredictable pattern of the late 20th century and today’s turbulent environment makes traditional analytical models inappropriate for use on their own. The question then arises as to what type of innovative strategic management approaches will help organisations to adapt to and/or to enable industry inflection and corporate innovation.

There is a growing academic popularity of the complexity theory as appropriate strategy thinking for agile management practices (Sanchez, 1997; Brown & Eisenhardt, 1998;

Rosenhead, 1998; Anderson, 1999; Beinhocker, 1999). There is also some indication on the ground of application of this theory for innovative strategic management practices (Youngblood, 1997; Pascale, 1999). This is still at an early stage, and may entail some challenges until it reaches a “tipping point.”

Many corporate leaders have risen to the top of their organisations through their mastery of traditional management techniques and approaches (Youngblood, 1997). Sanchez (1997) asserts that it is generally more difficult to change ideas that organisations use than the tangible assets they employ. Given the inevitability of the point of inflection in many industries, failure to change can cost businesses their sheer existence. It is therefore initially necessary to understand points of inflection in order to shed light on why management must change.

1.1.1 Strategic inflection points and industry context

Change can be evolutionary and continuous in some contexts, and revolutionary and discontinuous in others. This study deals with the latter, and discusses the origins of discontinuity, the impacts on industry structure, contexts and application of inflection points. Deregulation, privatisation, globalization, disintermediation, evolution to open standards, ecological and social pressures and, chiefly, digital convergence are some of the key change drivers that are accelerating the discontinuity in business environments today (Prahalad & Oosterveld, 1999). The impacts of these change drivers have been analysed using the Porterian “five forces” model (Porter, 1985).

According to Michael Porter’s industrial analysis (also known as the “five forces” model) (1985), as long as the five forces of industry dynamics remain under control, a firm can achieve competitive advantage by following certain strategic choices, for instances building strong brand identity, raising entry barriers, raising switching costs, and having proprietary products protected by patents. But when the impact of change drivers on one or more of the five forces becomes large enough to be significant, it fundamentally alters the existing industry structure, consequently requiring new business processes and models (Grove, 1996).

Transition in industry occurs when the balance of forces shifts from the existing structure to the new. For example, the introduction of the personal computer triggered industry inflection, resulting in a full-scale change that transformed the whole computer industry from horizontal to vertical structures (Grove, 1996). The question is: does the theory of inflection point apply in all industry contexts?

Some writers such as Courtney, Kikland, and Viguierie, (1997), Grant, (1998) and Porter, (2001) argue that, although multiple dimensions of uncertainty interact to create an environment that is virtually impossible to predict, strategic inflection points are rare. It is argued that, with the exception of computer and telecommunication industries, most empirical studies on industrial transformation show that change takes place slowly and changes in industry structure on average appear to be slow.

The opposing school, in contrast, contends that the convergence of telecommunications and the computing industry is changing everything (Evans & Wurster, 1997; Hamel, 1998; Tapscott, 2001). According to Evans and Wurster (1997), the breaking down of the trade-off between “*reach and richness*”, enabled by the interconnectedness of communication and computer technology, is deconstructing the vertically integrated value chains of many industries as well as transforming the structure of many industries.

It may not be possible to draw a general conclusion across the board. Every industry may be transformed according to its own context. An observation by a number of writers on a wide range of industries, however, reveals that the Internet is the biggest strategic inflection point that will affect many industries (Evans & Wurster, 1997; Hamel, 1998; Prahalad and Oosterveld, 1999; Tapscott, Ticoll & Lowy, 2000).

1.1.1.1 Case study: *Encyclopaedia Britannica*

The following case study is excerpted from an article in Harvard Business Review titled “*Strategy and the New Economics of Information*” by Evans and Wurster (1997), and it is relevant to review it here in order to illustrate the threat of strategic inflection points

Since 1990, sales of Britannica's multivolume sets have been declining by more than 50%. CD-ROMs came from nowhere and devastated the printed encyclopaedia business. The Encyclopaedia Britannica sells each somewhere in the region of \$1500-\$2000. An encyclopaedia on CD-ROM, Encarta, sells for around \$50. And many people get Encarta for free because it comes with their personal computers. The cost of producing a set of encyclopaedia – printing, binding, and physical distribution – is about \$200-\$300. The cost of producing a CD ROM is about \$1,50. The editors at Britannica probably viewed CD-ROMs as nothing more than electronic versions of inferior products. Encarta's content is licensed from the Funk & Wagnalls encyclopaedia, which was historically sold in supermarkets. Microsoft merely spruced up that content with public-domain illustrations and movie clips. The way Britannica's editors must have seen it, Encarta was not an encyclopaedia at all. It was a toy.

Judging from their initial inaction, Britannica's executives failed to understand what their customers were really buying. Parents had been buying Britannica less for its intellectual content than out of a desire to do the right thing for their children. Today when parents want to "do the right thing," they buy their kids a computer. The computer, then, is Britannica's real competitor. And along with the computer come a dozen CD-ROMs, one of which happens to be – as far as the customer is concerned – a more-or-less perfect substitute for the Britannica.

When the threat became obvious, Britannica did create a CD-ROM version – but to avoid undercutting the sales force, the company included it free with the printed version and charged \$1000 to any one buying the CD-ROM by itself. Revenues continued to decline. The best sales people left. And Britannica's owner, a trust controlled by the University of Chicago, finally sold it out. Britannica's downfall was more than a simple story about the dangers of complacency, Evans & Wurster (1997) write. It shows how quickly and drastically a point of inflection can change the rules of competition, allowing new players and substitute products to render obsolete such traditional sources of competitive advantage as a sales force, a supreme brand and other existing competencies.

Source: Evans and Wurster (1997)

Like the *Encarta* CD-ROM, many offerings in the new economy are increasingly becoming knowledge-based, which exhibit characteristics of abundance, the law of increasing return, network economies of scale and open standards (Tapscott *et al.* 2000). These characteristics all point to the fact that once a company invested in original production, the goods can be reproduced and distributed in abundance at virtually zero marginal cost. The interconnected network enables a first mover to achieve critical mass quickly, causing the inflection point to hit hard and without warning.

Industry inflection point, however, can be more than just a technology transition. Observing how infectious bio-living things breakout in a widespread epidemic, Gladwell (2000) argues that change often occurs because of people's behaviour and their social interactions. In order to illustrate how the "tipping point" occurs, Gladwell provides the following example of how a certain brand of shoes called Hush Puppies, (classic American brushed-suede shoes with a lightweight crepe sole) suddenly and dramatically, beyond rational explanation, became a fashion from little unrelated causes in initial conditions.

The tipping point of Hush Puppies

The brand (Hush Puppies) had been all but dead until the Tipping Point came somewhere between late 1994 and early 1995 ... The company was thinking of phasing out the shoes that made them famous. But Hush Puppies had suddenly exploded, and it all started with a handful of kids in the East Village and Soho. How did that happen? Those first few kids, whoever they were, weren't deliberately trying to promote Hush Puppies. They were wearing them precisely because no one else would wear them. Then the fad spread to two fashion designers who used the shoes to peddle something else – haute couture. No one was trying to make Hush Puppies a trend. Yet, somehow that's exactly what happened. The thirty-dollar pair of shoes that were long out of fashion, passed a certain point in popularity and tipped at once. Source: Gladwell, (2000:15).

Building on Gladwell's explanation of the "Tipping Point", in this study context, three characteristics of strategic inflection point are identified:

- i) little changes spawning from ongoing, dynamic and complex interactions between individuals, businesses and economies (Rosenhead, 1997);

- ii) as a result of the highly interconnected world change happens not gradually, but at one dramatic moment, affecting all at once (Gladwell, 2001), and
- iii) forces of discontinuity acting simultaneously and interdependently (Prahalad & Oosterveld, 1999), and these all seem to trigger points of inflection.

Change can occur anywhere, anytime in different ways. The complex interconnectedness of systems (corporations, competitors, suppliers, customers, institutions, societies) serves as a network of super highways that spread change to break out quickly, and to affect all at once. The result is discontinuity of existing ways of doing business as well as change in industry structure and shifts in market forces. When this happens a strategic inflection point occurs, i.e. the point where industry dynamics fundamentally change (Grove, 1996).

However, many industry incumbents do not realise when it signals. Prahalad and Oosterveld (1999) state that corporate leaders often misinterpret the effects of strategic inflection points, attributing the change to loss of market share, unattractive products and profit declines; their first reaction to discontinuities therefore is to “work harder” when what they really need is to “work differently”. Burgelman and Grove (1995) call this "*strategic dissonance*," referring to conflicting voices that emerge within the organisation when a firm's competencies suddenly diverge from the basis of competition or when its stated strategy differs dramatically from what it actually does.

1.2 Statement of the problem

As the *Encyclopaedia Britannica* case study illustrates, a strategic inflection point seems to threaten a successful and established firm more seriously, because suddenly its key success factors of the past may become its liabilities. The challenge facing many business organisations today is to recognise the patterns of inflection point when it emerges and to respond proactively.

Some inflection points, such as deregulation and privatisation, may be foreseen because a debate could already have been going on for some time. In today's highly uncertain environment, however, many inflection points, either coming from the Internet or other means, may not be foreseen. They may initially come as a small change, which can often be missed by industry incumbents; then at one dramatic moment, they suddenly hit without warning, causing drastic consequences. Yet, recognising the patterns may not be easy, because not all big or small changes are strategic inflection points. The challenge for established firms is to adopt a proactive strategic management that will enable the company not only to adapt to, but also to enable industry inflection proactively. This research hypothesises that-

The application of the complexity management theory to strategic management can help an organisation not only to anticipate external inflection point proactively, but also to enable internal strategic inflection point and corporate innovation.

1.3 Objective of the study

The objective of the study is to investigate the relevance and application of the complexity theory to strategic management for adapting to, or enabling industry inflection and corporate innovation.

1.4 Scope of the study

This study aims to describe and understand how point of inflection occurs, and how complexity management thinking might be utilised for adapting to, and consciously bringing a point inflection about. During this study an extensive investigation has therefore been conducted on extant strategic management literature, including knowledge creation tools, strategic adaptation, industry evolution, strategic reinvention, and organisational innovation and change. Whilst the emphasis of the study is on the complexity management theory, an analysis of major traditional strategic management models has also been made in order to review their relevance in dealing with industry inflection.

This study focuses on incumbent large industry corporations. The study of innovation and prime-movership is examined from the point of view of incumbent firms. Although the current rapid rate of transformation is affecting almost all industries, the widespread impact of the Internet is more radically transforming the computer, telecommunication, finance, banking, insurance, office equipment, printing, and entertainment industries. From these industries, this thesis attempts to draw a number of case studies so as to provide empirical evidence for some theoretical arguments.

1.5 Research methodology

The study has been conducted by way of extensive literature investigation of secondary sources of information, including published books, articles, research reports, published academic and professional conference discussions, Internet sources, and other reliable documents. The sources have been gathered by accessing library literature and Internet searches.

1.6 Organisation of the study

The study is organised and presented in six chapters. Chapter one provides an overview of the study, followed by the statement of the problem, objective of the study, scope of the study and research methodology. Subsequently, the outline of the study structure has been delineated in logical sequence.

Chapter two discusses industry transition and point of inflection contexts and applications. In attempting to understand and describe the point of inflection, this chapter looks in depth at origins or causes of discontinuity, how changes can trigger point of inflection, and how changes may dramatically affect the whole industry at once. Some case studies are presented for this purpose.

Chapter three reviews the relevance of traditional strategic management approaches in dealing with industry inflection. The aim of this chapter is to analyse different contemporary views, including opposing views, in order to investigate whether traditional analytical models are appropriate for organisational practices in dealing with industry inflection.

Chapter four provides an analysis of the theory and concepts of complexity thinking and the rationale for utilising the theory for innovative strategic management in adapting to, or enabling industry inflection. The concept of organisational fitness, the application of complex adaptive systems theory into organisational design, innovative behaviour and co-evolution are reviewed.

Chapter five covers sense-making tools, innovation of new business models, prime movership, and experimentation. The application of complexity in co-shaping process for a new business model, and the implication of the concept of natural selection to a proactive strategy for enabling strategic inflection points are analysed. In this chapter, the study describes a couple-phased complexity approach as a possible means for enabling industry inflection.

In Chapter six, the summary, conclusions and recommendations are presented. Recommendations for a better implementation and utilisation of complexity thinking for innovative strategic management practices, and recommendations for possible area of research are provided.

1.7 Summary

Chapter one introduced the overview of the study and underlined the research challenge. It was described that change can be evolutionary in some contexts, and revolutionary in others. This study focuses on revolutionary changes. The statement of the problem was clarified. Discontinuous or revolutionary changes can be foreseen in some instances, but in today's highly unpredictable environment, inflection points emerge in most situations initially too

small to be noticed, eventually turning into avalanches which can be called strategic inflection points, the point where industry fundamentals change forever.

The objective of this study has been formulated. This study has proposed to investigate the relevance and application of the complexity management theory for adapting to, or enabling industry inflection and corporate innovation. The scope and methodology of the study were delineated and the structure of the study was outlined.

CHAPTER II

INDUSTRY TRANSITION AND POINTS OF INFLECTION: CONTEXTS AND APPLICATIONS

2.1 Introduction

Today's business environments are constantly changing, sometimes incrementally, sometimes in a quantum and discontinuous fashion. Industry inflection points deal with the latter, discontinuous changes.

A *discontinuity* is defined as “abrupt change” (Prahalad and Oosterveld, 1999), referring to a dislocation or interruption of the established state of affairs. It is revolutionary in nature and usually requires a radical strategic response. Some discontinuities may be foreseen, such as the deregulation of industries, which results from a political decision that has been debated for a long time. But in other instances discontinuities can be complete surprises, leading to a dramatic inflection point.

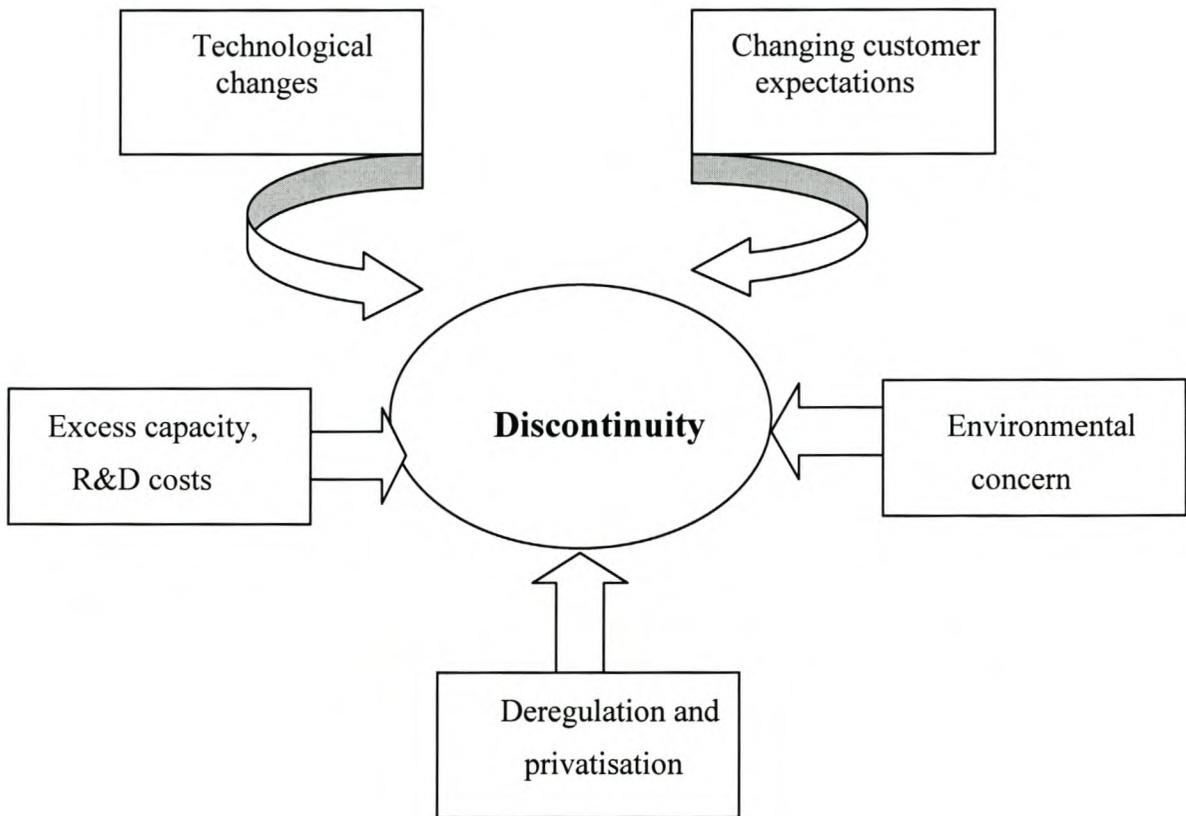
This chapter describes forces causing discontinuity, and reviews the impact of this on industry structure and how strategic inflection points unfold. This study identifies five major change drivers of discontinuity:

- (a) technological change, in which the Internet is behind many strategic inflection points;
- (b) changing customer expectations;
- (c) excess capacity and high R&D costs,
- (d) deregulation and privatisation, and
- (e) environmental concerns.

The impacts of the forces of discontinuity on industry structure have been analysed using Porter's five forces model. Whilst all strategic inflection points are changes, not all changes are strategic inflection points. Some big changes may not cause industry inflection. Conversely, a small change in one of the change drivers of discontinuity can lead to big effects in one of the five industry forces. According to Grove (1996), a strategic point of inflection occurs when the balance of forces shifts the existing industry structure from the old to the new.

While it appears impossible to draw a general conclusion regarding the impacts of discontinuity forces upon all industries, many scholars believe that the flux of industry transition is already happening in a wide range of industries (Evans & Wurster, 1997; Hamel, 1998; Prahalad & Oosterveld, 1999; Tapscott, 2001). The conclusion this chapter comes to is that strategic point inflection cannot be anticipated.

Figure 2.1 Forces causing discontinuity



2.2 Forces causing discontinuity

While there are numerous forces causing discontinuity, five major forces have been identified for the purpose of this study as sources of discontinuity, namely technological changes, changing customer expectations, excess capacity and high R&D costs, deregulation and privatisation, and environmental concerns. Figure 2.1 below shows the forces causing discontinuity.

2.2.1 Technological changes

The large-scale technological revolution, which appears to have begun in the 1980s, is the convergence of communications with computer technology, and most radically the emergence of the Internet. The impact of radical technological changes upon industry ranges from expansion of existing industries that had been constrained by high costs and the limited infrastructure for communication to restructuring existing industries and creating entirely new ones. In existing industries, the Internet seems to affect all aspects of vertically integrated value chains, including brand name, marketing activities, physical distribution channels, and their competitive positions.

2.2.1.1 The interconnected world

Because of the Internet, it is widely believed that a wide range of industries are in the middle of strategic inflection point (Evans & Wurster, 1997; Hamel, 1998; Prahalad & Oosterveld, 1999; Tapscott, 2001).

The convergence of telecommunications network, multimedia and the computer is building a seamless infrastructure to interconnect and integrate the economies and societies of the world. The Extranet, an intelligent infrastructure for intra-organisation networks makes easier and cheaper for companies to target value in the network that does not belong to them. Inside organisation, the Intranet permits exchange of ideas through networking with open standards while promoting cross-functional teams, and tending to eliminate a hierarchal structure and the proprietary information systems of the companies.

With the explosion of the Internet technology it has become possible for a company to reach everyone, and for everyone to reach the company at virtually zero cost. This connectivity can accelerate industry transition by diffusing and stimulating innovation of new products and processes in many industries, allowing firms to base different parts of their business in different countries and to connect them by computer networks. Conversely, this high connectivity also means erosion of some functions of a vertically integrated value chain.

2.2.1.2 The deconstruction of the value chain

Evans and Wurster (1997) argue that every business is an information business. Information is the glue that holds together the structure of a vertically integrated value chain. According to these authors, because information is embedded in physical modes of delivery, a company's economics are governed by a basic law: the trade-off between richness and reach.

Reach simply means the number of people, at home or at work, exchanging information. *Richness* is defined by three aspects of the information itself. The first is *bandwidth*, or the amount of information that can be moved from sender to receiver at a given time. The second aspect is the degree to which the information can be *customised*. The third aspect is *interactivity*. Dialogue is possible for a small group, but to reach millions of people the message must be in the form of monologue.

In general, the communication of rich information has required proximity and dedicated channels the costs or physical constraints of which have limited the size of the audience to which the information can be sent. Conversely, the communication of information to a large audience has required compromise in bandwidth, customisation, and interactivity. Evans and Wurster (1997) argue that it is this trade-off that is now being blown up due to the rapid emergence of universal technical standards for communication, allowing everybody to communicate with everybody else at essentially zero cost. These emerging open standards and the explosion in the number of people and organisations connected by networks are freeing information from the channels that have been required to exchange it, making those channels unnecessary or uneconomical.

Where once a sales force, a system of branches, a printing press, a chain of stores, or a delivery fleet served as formidable barriers to entry because they took years and heavy investment to build, in the new economy they can suddenly become expensive liabilities. New competitors on the Internet will be able to come from nowhere to snatch some value business from the vertically integrated value chain. In such a situation, even a small portion loss of a large corporation's vertically integrated value chain may trigger industry inflection in the industry.

2.2.1.3 Technology and new innovations

Successive rounds of technological change are constantly creating new products and services that result in discontinuities of existing products and services. In the knowledge economy, corporations must expect competing products to appear almost immediately, which means that a firm has to gain volumes rapidly to amortise investment. The life cycles of products and services are becoming dramatically shortened, approaching months and weeks (Prahalad & Oosterveld, 1999). Scaling up the logistics chain, supply, manufacturing, distribution, and marketing is now a critical capability. Because the market for a product can decline just as rapidly, the ability to scale down is equally important. This volatility imposes pressures upon organisations to transform.

2.2.2 Changing customer expectations

Changes in customers' demographics, lifestyles, preferences and needs can affect the size and character of markets, impacting upon firms to rethink their strategies and ways of doing business. As a result of the collapse of political boundaries between east and west, the demographic composition and size of the global markets have substantially changed. New lifestyles and fashions seem to evolve and fade quickly as a result of the rapid diffusion of new products and the shortening life cycle of the products.

The global spread of television and the Internet gives consumers access to vast amounts of information, boosting their knowledge and, making it possible for them to insist on high quality, an improved price-performance relationship and immediate delivery. It is argued that the dramatic shift in the balance of power among manufacturers, distributors and consumers is turning businesses to become pro-consumers, as consumers gain access to more information and start exercising their new options. This new phenomenon is described as *the age of prosumerism* (Prahalad & Oosterveld, 1999).

2.2.3 Excess capacity and high R&D costs

A compounding effect of technology and knowledge is that this effects cuts across the cost of producing goods and services, which inevitably leads to excess capacity. In addition, the escalating R&D costs in developing new technology or products as well as shortening the life cycle of the product are driving forces that are transforming many companies into global

enterprises while making the worldwide scope of activities not a matter of choice but an essential prerequisite for companies to survive (Bartlett & Ghoshal, 2000). These driving forces put pressure upon companies that had historically focused only on their domestic markets to go either global or out of business.

2.2.4 Deregulation and privatisation

Although the pace and timing of it vary in different parts of the world, deregulation and privatisation play important roles in speeding up the industry transition. Deregulation destroys local monopolies, allowing entrepreneurial firms to exploit global opportunities in industries that were, for most of the 20th century, primarily local. Firms use joint ventures, direct investments, mergers and acquisitions to enter markets that have previously been restricted to domestic companies. Companies that have had a long history of operating as state-owned monopolies are being placed in competitive environment. According to Clarke and Clegg (2000), this is already impacting on many industries in the former command economies. Privatisation, new government regulations or deregulations can bring about changes that can potentially drive strategic inflection points.

2.2.5 Environmental concern

The public awareness of industrial consequences on the environment is growing. Public and government demands to eliminate pollution, to recycle and to accept stewardship of environmental resources are all pressing upon a wide range of industries around the world. This pressure seems to have an impact on packaging, product design and choice of technology.

Changes causing discontinuity are many; they can not all be described here. Some such changes, although big, may not cause industry inflection. Other small causes, by contrast, may trigger industry inflection.

Table 2.1 Strategic impacts of the Internet on the five forces

Bargaining power of buyers	<ul style="list-style-type: none"> - Shifts bargaining power to end-consumers by providing easier access to information about products and suppliers. - Reduces switching costs
Bargaining of suppliers	<ul style="list-style-type: none"> - Procurement by using the Internet tends to raise bargaining power over suppliers. - The Internet provides a channel for suppliers to reach end-users, reducing the leverage of intervening companies. - Internet procurement and digital markets tend to give all companies equal access to suppliers, and gravitate procurement to standardised products that reduce differentiation. - Reduces barriers to entry, and the proliferation of competitors downstream shifts power to suppliers.
Barriers to entry	<ul style="list-style-type: none"> - Reduces barriers to entry by eliminating sales force, traditional channels and physical locations. - Internet applications make difficult to keep proprietary products from new entrants. - A flood of new entrants has come into many industries.
Threats of substitutes	<ul style="list-style-type: none"> - The digital economy creates new substitutions abundantly and easily by newcomers playing new rules of the game.
Rivalry among existing competitors	<ul style="list-style-type: none"> - Reduces differences among competitors as offerings are difficult to keep proprietary due to emerging open systems, thus intensifying rivalry. - Mitigates competition to price. - Widens the geographic market and increases the number of competitors. - Lowers variable cost relative to fixed cost, increasing pressures for price discounting.

Source: Adapted from Porter (2001).

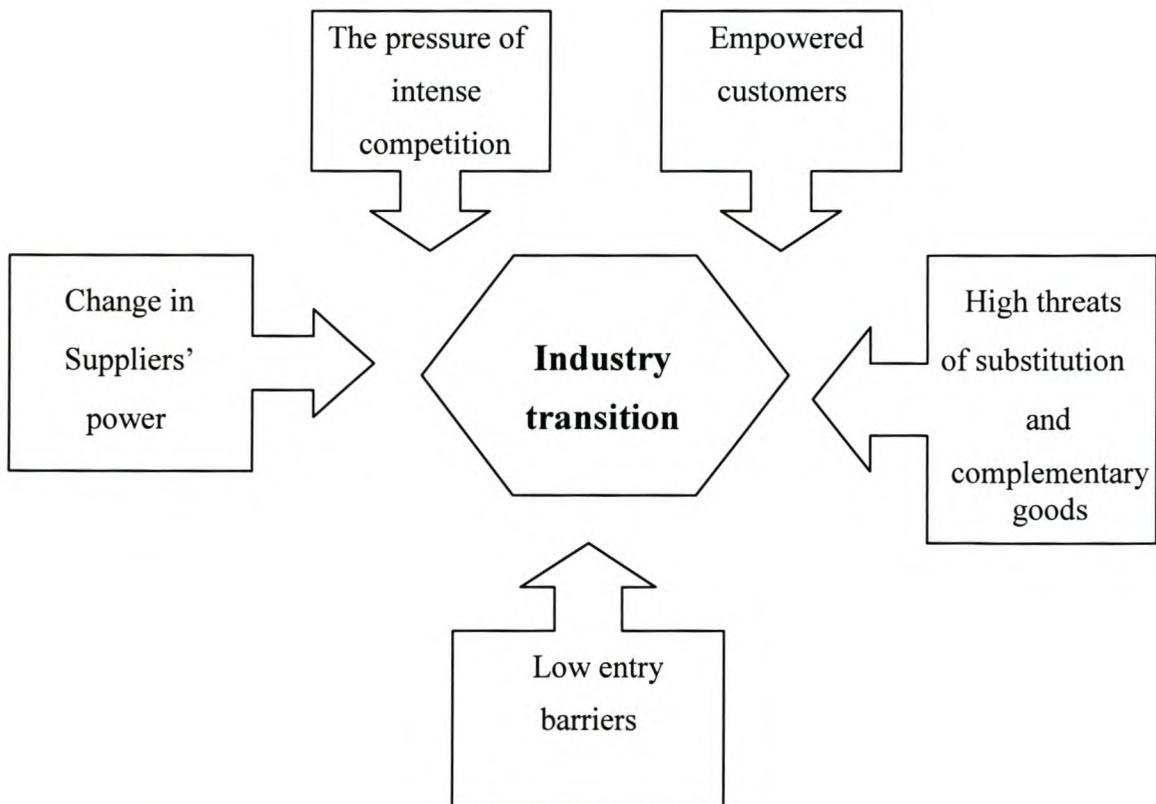
2.3 The impacts of discontinuity forces on industry transition

The five forces model is less appropriate to be used on its own due to environment turbulence today, as will be described in Chapter three. The model, however, can be used as a systematic

framework for assessing the impacts of discontinuity upon industries and for identifying possible implications for strategic management.

According to Michael Porter’s industrial analysis model (1985), a firm can achieve competitive advantage by following certain strategic choices, for instance building strong brand identity, raising entry barriers, raising switching costs, and having proprietary products that are protected by patents as long as the five forces of industry dynamics (competitors, suppliers, customers, new entrants and substitution) remain under control. But when one or more of the five forces change substantially, it can lead to an industry inflection point. Table 2.1 above summarises the impacts of the Internet on the five forces.

Figure 2.2 Radical changes in the five forces and their implication to industry transition



2.3.1 The pressures of intense competition

There is a general opinion that competitive pressures are leading to imitative, reactive strategies and ignorance of emerging opportunities or threats (Prahalad & Hamel, 1990; Porter, 1996; Kim & Mauborgne, 1999b; Govindarajan & Gupta, 2001). The massive discontinuous change intensifies competition by reducing differences among competitors as offerings are difficult to keep proprietary due to emerging open systems, mitigating competition merely to price/performance. Several explanations may be given for this.

First, companies often accept what competitors are doing and simply strive to do it better. But, as competition gets intense, it seems competition based on incremental improvements becomes harder. Porter (1996) states that the most plausible reason is the ubiquity of best practices, including accesses to the latest technology and quality management systems. Competitors can quickly imitate management techniques, new technologies, input improvements and superior ways of meeting customers' needs.

Secondly, as companies focus on matching and beating each other, time and talent are unconsciously absorbed in responding to daily competitive moves. In the absence of radical transformation, it appears that competitors will inevitably find themselves in conflict with each other for diminishing gains, rather than creating growth opportunities (Govindarajan & Gupta, 2001). This obsessive mentality of competition leads to excessive focus on inward core capabilities, which significantly limits a company's learning and responding abilities and introduces resistance to change or "core rigidities", if the emerging environment is evolving away from the company's strategy (Leonard-Barton, 1998).

In such a situation an attempt by any given competitor to break out of the competitive pack, by radically changing the existing rules of the game, may therefore likely result in changing the context for many. Structural changes in the external environment do not always originate from external forces. Table 2.2 shows some of successful innovators that changed their landscape by exploiting the stable industry structure.

Table 2.2 Proactive changes by exploiting the stable industry structure

Company	Contextual drivers	Redefining customer base	Reinventing customer value	Business network configuration	Sustainable factors
<i>Dell</i>	PC industry focuses on building up stock	Experienced PC buyers	Self-service solutions	Build to order, direct channel	Incumbent channel constraints and build to order expertise
<i>Charles Schwab</i>	Online access to information	Life-long, average net worth investors	Multichannel, multiproduct access	Integrated channels	Incumbents unwilling to sell competing products
<i>Cisco</i>	Industry volatility due to rapid technology/product development	Large business networking managers	Integrated, best-of-breed networking	Branded platform and customer base	Broader and superior product offering
<i>GE</i>	Maturing markets, underserved customers	Senior level commercial, technical buyers	Integrated product service and financing solutions	Service-centric product-platform business	Complex business, customer service dependency
<i>Corning</i>	New technology, mature market and underserved customers.	Business seeking growth through technology	Best class R&D	R&D processes and partnering expertise	Strong alliances, network and technology competences
<i>Harley-Davidson</i>	Japanese lead in motorcycle technology	“Rebel” image executives	Branded motor-cycle rebel lifestyle	Brand Harley owners groups	Business model built around rebel brand
<i>Paychex</i>	Small businesses underserved by outsourcing industry	Small businesses	Small-business focused payroll outsourcing	Branded low cost operations	Incumbents unable to profitably serve small businesses
<i>Southwest</i>	Deregulation, and airlines focus on high value business travelers	Cost-sensitive travelers	No-frills travel	Point-to-point resources	Incumbents committed to higher-cost model
<i>Well-point</i>	Payer industry focused on large groups	Individual and small businesses	Tailored health care solutions	Customer-centric organisation	Incumbents unable to become customer-centric

Source: Adapted from Rosenblum (2002).

2.3.2 The rising power of customers

As firms compete fiercely through improving price/performance attributes for diminishing returns, customers seem to receive the lion’s share of the productivity gains. Moreover, the Internet shifts bargaining power to end-consumers by providing easier access to information about products and suppliers and reducing switching costs. In addition, given their

sophisticated knowledge of products and corporations, customers are being encouraged to take part in deciding how their needs might be addressed. The proliferation of customers' chat rooms on the Internet is an indication of this new phenomenon. Customers' demands for high quality, improved price performance relationship and immediate delivery are pressing upon firms to transform.

2.3.3 Changes in suppliers' bargaining power

In a business-to-business (B2B) relationship, the massive discontinuous change affects the position of suppliers in many ways. The emergence of open procurement and bidding through the Internet tends to break down a long-standing relationship between suppliers and companies. Internet procurement and digital markets tend to give all suppliers equal access to companies, thus intensifying competition regarding price/performance among suppliers. This raises the bargaining power of manufacturers over input suppliers. On the other hand, the emergence of new suppliers with technologically superior, proprietary inputs, ubiquitous open standards, proliferation of competitors and new entrants may increase input demands, thus bolstering the suppliers' power in the market by being so powerful that they can affect the way the rest of the industry does business.

2.3.4 The proliferation of new entrants

The competitive forces of discontinuity reduce barriers to entry by eliminating regulations, making standards open, enabling easy accesses to technology and making it less difficult to keep proprietary technology from new entrants. The Internet eliminates sales force, traditional channels and physical locations by disrupting barriers.

Hamel (1998) observes a flood of new entrants that has come into many industries, and which has dominated the market by taking the best advantage of change over the past ten years, playing by new rules of the game. With the emergence of the Internet, the newcomers seem to be a more serious threat to established firms today than any seen previously. This presses upon incumbents to create new business models to compete with new entrants that can possibly shape their business environment.

2.3.5 Substitution and complementary goods effects

Threats pressing upon incumbents come in many ways including from substitution providers and complementors. Substitution resulting from new technology has been one of the major causes of change in industries over the last two decades. Many products and their industries have disappeared – such as carbon paper, typewriters and the Teletype – and others, such as metals, have had their markets eroded. Complementors are other related businesses from whom customers buy complementary products (Grove, 1996). Complementors may step ahead to take the company's businesses with a cost and differentiation advantage, or in a much greater threat, complementors may set a new standard that lowers entry barriers enabling many new competitors to target the value that has previously been the domain of only a few companies.

2.4 Strategic inflection point

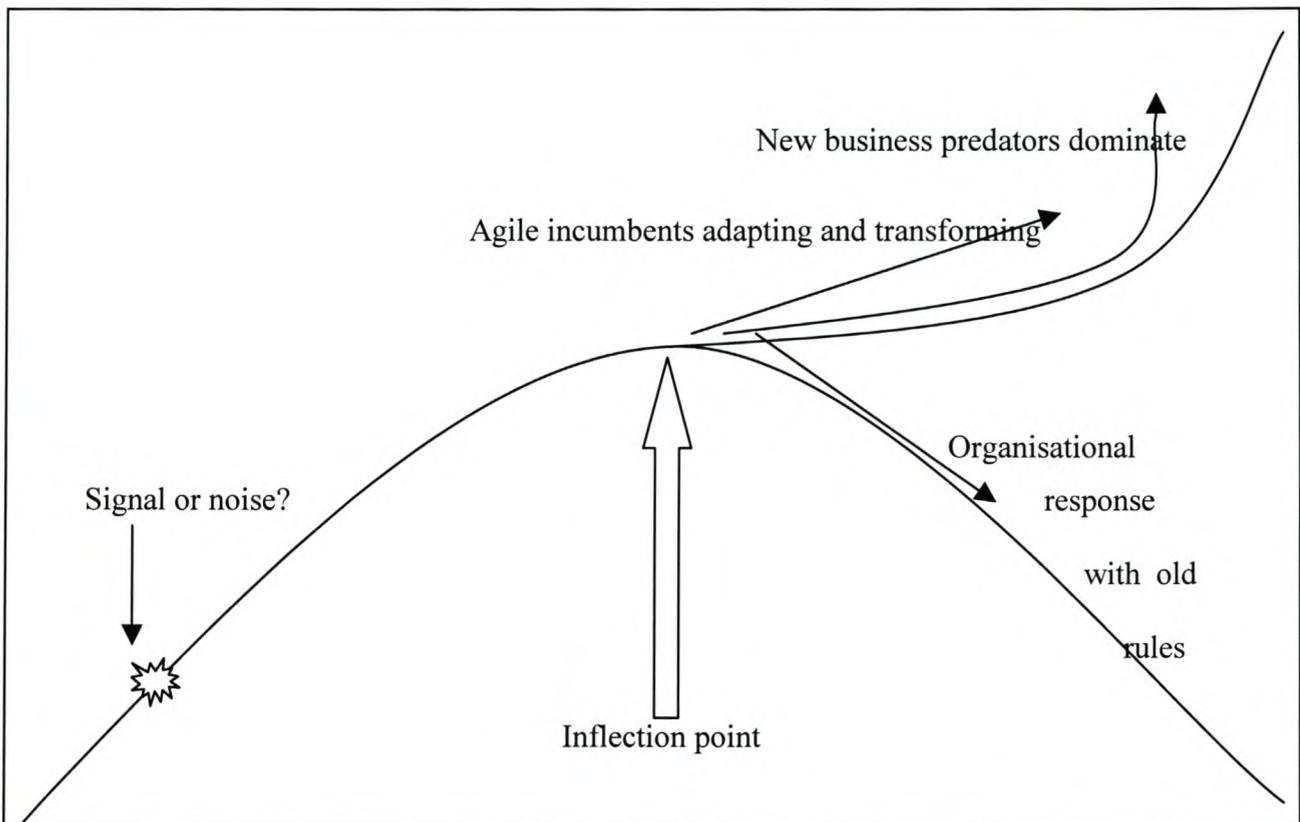
According to Grove (1996), when one of the five forces changes substantially as a result of forces of discontinuity, it radically alters existing ways of doing business, consequently requiring new business processes and models. The strategic inflection point is the point when the balance of forces starts to shift from the existing structure to the new. To emphasise the magnitude of a radical change that triggers the point of inflection, the author writes, "*There is wind and there is a typhoon, there are waves and there is a tsunami. There are competitive forces and there are supercompetitive forces*" (Grove, 1996, p. 30).

During the strategic inflection point, the way a business operates as well as the very structure and concepts of the business, undergoes a change. But the irony is that the concept of strategic inflection point itself assumes at this point nothing much happens. Yet, at a point where nothing happens, the strategic inflection point demands recognition of the pattern, and whether the pattern trajectory is going to head up or down. After recognition, how well a business adapts to this transition determines its future. This is called an *inflection point* and is defined as follows:

Mathematically, we encounter an inflection point when the rate of change of the slope of the curve (referred to as its "second derivative") changes sign, for instance, going from negative to positive. In physical terms, it's where a curve changes from convex to concave, or vice versa. Strategic point of inflection is

when the balance of forces shifts from the old structure, from the old ways of doing business and the old ways of competing to the new. Before the strategic inflection point, the industry simply was more like the old. After it, it is more like the new. It is a point where the curve has subtly but profoundly changed, never to change back again (Grove, 1996, p. 32).

Figure 2.3 The inflection curve



Source: Adapted from Grove (1996).

As figure 2.3 indicates, an inflection point takes place when the old strategic positions are disrupted and give way to the new rules of the game.

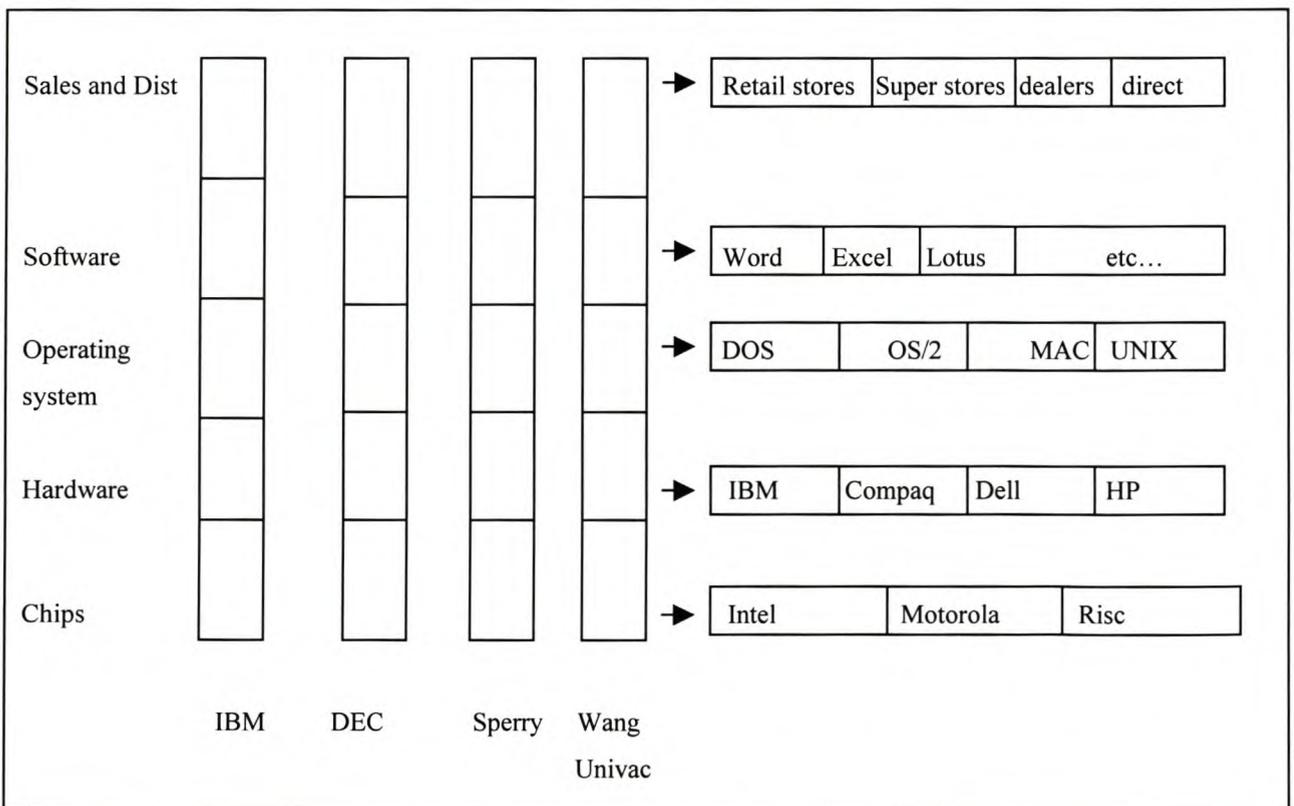
2.4.1 Industry transition

The period between starting the inflection point and reaching an equilibrium is called *industry transition*. Grove (1996) argues that while few agile organisations are able to adapt quickly,

for many it is difficult to manage change because it was not anticipated. Those who try to respond better and faster, using the old rules of the game, may initially go through a peak and then they decline due to a diverging landscape. Agile organisations, which speedily adapt, using new rules of the game, will manage to cross through the point. Moreover, newcomers have a better opportunity to enter and dominate the game, because they start clean. Finally, irrespective of any company's conscious strategic move, the industry reaches a new equilibrium.

The well-known example of industry transition as a result of forces of discontinuity is the transformation of the computer industry from a vertical to a horizontal structure.

Figure 2.4 The transformation of the computer industry from vertical to horizontal structure



Source: Grove (1996).

As shown in figure 2.4 above the computer industry used to be vertically integrated. A company would do almost everything on its own, from semiconductor chips implementation, manufacturing hardware, developing operating system software, and sales and distribution.

With a vertical manufacturing model, traditional companies could gain a competitive advantage over competition because it was cheaper and simpler for them to perform the maximum number of functions in-house, rather than incurring the high cost, and risk of partnering with outsiders to execute vital business activities. When the personal computer empowered by the new microprocessor emerged on the market and delivered much greater customer value than the existing computing devices, it changed the entire industry structure from vertical to horizontal (Grove,1996).

The Intel case illustrates that emergence of the personal computer on the market triggered industry inflection. This implies that the profundity and speed of the transition are determined, beyond any organisation's control, by a market acceptance of a new innovation.

2.4.1.1 Factors determining industry transition

In today's rapidly changing environment, the industry transition period can be very short as a result of high knowledge creation and technology capabilities. To understand how dramatic change can be in the knowledge economy, a comparison is drawn between traditional market forces and the new market characteristics of the new economy.

2.4.1.1.1 Traditional factors for accelerating industry transition

Traditionally industry transition has always been determined by economies of scale, the relative economic benefit of the new product or service, environmental sensitivity of the new product, and the relative global uniformity of customers.

- **Economies of scale:** The industrial economy depends on physical goods and services. Industrial corporations try to influence markets through economies of scale and scope. Mass production is seen as a means to meet a large customer base and to absorb the high costs of mobilising raw materials, fabricating and assembling goods, and delivering them to their destinations.

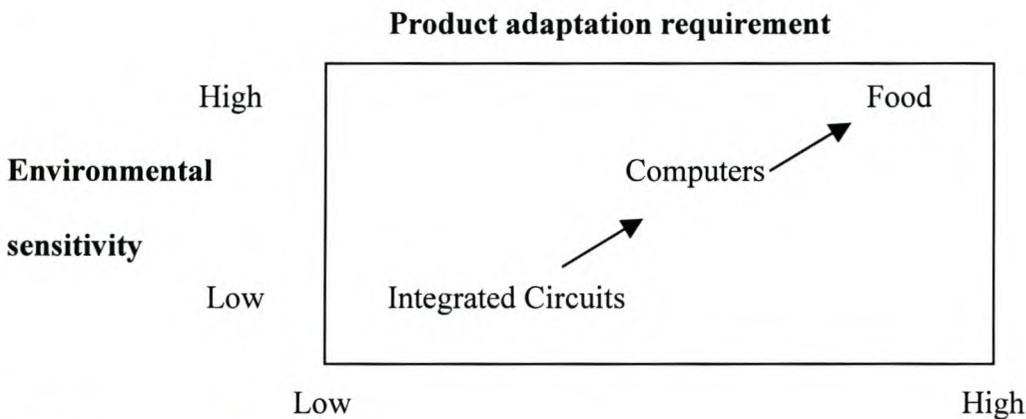
- **Relative economic value of innovation**

It is assumed that a new product or service innovation should exceed customer value at least 10 times (10x) greater than the established product in order to succeed in an existing category and to influence industry transformation. For example, CD players are 10x better compared to LPs that turned the whole industry to transform, and rendered LPs virtually extinct in less than a decade (Keegan, 1999).

- **Environmental sensitivity**

Environmental sensitivity means that the educational, cultural, political, religious, and ecological needs of different national markets vary and determine the extent to which products must be adapted to a specific country's market (Keegan, 1999). According to this author, a useful approach is to view products on a continuum of environmental sensitivity. The sensitivity of products can be represented on a two-dimensional scale, as shown in figure 2.5.

Figure 2.5 Environmental sensitivity



Source: Keegan (1999).

The horizontal axis shows environmental sensitivity, the vertical axis the degree of product adaptation needed. The lower an offering's environmental sensitivity, the higher the adoption, and likely the more it is to influence industry transition. For example, because a chip is basically universal, Intel would spend relatively less time determining the specific and unique conditions of local markets. Computers are characterised by moderate levels of environmental sensitivity; variations in a country's

voltage requirements necessitate some adaptation. In addition, a country could require the computer's software documentation to be in the local language.

At the upper end of figure 2.5 are products which require greater need for companies to address country-specific economic, regulatory, technology, social and cultural environmental conditions. Food sometimes falls into this category because it is sensitive to national differences including culture and religion. For example, despite Monsanto's firm belief that genetic food engineering is scientific innovation and that its diffusion is being made for the good of human kind, many customer opposition groups have protested in many countries around the world, alleging that the company violates all cultural, religious and democratic ecological norms of countries (The National Council for Science and the Environment, 2001).

- **Global customer characteristics**

Takada and Jain (in Keegan, 1999) suggest that culture and communication patterns affect diffusion processes for new products. The authors surmise that faster rates of diffusion would be found in high-context cultures with relatively homogeneous populations compared to low-context, heterogeneous cultures. Although the spread of multimedia including global television networks and the Internet, is converging lifestyles and fashions of consumers around the world, significant regional differences, however, persist beneath the surface of global uniformity. Generally, the relative global uniformity of customers is important for diffusion of a given innovation.

The above factors may still be valid in some contexts, but in others some of the factors have already become irrelevant. With many goods now becoming mobile (mobile phone and handheld computers, for example), the factor of environmental sensitivity appears less significant.

2.4.1.1.2 Driving forces of inflection point in the new economy

In the new economy abundance, the law of increasing return, network economies of scale and acceptance of open standards are major characteristics of forces driving the new economy (Tapscott, *e. al.*, 2000).

- **From economies of scale to abundance**

In the knowledge economy, many offerings are becoming physically less intensive and more knowledge-based. Once companies invested in the establishment of a plant, they can reproduce and distribute knowledge-based products, like software and electronic entertainment, for near zero marginal cost. Also, the price of knowledge intensive physical goods becomes much cheaper.

The use of satellite imaging, intelligent robots and state-of-the-art factories quickens production and slashes operation costs substantially. Consequently the economy shifts from economies of scale to abundance.

- **The law of increasing returns**

Many knowledge-based goods exhibit the law of increasing return. Once a company has absorbed the cost of making the first digital “copy” (e.g of a piece of software or an electronic publication), the marginal reproduction cost approaches zero, resulting in huge potential profits.

- **The network economies of scale**

In a networked market, the greater the number of people connected, the greater the value of being connected, thus creating network economies of scale (Evans & Wurster, 1997). As the following example illustrates, as number of people who own MP3 software rises, the value of hooking up for any one individual increases progressively. In other words, the individual will have access to a large number of music sources. This self-reinforcing dynamic builds powerful monopolies. Businesses who take advantage of this dynamics and who move first to set standards or create markets, can achieve critical mass.

- **Acceptance of open standards**

The word *standards* in general seems to indicate common acceptance or agreement on given practices or technology emerging in many ways. Mostly, businesses reserve the highest level of respect to *de jure* standards promulgated by world-class

independent organisations and governments. Standards can also be developed by consortia working out specifications that would be maintained by industry incumbents. If the standards in a given industry are overly institutionalised and customised, aiming at making entry less possible, the most established powerful companies may exercise greater control over proprietary technology.

Most of the standards developing in new industries are *de facto* and open in ways where no single vendor or government can control them, and these standards are available to anyone willing to license. The emerging markets indicate that the impact of market power-based *de facto* standards (such as DOS and Windows) seems to be as strong or stronger than *de jure* standards. Provided that the new standard is responsive to the needs and demands of many commercial constituencies, its acceptance by a business community will likely trigger a strategic inflection point.

The MP3 story

An oligopoly of the industrial age record companies and broadcast networks like RCA and CBS controlled the music distribution business. Today their dominion is fragmenting. While partisans quibble about its profitability, convenience, sound quality, or long-term prospects, the MP3 phenomenon has changed forever the rule of the game of this \$38 billion industry.

The Fraunhofer Institute, a German industrial electronics research company, released MP3 in 1991 as a freely available technical standard for the compression and transmission of digital audio. The user "business case" for MP3 is simple: buy a CD software for three hundred dollars, and you can download and save an entire pirated Beatles collection on two CDs. At this point, you've made back your hardware investment, and now you can build the rest of your music library for the cost of the blank CDs.

Viscerally appealing to youngsters in the Net Generation demographic, MP3 attained critical mass in 1998, when it whirled through the Internet almost overnight. Millions of technology-literate kids and teenagers, high on music, low on cash, and sold on the mantra that "information wants to be free," used the Net to create and share MP3 software tools freely and to their heart's content. MPs show how internetworking and critical market mass can

drive strategic inflection point. Piracy cost the music industry \$10 billion in 1998. At any one time, more than half a million music files were available on the Internet for illegal downloading. While the recording industry scrambled to deal with this hurricane of music piracy, most people were not even aware that all this was going on.

Source : Adapted from Tapscott *et al.* (2000 p. 3-4.).

Transformational scholars suggest that, as MP3 and Britannica Encyclopaedia cases illustrate, hurricane of change can hit hard, and without warning (Evans & Wurster, 1997; Tapscott, *et al.* 2000). Other writers, to the contrary, argue that these situations are rare.

2.5 Contexts of strategic inflection point

There are two camps of thoughts with regard to the contexts in which strategic inflection points are applicable. Some writers such as Courtney *et al.* (1997) and Porter (2001) argue that, although multiple dimensions of uncertainty interact to create an environment that is virtually impossible to predict, the strategic inflection point is a rare phenomenon, and it tends to be neutralized as it reaches an equilibrium. It is argued that, with the exception of the computer and telecommunication industries, most empirical studies on industrial transformation show that entry takes place slowly and changes in the industry structure appear on average to be slow (Grant, 1998).

According to one researcher (Kassaye, 1997), only few industries are subject to rapid technological change if we take the use of Internet for marketing activities as measure. In addition this author maintains most Web-oriented industries in the hierarchy of current participation levels are: telecommunications 45%, computer and office equipment 42%, electronic entertainment equipment 25%, publishing and media companies 22%, financial services 19%, and insurance and real estate firms 14%. The least Web-oriented industries include agriculture and food products, retailing, building materials and drugs which have only 4% of the companies in each of these industries currently participate in Internet marketing activities.

This data reflects only marketing activities on the Web. But Porter, (1996; 2001) leading this

front, continues to argue that there is no hyper-competition, and boldly asserts that there is no “new economy”. He believes that -

The Internet brings nothing fundamentally new. For all its power, the Internet does not represent a break from the past; rather, it is the latest stage in the ongoing evolution of information technology. As all companies come to embrace Internet technology, moreover, the Internet itself will be neutralized as a source of competitive advantage (Porter, 2001: p. 65).

The other side in the debate are strategic management thinkers who see that the convergence of the telecommunications and computing industry is changing everything (Evans & Wurster, 1997; Hamel, 1998; Tapscott, 2001). According to Evans and Wurster (1997), the breaking down of the trade-off between reach and richness enabled by the interconnectedness of communication and computer technology, is deconstructing the vertically integrated value chains of many industries as well as transforming the structure of many industries.

To the question whether the so-called new economy is happening, Hamel (1998) answers that the question is no longer whether it is happening or not, but rather what type of companies will create the new wealth in this transition. He says that today it is not only “ ... product life cycles that are getting shorter, but also strategy life cycles are getting shorter ... ” His evidence for making such bold assertions is,

The telephone took almost 40 years to reach 10 million customers in the US. Yet the Web browser reached 110 million customers in 18 months. Sun Microsystems’ Java software platform was populated on 100 million computers in only 13 months (Hamel, 1998, p. 20).

In a world, where everybody is connected, and where every piece of information, every image, and every sound and every motion picture can be turned into computer data, the Internet is going to be the biggest strategic inflection point for many industries and commerce.

It may not be possible to draw a general conclusion across the board. Every industry may be transformed according to its own context. An observation by a number of writers on a wide

range of industries, however, reveals some visible trends on all industries (Evans & Wurster, 1997; Hamel, 1998; Prahalad & Oosterveld, 1999; Tapscott *et al.* 2000). More specifically, the transformations are visible for anyone in the computer, communications, financial and entertainment industries and others that can readily be replaced electronically.

The industry inflection point, however, can be more than just a technology transition. Observing how infectious bio-living things breakout into a widespread epidemic, Gladwell (2000) argues that change happens much because of people's behaviour and their social interactions.

There is a continuous interaction between individuals, businesses, economies, nations and societies. Each action by one agent or organisation is naturally reciprocated by another agent or organisation. In this continuous reciprocal process, small initial change that occurs remotely may trigger a reaction somewhere that, in turn, becomes an event in some other organisation. This is accelerated by the high connectivity of the networked economy.

2.6 Application of strategic inflection point

In the industry transformation context, building on Gladwell's (2000) theory of a tipping point, three principles can be identified for the application of a strategic inflection point:

- **Principle 1:** *Little changes can cause big effects as a result of on-going interactions among agents in the larger complex adaptive systems;*
- **Principle 2:** *Change happens not gradually, but at one dramatic moment, affecting all at once* (Gladwell, 2000), and
- **Principle 3:** *These two lead to discontinuity of the existing industry structure* (Prahalad & Oosterveld, 1999).

Principle 1

Little changes can cause big effects as a result of ongoing interactions among agents in the larger complex adaptive systems. The complexity theory holds that changes do not necessarily follow the law of a cause-and-effect relationship. Little changes can appear somehow, anytime, anywhere, as the example of Hush Puppies provided in the first chapter of this paper illustrates. The outcome of the little change is non-linear in nature, and therefore it

cannot be predicted. The non-proportional big effect could be the result of the on-going interaction between individuals, companies and larger systems. The oft-quoted imagery for this is the assertion that the flapping of a butterfly's wing can in due course decisively affect weather on a global scale.

Principle 2

The second principle of strategic inflection point is that change happens not gradually, but at one dramatic moment, affecting all at once. Gladwell's (2001) notion of "contagiousness" holds that the world follows the rules of epidemics in which ideas, products, messages and behaviours spread just like a virus does. The Internet and multimedia connectivity serve as networks of the information super highway that connect individuals, customers, suppliers, corporations, competitors, institutions, societies and nations, enabling change to spread rapidly. Thus, a little change can affect the whole world, going across populations and nations, doubling again and again exponentially until it grows to "tip" all at one dramatic moment.

Principle 3

The result of the two principles is discontinuity of existing ways of doing business, change in industry structure and shifts in market forces, forming the third principle of the strategic inflection point. When this happens, a strategic inflection point occurs, the point where industry dynamics fundamentally change (Grove, 1996).

Whilst all strategic inflection points are changes, not all changes are strategic inflection points. The most important question, therefore, is how to distinguish a strategic inflection point from a non-strategic change, in other words how to distinguish a signal from a noise. Three characteristics are essential for assessing patterns of inflection points:

- (a) they must be critical to a business (and industry);
- (b) they must be irreversible, and
- (c) they must have a clear trajectory.

Yet, the question becomes worse because inflection points may emerge initially too small to be recognised.

2.7 Can strategic inflection point be anticipated?

The victims of strategic inflection points seem to be incumbents, especially those who have been successful in the past. Those who are currently undergoing discontinuities are those who are providing offerings that could be replaced more effectively and less costly electronically, such as entertainment, publishing, banking and others (as evidenced by the case of *Encyclopaedia Britannica* mentioned in the first chapter).

Prahalad and Oosterveld (1999) state that many industry incumbents do not realise when large scale change signals occur and that corporate leaders often misinterpret its effects, attributing the change to loss of market share, unattractive products and profit declines. Their first reaction to discontinuities is therefore to “work harder”, when what they really need is to “work differently”. Burgelman and Grove (1995) call this "strategic dissonance", referring to conflicting voices that emerge within the organisation when a firm's competencies suddenly diverge from the basis of competition or when the firm's stated strategy differs dramatically from what it actually does.

Theoretically, the solution for this seems to sense the signals of an inflection point early and to respond early and appropriately. But in reality this means acting when the company is still healthy, when everything is not known, when the trends are not clarified, and when data for a scenario analysis has not yet matured. Time and again prediction is not possible.

Yet when an inflection point hits, it is difficult to implement radical organisational transformation in practice. In many businesses it is not easy to withdraw from the existing physical assets, core competences and ideologies that provided a competitive advantage in the past and which are central to a company's identity. Financially, it is not easy to write off large factories with huge fixed costs or to break with existing customers and suppliers that are source of profits. Newcomers suffer none of these obstacles. This is the challenge that faces many businesses today.

2.8 Summary

The purpose of this chapter was to review forces causing discontinuity, their impacts on the industry structure, and how strategic inflection points occur. Discontinuity arises from many sources, including technological changes, changing customer expectations, excess capacity and high R&D costs, deregulation and privatisation, and environmental concerns. The impacts of these forces have been analysed within the framework of the five forces. These forces lead to intense competition, raise customers' bargaining power, change suppliers' position, lower entry barriers and increase threats coming from substitutes and complementors. A substantial change in one or more of the five forces can lead to a strategic inflection point.

The process of strategic point of inflection is described as change in the balance of forces from the old structure, from the old ways of doing business and the old ways of competing to the new. The driving market forces for strategic inflection point in the new economy were reviewed in comparison to traditional market forces. It was concluded that strategic inflection point can happen quickly and dramatically in the new economy because of a shift of production from economies of scale to abundance, with many knowledge based goods exhibiting the law of increasing return and networked economies of scale.

It was inferred that, in a world where everyone is connected, the Internet is going to bring about the biggest strategic inflection points for many industries and commerce, though most radically for the computer, communications, financial and entertainment industries.

Three principles have been identified to understand how inflection points occur in this era of high connectivity: i) little changes can cause big effects, as a result of on-going interactions among agents in complex adaptive systems, ii) change happens not gradually but at one dramatic moment, affecting all at once, thus iii) leading to discontinuity of existing ways of doing business.

Finally, this chapter concluded that strategic inflection points cannot be anticipated. The next chapter will review whether traditional strategy approaches are relevant in dealing with industry inflection.

CHAPTER III

THE RELEVANCE OF TRADITIONAL STRATEGIC MANAGEMENT APPROACHES IN DEALING WITH INDUSTRY INFLECTION

3.1 Introduction

In today's highly interconnected economy, industry inflection can hit hard and without warning. In view of this assumption, this chapter attempts to conduct a critical analysis on the relevance of traditional strategic management approaches in dealing with industry inflection.

Several streams of strategic management approaches appear in the literature since 1950: budgetary planning and control, forecasting and investment planning models, SBUs and portfolio planning, analysis of industry structure and competition, resource-based view of the firm and core competencies, and finally strategy approaches dealing with organisational flexibility, organisational learning and complexity and chaos theories (Grant, 1998, 2002).

Traditional strategic management approaches comprise all strategy theories and models prior to the late 1990s. Many of the earlier theories – that is prior to late 1970s - were not able to withstand the macroeconomic instability of the 1970s (Grant, 1998; Shay & Rothaermel, 1999). The two approaches that seem to have been most popular over the last two decades and which are still the subject of many academic reviews, are the Porterian “five forces” (Porter, 1985) and the “resource-based view of the firm”, commonly known as RBV (Collis & Montgomery, 1995). The current study mainly focuses on these two approaches which are representative of the “*Outward-inward*” and “*Inward-outward*” traditional strategic management theories respectively.

Traditional strategic management approaches focus on identifying the *content* of sources of competitive advantage, by analysing the present situations for the purpose of devising a theoretical framework for the future. A careful analysis on the academic arguments on the relevance of traditional approaches in dealing with discontinuous change reveals three varying

explanations for declaring the traditional approaches inappropriate in dealing with discontinuous changes:

- traditional approaches are useful for generating strategies for businesses facing low levels of uncertainty, and alternative approaches should be used according to levels of uncertainty (Courtney *et al.*, 1997)
- traditional approaches have fundamental flaws inherent in their concepts and have never worked out in practice (Mintzberg, 1994; Campbell & Alexander, 1997; Huffman, 2001).
- current turbulence means traditional approaches are inadequate and ineffective, thus they have to give way to a new paradigm (Camillus, 1997; Sanchez, 1997; Hamel 1998; Pascale, 1999).

These varying criticisms on traditional approaches seem to have come from the field of strategic management's endeavours to take a proactive approach to the competitive pressures facing many business organisations today.

This chapter argues that traditional approaches can be useful in stable environments, but in turbulent environments, characterised by waves of strategic inflection points, the focus of strategic management research should be on designing *organisational processes* that would enable a firm not only to adapt to, but also to enable strategic inflection points proactively.

3.2 The evolution of strategic management

From the 1950s to present day, the streams briefly described below appear in the literature of strategic management (Grant, 1998; Shay & Rothaermel, 1999; Grant, 2002). Each of the approaches seems to reflect the management challenges associated with its period over the past five decades:

During the 1950s financial planning and control procedures were developed in order to assist managers to deal with problems in coordinating decisions and maintaining control of activities in firms that were growing increasingly large and complex. But the coordination of

capital investment decisions required a longer-term planning horizon than annual budgeting plans.

During the 1960s the emphasis on longer-term corporate planning reflected concern with achieving coordination and consistency in investment planning in times of stability and expansion. The typical format was a five-year corporate planning document that forecast key economic trends, established priorities for different products and business areas of the firm, and allocated capital expenditure. The majority of the largest US companies set up corporate planning departments for this purpose in the early 1960s.

Diffusion of corporate strategy during the late 1960s and early 1970s was closely associated with a drive toward diversification as large corporations came to view their management skills as unbounded by industry divisions. Increasingly, corporate strategy became focused on the management of diversified business units, on achieving synergy among different divisions, and on increasing the global market share. During the early 1970s, the portfolio-planning matrices were developed as a framework for selecting strategies and allocating resources within the diversified corporation.

During the late 1970s increased turbulence forced firms to abandon their corporate strategy in favour of more flexible approaches to strategic management where the focus was less on planning for diversification and growth and more on achieving competitiveness. This transition from corporate planning to what is now termed *strategic management* was associated with increasing focus on competition as the central characteristic of the business environment and competitive advantage as the primary goal of strategy. During the late 1970s and early 1980s, the focus was on firms' market environment with particular emphasis on the analysis of industry structure and competition.

During the late 1980s and early 1990s interest in the role of strategy in building competitive advantage resulted in a shift of interest toward the internal aspects of the firm. Developments in the resource-based view of the firm and organisational competencies and capabilities pointed to the firm's resources and capabilities as the primary source of its profitability and the basis for formulating its longer-term strategy.

As the 1990s drew to close, the field continued its rapid evolution. Key developments included interest in the role of knowledge within the firm as important source for strategic innovation, in cooperative strategies in the new economy (particularly strategic alliances and inter-firm networks), in organisational flexibility for speedy adaptation to, and proactively shaping the new, digital, networked economy (Grant, 2002).

Table 3.1 below summarises the evolution of strategic management.

Table 3.1 The evolution of strategic management

Period	Dominant theme	Main issues	Principal concepts and techniques	Organisational implications
1950s	<i>Budgetary planning and control</i>	<i>Financial control through operational and capital budgeting</i>	<i>Financial budgeting, investment planning, project appraisal</i>	<i>Key task was financial management</i>
1960s	<i>Corporate planning</i>	<i>Planning growth</i>	<i>Business forecasting, investment-planning models</i>	<i>Rise of corporate planning departments and medium-term formal planning</i>
Early to mid 1970s	<i>Corporate strategy</i>	<i>Diversification and portfolio planning</i>	<i>Synergy, SBUs, portfolio-planning matrices</i>	<i>Diversification, multidivisional structures, quest for global market share</i>
Late 1970s and early 1980s	<i>Analysis of industry and competition</i>	<i>Choice of industries, markets, and segments, and positioning within them</i>	<i>Experiences curve and returns to market share, analysis of industry structure, competitor analysis, PIMS analysis</i>	<i>Greater industry and market selectivity, industry restructuring, active asset management</i>
Late 1980s and early 1990s	<i>The quest for competitive advantage</i>	<i>Sources of competitive advantage within the firm</i>	<i>Resource analysis, analysis of core competencies, RBV</i>	<i>Corporate restructuring and business Process, reengineering, refocusing and outsourcing</i>
Late 1990s and early 2000s	<i>Strategic innovation and the new economy</i>	<i>Competitive advantage through strategic innovation, competing for knowledge, adapting to the new, digital, networked economy</i>	<i>Organisational flexibility and speed of response, knowledge management and organisational learning, Computing for standards, early mover advantage</i>	<i>The virtual organisation, the knowledge-based firm, alliances and networks, the quest for critical mass</i>

Source: Adapted from Grant (2002).

3.3 The quest for sources of competitive advantage: an outward-inward analysis

Many of the earlier theories, i.e. those prior to the late 1970s - including the BCG portfolio-planning matrices model which focused on long-term forecast, were not able to withstand the macroeconomic instability of the 1970s (the oil crisis, high interest rate environments and fierce competition from Japanese corporations). Consequently, development of strategic analysis models shifted from reliance on “long-term planning” to focus on a (static) “competitor analysis” of strategy (Grant, 1998; Shay & Rothaermel 1999).

During the late 1970s and early 1980s, the focus was on relating the firm to its environment, with particular emphasis on the analysis of industry structure and competition. This external focus of strategy can be referred to as an *outward-inward analysis* (Teece, Pisano, & Shuen, 1997; Shay & Rothaermel, 1999). One such strategic analysis model is Porter’s five forces approach that dominated during the late 1970s and early 1980s.

The five forces model (Porter, 1985) focuses on the analysis of industry content (customers, suppliers, competitors) and on predictable developments (new entrants, substitutes) to identify the source of competitive advantage through favourably positioning a firm within an attractive industry. The essence of the model is that the structure of an industry determines the state of competition within that industry and sets the context for the company’s strategy. This model underlines that there are five forces that determine the average profitability of the industry and which have a correspondingly strong impact on the profitability of individual corporate strategy.

Extending his earlier work to reflect as the current business environment, Porter (1996) argues that a competitive advantage develops from carving out a strategic position through making trade-offs within the five forces framework by tailoring the company’s activities to strengthen the position. His latest notion of “fit” among companies’ activities seems to have been developed in response to the RBV emphasis on source of competitive advantage as stemming from a firm’s few internal specific hard-to-imitate valuable resources, in which he says that every resources matters and the consistency among different activities of the firm strengthens its strategic position in the industry structure.

Despite some strong reservations among researchers regarding the relevance of the industry structure in today's business environment e.g. Moore's ecosystem (Moore, 1993); Gulati, Nohria and Zaheer's strategic network (Gulati *et al.*, 2000); Tapscott *et al.*'s Business-web (Tapscott *et al.*, 2000); Leibold, Gibbert and Probst's Socio-cultural business system (Leibold *et al.*, 2002), Porter contends that the industry structure and a sustainable competitive advantage are two fundamental factors that determine average industry profitability, and that these are universal in that they transcend any technological advancement even if suppliers, channels, substitutes or competition change. While he does not entirely deny that the Internet has brought new ways of doing business, Porter argues that the *fundamentals* of the old rules remain unchanged.

3.4 The quest for sources of competitive advantage: an inward-outward analysis

During late 1980s and early 1990s, with the emergence of the *core competence* (Hamel & Prahalad, 1990) and *resource-based view of the firm* (Collis & Montgomery, 1995), the strategic management research in quest of sources of competitive advantage appears to have shifted from an *outward-inward* to *inward-outward* analysis. The core competence approach emphasises the importance of both skills and collective learning embedded within an organisation and management's ability to guide them. This view assumes that the sources of competitive advantage reside inside the organization, and the adoption of new strategies is determined by the company's current competencies.

The RBV builds on the tenets of core competences, and although it tries, to some degree, to rely on industry organisation economic reasoning, the theory largely focuses on analysing resources and competencies internal to individual firms. From the RBV perspective, firms are heterogeneous with respect to their resources or capabilities. Corporate strategy would be successful only to the extent that the firm possesses (tangible and intangible) assets that have inimitable and highly strategic characteristics and that it leverages those resources appropriately.

Whereas the five forces approach focuses on the industry as the unit of analysis, the resource-based view of the firm focuses on the individual firm's internal resources and capabilities. Nevertheless, both approaches tend to provide a framework for identifying content variables

of sources of competitive advantage that are said to be static (Sanchez, 1997). In this respect, the traditional approaches are useful in a relatively stable environment. But when environments are said to be characterised by waves of strategic inflection points, the question arises as to whether traditional strategy models are relevant to deal with inflection points.

In view of the above question, a careful analysis of the strategic management literature regarding traditional approaches revealed three explanations for stating that the traditional approaches are inappropriate to deal with discontinuous change:

- the first group (Courtney *et al.*, 1997) argues that the business world should not be seen in a *binary way* either as turbulent or stable. They maintain that the traditional approaches are still useful for generating strategies for businesses facing low levels of uncertainty, but alternative approaches should be applied to firms confronting higher levels of uncertainty.
- in contrast to the above, the second group herein referred to as the “learning school”, contends that the issue in question is not change by itself, but that traditional approaches have fundamental flaws inherent in their concepts and have never worked out the way it is claimed since their foundation (Mintzberg, 1994; Campbell & Alexander, 1997; Huffman, 2001). In support of their argument, Campbell and Alexander (1997) quoted the following:

The popular management author Tom Peters is famous for having offered \$100 to the first manager who could demonstrate that a successful strategy had resulted from the planning process. He has never paid out (p. 2).

- the third group (Camillus, 1997; Pascale, 1997; Sanchez, 1997; Hamel 1999), argues that all environments are characterised by turbulence, thus, traditional approaches have to give way to an entirely new paradigm.

3.5 The challenge of uncertainty and traditional strategy models

Courtney *et al* (1997) believe that analysis is at the heart of all strategies when situations are relatively stable. But analysis tends to break down when the environment is so uncertain that

no amount of good analysis will allow strategic management to predict the future. According to these authors, looking at the world in a *binary way* as either the environment is certain - and therefore open to precise predictions about the future - or uncertain - and therefore completely unpredictable - is dangerous.

Underestimating uncertainty can lead to strategies that neither defend against the threats nor take advantage of the opportunities that higher levels of uncertainty may provide. At the other extreme, assuming that the world is entirely unpredictable can lead managers to abandon the analytical rigour of strategic planning processes altogether and to base their strategic decisions primarily on gut instinct.

3.5.1 Levels of uncertainty

Courtney *et al.* (1997) have developed a framework to classify the levels of uncertainties in four levels according to the magnitude of change. They maintain that the traditional approaches are useful for generating strategies for businesses facing low levels of uncertainty, and alternative approaches should be applied according to the various levels of uncertainty in uncertain environments. What seems relevant to the study of industry inflection, is the highest level in the hierarchy of the uncertainty, level 4 or *true ambiguity*.

- **Level 1: *A clear-enough future***

The future is precise enough to develop a strategy based on analysis. It is recommended that traditional models can be utilised for generating strategies for businesses facing low levels of uncertainty.

- **Level 2: *Alternative futures***

The future can be described as one of a few alternate outcomes, or discrete scenarios. Decision analysis, option valuation models and the game theory may be used to identify the different possible future outcomes and to consider the likely paths the industry might take to reach those alternative futures.

- **Level 3: *A range of futures***

At this level, a range of potential futures can be identified. That range is defined by a limited number of key variables, but the actual outcome may lie anywhere along a continuum. Courtney *et al.* (1997) suggest that a set of latent demand research, technology forecasting and scenario planning could be used to predict relevant scenarios that describe alternative future outcomes, and analysis should focus on the trigger events signaling that the market is moving toward one general direction or another scenario.

- **Level 4: *True ambiguity***

At level 4, multiple dimensions of uncertainty interact to create an environment that is virtually impossible to predict. Not only scenarios within the range, but the whole range of potential outcomes cannot be identified. It might not even be possible to identify, much less predict, all the relevant variables that will define the future.

What is relevant to the study of industry inflection, is level four or *true ambiguity*. Courtney *et al.* (1997) have made it clear that at this level traditional strategic management approaches are inappropriate.

3.6 The view of learning school on traditional strategy models

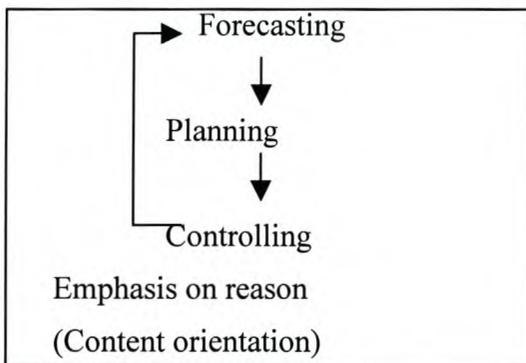
The collective viewpoint of evolutionary theorists (Mintzberg, 1994; Campbell & Alexander, 1997; Huffman, 2001) which is commonly referred to as the *learning paradigm* views strategy as an emergent, a process of ongoing learning and analysis, in contrast to conducting analysis at a given time to identify *content* of sources of competitive advantage. Contrary to the views of Courtney *et al.* (1997), who maintain that the rate of change determines the relevance of traditional approaches, the learning school contends that the issue of concern is not change *per se*, but that the traditional approaches have fundamental flaws inherent in their concepts, and therefore, have since their foundation never worked out the way it was claimed. According to this group's viewpoint, the fallacies of traditional models are highlighted regarding several fundamental concepts, including prediction, vision, content analysis, detachment of top managers, and sequential steps of strategy formulation and implementation.

3.6.1 From prediction to on-going learning

The basic underlying assumption of the traditional models is that a combination of analysis and rationality can lead to reliable predictions regarding the future. Porter (1996) emphasises that strategic positioning should consider a perspective of “... *a decade and longer horizon* ... (p. 69).” Mintzberg (1994) rejects this, stating that in view of strategic planning models, “... *the world is supposed to hold motionless when the plan is being developed and that it stays on the predicted course while that plan is being implemented* ... (p. 109).”

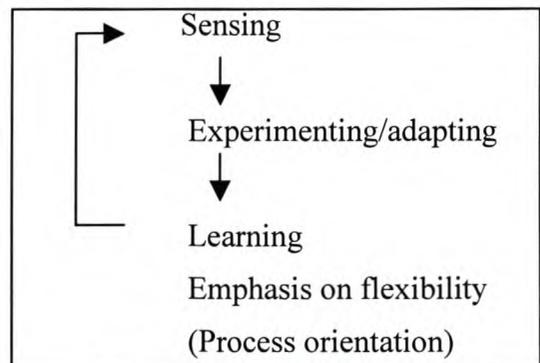
It seems that that the rapidity with which the business environment had changed, made it clear that prediction is very difficult. Accepting this reality seems to shift the focus of strategic planning (see figures 3.1 & 3.3) from an attempt to predict the future to flexible and speedy responses to a changing present, from a plan based on analysis and reason to a design of experiments to provide a basis for ongoing learning and adaptation (Camillus, 1997).

Figure 3.1. The prediction model



Source: Camillus (1997)

Figure 3.2 The learning model



Source: Camillus (1997)

3.6.2 The fallacies in vision

The traditional mindset assumes that the objective for any business is to make profits. Porter (2001) states that “... *the creation of economic value once again becomes the final arbiter of business success ... and over the long run, shareholder value is a reliable measure of economic value* (p. 65).”

Campbell and Alexander (1997) challenge Porter’s assertion, stating that creating value for

shareholders is not much of an objective, as it is an economic constraint on a company's actions, and, thus, to describe the competitive advantage or shareholders' value as an objective that drives strategic thinking, is to misunderstand the universal constraints. In supporting to this argument, Mintzberg (1994) says that “ ... *strategic planning is the source of such confusion causing managers to confuse real vision with the manipulation of numbers* ... (p. 110).”

Campbell and Alexander (1997) argue that visions that describe the essence of why the organisation exists, are the basis for generating strategy, and hold that when a vision is more focused and detailed, it is likely to enable a company to develop a winning strategy. Similarly, Mintzberg (1994) believes that business founders' vision, such as a dream about inventing a new product drives strategic thinking. According to this group, this kind of purpose limits the range of strategic choices that need evaluating and therefore helps to simplify strategy development.

3.6.3 The simultaneous nature of formulation and implementation

In the traditional process, planning development follows sequentially, with mission being first, then objective, followed by strategy and lastly tactics (generally known as MOST). Traditional approaches drive strategies from objectives, formalising those strategies so that they can be implemented step by step, and articulating the anticipated consequences or results of each step. In general, traditional approaches view the strategy formulation process as deliberate and deductive.

The learning school criticises the formal strategy formulation process, arguing that objectives and strategy, as well as formulation and implementation are intertwined in a way that makes it difficult for an organisation to decide where to start. It is argued that, in reality, when developing objectives, the idea of how to achieve them, comes instantaneously. And if management cannot think of a sound strategy, it is likely to reject the objective as unrealistic. Tactics and strategy have the same sequencing problem. The tactics need to be worked out before the strategy can be determined, and the strategy needs to be clear in order to define the objectives. The MOST framework, therefore, collapses from a sequential path into a simultaneous coming together of all the elements.

This argument implies that one should know all the processes and insights when developing a strategy. Narrowing this implication, however, Campbell and Alexander (1997) and Huffman (2001) argue that the most fundamental thing in developing a strategy is to understand the tactical details that provide the insights for a winning strategy and which give leaders the courage to set bold objectives. In effect, the learning paradigm emphasises a bottom-up strategy formulation, in contrast to the traditional mindset of a top-down strategy formulation.

3.6.4 The exclusion of lower level managers

In the traditional mindset, leaders are expected to select a winning strategy, to develop a detailed operating plans, and to direct the activities of subordinates in the realisation of the strategy. Supporting this mindset, Porter (1996) avows that lower level employees who are immersed in the technical details but who are encouraged to search for every means of competitive advantage, are not capable of having strategic thinking.

On the other hand, leaders simply do not have the information, expertise, or time to make detailed strategic decisions, to draft plans for implementing their decisions, and to monitor full compliance with plans. There is a general opinion that operating managers who have good insight but who do not have a say in managing the company, may be excluded from the strategy-making process (Mintzberg, 1994; Campbell & Alexander, 1997). Huffman (2001) observes that “ ... *brilliant strategy comes either as part of an evolutionary process or as the product of an unknown and apparently unknown process inside the head of the experienced manager but with the least power to promote them successfully...* (p. 14).”

It is true that hierarchical structures discourage effective communication in the organization, resulting in time delays, eroding richness in contents of message and excluding the qualitative information. However, the proponents of the learning paradigm (Mintzberg, 1994; Campbell & Alexander, 1997; Huffman, 2001) seem to make no attempt to study how the hierarchical structure might be restructured to enable learning to take place on an ongoing basis.

3.6.5 The rejection of application of methodology in strategy-making

The authors mentioned in this thesis as belonging to the learning school, have identified the weaknesses of defining elements of traditional approaches, like prediction, vision, detachment

of top managers, and sequential steps of strategy formulation and implementation. This seems to lead one of the authors (Huffman, 2001) to aver that there is no formal analytical or systematic way of developing strategy, stating that “... *if making strategy is essentially about making something new, then strategy-making is beyond normal science and there is a serious doubt as to whether strategy-making can be taught at all...* (p. 19).” This may be untrue in a relatively stable environment where traditional approaches could be effectively applicable. But the assertion by Huffman (2001) implies a need for further strategic management research to pursue non-linear, systemic and holistic-based strategic thinking that might enable firms to deal with discontinuous changes appropriately.

Having identified the weaknesses of traditional approaches, the proponents of the learning paradigm (Mintzberg, 1994; Campbell & Alexander, 1997; Huffman, 2001) contend that evolution, as opposed to deductive analysis, is the source of successful strategy.

3.7 The evolutionary process for strategy developing

The collective perspective pertaining to the learning paradigm holds that strategies are the result of a synthesis of insight (Mintzberg, 1994) (Campbell and Alexander, 1997), and experience. Mintzberg (1994) writes -

Strategy making is an immensely complex process, which involves the most sophisticated, subtle, and at times, subconscious elements of human thinking. What it takes the forms of fits and starts, discoveries based on serendipitous events and the recognition of unexpected patterns, learning inevitably plays a, if not the, crucial role in the development of novel strategies Innovation being a necessary characteristic of a good strategy has never been institutionalized and perhaps never will... (p. 112).”

The proposal by Leibold and Gibbert’s (2002) for the use of satire for imaginative strategy-making seems to fit in with the learning paradigm. Given satire’s potential to “... *hold up vice or folly to ridicule ... (p. 2)*”, it seems useful to help managers out of their conventional ruts by way of creating unexpected *funniness*. So the satire approach seems to complement the assertion by Mintzberg (1994) that study has shown the most effective managers rely on some of the softest forms of information, including gossip, hearsay and various other intangible scraps of information.

The learning approach of strategic management has been manifested in practice by ways of performance improvement techniques, including reengineering, Total Quality Management (TQM) and Just-In-Time. Porter (1996) seems to reject these approaches of developing strategy, referring to it as *operational effectiveness*, which, he argues, is necessary but not sufficient to be called strategy. In addition, Porter observes that firms' strategies are converging due to industry incumbents invariably pursuing operational effectiveness and calls for a return to the *fundamentals* of strategic positioning.

In disagreement to Porter, the learning paradigm contends that evolution, as opposed to deductive analysis, is the source of successful strategy. In the learning approach point of view strategies are rarely planned, but that they rather evolve slowly over time. Analysis and techniques are taken as an integral part of ongoing decision-making activities, and that strengths, weaknesses, opportunities and threats (SWOT) analysis is seen not as an occasional analysis, but becomes a real-time, ongoing state of mind.

However, the proponents of quantum change (Camillus, 1997; Sanchez, 1997; Hamel 1998; Pascale, 1999) argue that - in an epoch of massive discontinuities - the learning approach is not adequate on its own; firms need to seek beyond product innovation and performance improvements techniques for an innovative strategy that would enable them to adapt to industry inflection. This group contends that evolutionary thinking has to give way to a revolutionary thinking of strategy.

3.8 Difficulties of traditional strategic management approaches in dealing with industry inflection

In view of the above-mentioned third group who maintains that traditional approaches and the approaches of the learning paradigms are not adequate on their own to deal with strategic inflection points, four difficulties can be inferred to claim that both the approaches are no longer appropriate in dealing with industry inflection. First, the traditional approaches, namely the Porterian approach and the RBV theory, could lead to a myopic focus on firm's specific resources or an attractive industry positions, when firms' existing valuable resources or strategic positions are diverging from the emerging landscape due to radical changes in the industry.

Secondly, the traditional mindset that stresses the nature and degree of competition as a key driving force in developing a strategy, seems to be ineffectual in the transformational era where collaboration and partnership with competitors is seen to be a commonly dominant consideration (Camillus, 1997). Thirdly, Porter's (1996) notion of fit, as understood to be consistency among a firm's internal activities to strengthen the firm's external strategic position, may appear less relevant in the transformational concept of strategy. Instead, the requirement for firms in the new economy would be to achieve organisational fitness in order to be dynamically fit in a dynamic complex environment. Lastly, adherence to an evolutionary or a learning approach in time of radical changes could possibly turn core competencies to *core rigidities* (Leonard-Barton, 1998).

3.8.1 The focus on positioning or firm's specific valuable resources

In face of the emerging massive discontinuities when firms' existing strategy is diverging from the emerging landscapes as a result of radical change in the industry, adhering to the Porterian five forces or RBV models could lead to a myopic focus on a firm's specific resources or attractive industry positions. The focus on defined industry boundaries may lead a company to ignore opportunities or threats arising from the interconnected complex economy that crosses a variety of industries. Similarly, the emphasis on a firm's specific competencies and resources may inhibit the firm from learning new capabilities that are required when quantum changes are seen to be necessary for survival.

3.8.1.1 The blurring of industry boundaries

Traditional strategy models view firms as autonomous entities capable of curving out strategic positions in the industry or building their own resources that lead to a sustainable competitive advantage. Joseph Schumpeter's (in Grant, 1998) *perennial gale of creative destruction* might never have been as relevant as today to raise key issues whether the current industry structure could be used to identify a firm's source of competitive advantage.

A relevant consideration is the speed of structural change in industry. If the pace of transformation is rapid, if entry rapidly undermines the market power of incumbents, if innovation is speedily transforming the industry structure by creating substitutes and by shifting the landscape on which firms compete (Hamel 1998; Tapscott, 2001), then there is

little merit in using industry structure as a basis for analysing sources of competitive advantage. In the face of such massive discontinuities, it fundamentally alters existing industry structure resulting in an inflection point when one of the 'five forces' changes substantially.

Tapscott (2001) writes that the Internet is enabling a new business architecture that challenges the industry structure as the basis for competitive strategy. Reminiscent of the concept of an ecosystem (Moore, 1993), Tapscott calls this new business architecture *Business web*, which is defined as any system composed of suppliers, distributors, service providers, infrastructure providers, and customers that uses the Internet for business communications and transactions. In contrast to the traditional vertically integrated competition, this networked business assumes that each business in the B-web focuses on its core competence, which appears to be more agile, innovative, cost-efficient and profitable.

3.8.1.2 The blurring of a firm's specific valuable resources

A firm's specific resources are less specific to the firm if innovation represents a *perennial gale of creative destruction* through which industry incumbents contain the seeds of their own destruction by providing incentives for new entrants to target them by applying new rules of the game. According to the network strategic perspective (Gulati *et al*, 2000), firms are viewed as connected to each other in multiple networks of resources and other flows. These linkages tie firms in complex relationships that are simultaneously competitive and cooperative. Sources of competitive advantage are not only deriving from own unique resources, but also from firms' target resources in the network structure where their capabilities and competencies can be optimised.

From these explanations, it can be inferred that the conceptual boundaries of outward or inward approaches are being blurred. In contrast to the industrial structure analysis point of view, sources of competitive advantage are not only captured externally, but also internally by focusing on a firm's specific core competencies. Contrary to the resource-based view of the firm, sources of competitive advantage are not only deriving from own unique resources, but also from outside. What becomes of strategic importance, is to design an organisational process for enabling firms to target resources that will generate maximum wealth, irrespective of boundaries.

3.8.2 The focus on competition

In the traditional mindset the starting point for strategic thinking has always been the stand-alone, vertically integrated corporation, and the nature and degree of competition is often a key driving force in developing strategy. Traditional companies gained momentum with vertical manufacturing model because it was cheaper and simpler for them to perform the maximum number of functions in-house, rather than incurring the high cost and risk of partnering with outsiders to execute vital business activities (Grant, 1998).

Camillus (1997) observes that in the transformational era collaboration with other organisations is not uncommonly a dominant consideration. When a firm intends to initiate a strategic move to enable industry inflection, an organisation may need to complement its capabilities and resources by collaborating with competitors. In a turbulent environment, collaborating with new innovators to bring new ideas into the ecosystem (see for example Moore, 1993) is seen to be an agile strategy in order to renew the company and to raise entry barriers for others. In the new economy, collaboration, partnership and alliances appear to be possible because of information technology.

3.8.3 The focus on fit

According to Porter (1996) *fit* is described as the consistency between the activities that a firm does as part of its overall strategy. He says that fit among a firm's various activities drives both competitive advantage and sustainability, and this fit prevents imitators by creating a chain that is as strong as its strongest link. In a stable environment, it seems true that this consistency provides high organisational effectiveness and efficiency. It may also be true that this consistency can generate a competitive advantage where there is an increasing return in following a trajectory path. Furthermore, the notions of path dependency (Teece *et al.*, 1997) underpin Porter's concern that frequent shifts in structure are costly and they take some time to achieve coherence again among different activities.

But when the existing vertical value chain tends to deconstruct and give way to fragmented multiple businesses because of fundamental change in industry structure (Evans & Wurster 1997), it is less clear how this fit will continue its fitness in order to adapt to the rapidly changing environment. What is more, it seems that the stronger the fit is entrenched, the more liability or core rigidities it acquires when inflection point hits the firm. The challenge

for the firm then seems less to achieve consistency among its activities and more to achieve organisational fitness in order to adapt to, or to enable industry inflection.

3.8.4 The emphasis on an evolutionary approach

In a continuously changing and predictable environment, the learning approach that emphasise the ongoing process of strategic management seems to be superior to the analytical-based content of strategy that was the focus of the traditional approach. When inflection points are said to shift the business environment into areas far different than any previously seen, the learning approach seems to suffer from its incremental ways of dealing with discontinuous changes. The learning approach assumption of strategy flexibility suffers from the fact that flexibility may not reflect in reality when the organisational structure remains unchanged. In addition, the emphasis on an evolutionary approach can inhibit the firm from learning new capabilities that are required when quantum changes are seen to be necessary for survival.

It is observed that the very evolutionary path followed over the years to develop core competencies could be the prime reason for solidifying core rigidities (Leonard-Barton, 1998). According to this author, falling in love with own processes and products, constantly overdoing performance or innovation in areas where the company excels, the limited options available due to path dependency and the fact that the system trains customers to expect better versions of adopted products contribute to core rigidities.

Moreover, ideas and values are the most difficult aspects to change (Sanchez, 1997). Firms adhering to learning approaches may become unable to foresee the drastic consequences of industry inflection. Prahalad and Oosterveld (1999) state that corporate leaders often misinterpret the effects of industry inflection, attributing the change to loss of market share, unattractive products and profit declines. Their first reaction to discontinuities is therefore to work harder when what they really need is to work differently. Burgelman and Grove (1995) call this *strategic dissonance*, referring to conflicting voices that emerge within the organisation when a firm's competencies suddenly diverge from the basis of competition or when its stated strategy differs dramatically from what it actually does. Therefore, it is intellectually challenging for managers to upgrade their knowledge capital continually, to free themselves of past rigidities through designing organizational processes conducive for speedy

adaptation to industry inflection and to enable it proactively.

3.9 Summary

The purpose of this chapter was to analyse critically the relevance of traditional strategic management approaches in dealing with industry inflection in view of the current shift of focus in the realm of strategic management research from analysing *content* of sources of competitive advantage to studying *processes* for shaping changes. A concise review on the traditional approaches was presented.

The traditional strategic analysis models prior to 1970s did not have much influence because of economic turbulence in the 1970s. The two dominant traditional approaches were the Porterian five forces and RBV models, referred to as *outward-inward* and *inward-outward* analysis respectively. While these approaches differ in the domain of analysis, they tend to provide a framework for analysing content variables to identify sources of competitive advantage where those sources are static. The traditional approaches are therefore useful in certain contexts where the environment is relatively stable.

When a competitive environment is assumed to be turbulent, the traditional models are not useful on their own for identifying strategic inflection point as well as speedy adaptation to it. In support of this conclusion, four difficulties have been identified regarding the relevance of traditional and learning approaches to deal with strategic inflection points.

In the transformational paradigm, sources of competitive advantage are viewed as not only deriving from either *outward* or *inward* analysis of industry structure or firm's own unique resources. Firms target others' resources in the networked economy, as well as focusing on own specific core competencies. This leads to blurring the conceptual boundaries of *outward* or *inward* traditional approaches. Consequently, the focus of strategic management research shifts to organizational processes for enabling firms to capture resources that can provide maximum stakeholders' wealth, irrespective of boundaries.

In the traditional mindset, competition is often a key driving force for wealth creation. But in conscious strategic moves to enable industry inflection, collaboration with other organisations

becomes a dominant consideration. In a stable environment, fit among a firm's internal activities provides consistency, high organisational effectiveness and efficiency. When an inflection point hits the firm, however, the stronger the fit is entrenched, the more of a liability or the bigger core rigidities they become.

In a continuously changing and predictable environment, the learning approach that emphasise the ongoing *process* of strategic management seems to be superior to the analytical-based *content* of strategy that was the focus of the traditional approach. Even so, the learning approach assumption of strategy flexibility suffers from the fact that flexibility may not reflect in reality when organisational structure remains unchanged. Hence, studying an *organisational process* that can provide maximum strategy flexibility for not only identifying strategic inflection point, but also for enabling inflection points, becomes important.

CHAPTER IV

COMPLEXITY MANAGEMENT THEORY AS A BASIS FOR ENABLING INDUSTRY INFLECTION AND CORPORATE INNOVATION

4.1 Introduction

In the preceding chapter, it was concluded that traditional strategic management approaches are not adequate on their own to deal with industry inflection. In view of the study objective, this chapter will critically review the relevance and application of the complexity theory to strategic management for enabling industry inflection and corporate innovation. A proactive strategy to enable strategic inflection point is seen as an effort to achieve a higher fitness landscape at a point in time. Before analysing such proactive strategic moves, it becomes necessary to study organisational processes conducive for corporate innovation.

Some writers observe that firms with high organisational fitness are capable not only to adapt, but also to enable industry inflection proactively (Normann, 2001; Leibold *et al.*, 2002). For the purpose of this study, *organisational fitness* is defined as *dynamic organisational capabilities through which an organisation becomes dynamically fit to self-organize internally continually and to co-evolve effectively with external players in order to adapt proactively to the constantly shifting landscape*. This definition provides a conceptual framework for guiding the analysis and subsequent formation of views in this chapter.

This chapter examines organisational fitness in two dimensions. The first part of this chapter deals with the internal dimension of organisational fitness. In order to review the rationale for growing academic suggestions to design complex adaptive systems in business organisation as a means of attaining organisational fitness, a critical analysis of dynamic capabilities and the knowledge creation process has been made.

The second part of this chapter focuses on co-evolution as a means for achieving the external dimension of organisational fitness. This section stresses the fact that designing complex adaptive systems in an organisation may enable a business organisation to become internally

fit to adapt to the changing landscape, but not fit enough to enable industry inflection, because the shape and movement of the fitness landscape depend not only on an organisation's own actions, but also on those of the other organisations with which it interacts (Stacey, 1996). The study analyses the co-evolutionary process that can create a context for co-adaptation and for a shadow organisation at ecosystem level. Some case studies are reported to support the theoretical underpinning of the study. The chapter concludes with a summary.

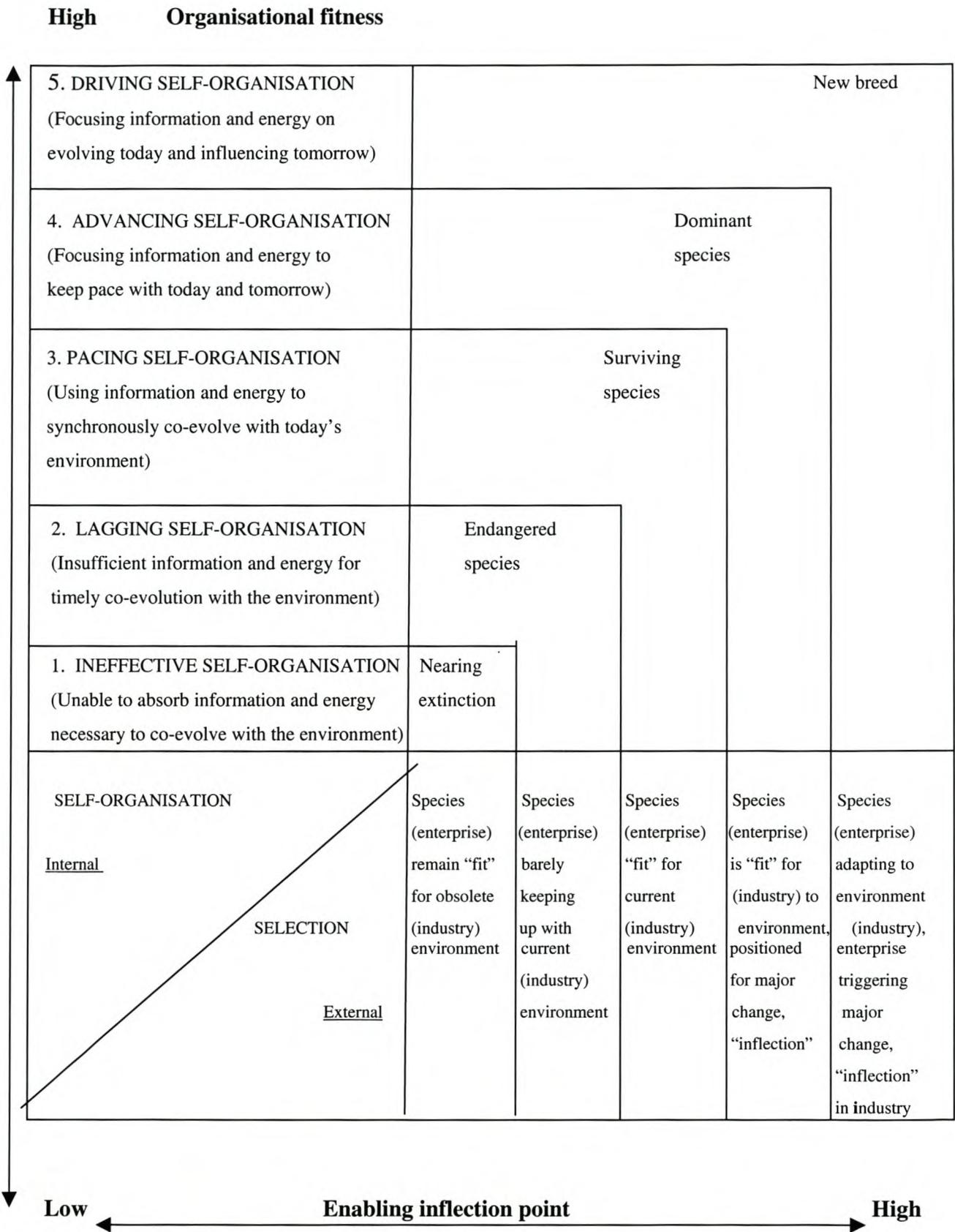
4.2 Organizational fitness and inflection point

As shown in figure 4.1 below, and based on the internal and external dimensions of organisational fitness (the ability to self-organise quickly and effectively, and the ability to adapt within one's changing context), Leibold, *et al.* (2002) distinguish five types of self-organisations, ranging from (1) *ineffective self-organization* that remains fit for obsolete industry, to (5) *driving self-organization* which is capable not only to adapt, but also to trigger an inflection point. Similarly, Rhenman (in Normann, 2001) categorises four types of organisation depending on firstly whether an organisation possesses a strategic management which can create freedom of action for its members, and, secondly whether the organization has *external* goals, i.e. ambitions about the state of the environment, or *internal* goals that are related to their own performance.

Rhenman (in Normann, 2001) says,

Appendix organizations try to fulfill the desires of their masters; marginal organizations have no other option but to adapt and be flexible; institutions measure their success in terms of how much they are able to influence the external environment; and corporations try to optimize their own performance but generally do so by relying on their power to dominate and homogenize at least certain territories of the external environment (p.81).

Figure 4.1 Stages of organisational fitness for co-evolution



Source: Leibold (2002).

What can be clearly understood from both these views and from figure 4.1 above, is that companies with high organisational fitness seem not only capable of adapting, but also of proactively triggering industry inflection.

4.2.1 Definition of organizational fitness

Although the term *organizational fitness* seems an ambiguous construct (Anderson, 1999), for the purpose of this study, *organizational fitness* is defined as *dynamic organisational capabilities by which an organisation becomes dynamically fit to transform (self-organize) internally and to co-evolve effectively in order to respond to the constantly shifting landscape*. The internal dimension of organisational fitness refers to dynamic organisational capabilities. Teece, Pisano, and Shuen (1997) define *dynamic capabilities* as “... *the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments ...* (p. 516).” More comprehensively, Leibold *et al.* (2002) define dynamic capabilities as

specific organizational and strategic processes by which managers alter their resource base. Patterns depend on market dynamism, ranging from detailed routines to simple, experiential ones. Dynamic capabilities should enable organizational resilience, based on a range of robust adaptive strategies, i.e. various options and strategic path capabilities (p. 351).

These definitions emphasise core competencies or simply knowledge that would enable an organisation to recognise when patterns of inflection points emerge either from internal or external sources and to transform so as to respond proactively. So, having dynamic organisational capabilities is a necessary precondition for initiating strategic moves to enable industry inflection.

4.2.1.1 Components of dynamic capabilities

Dynamic capabilities can be described in terms of three components; resources, knowledge, and an institutionalised system:

- **Resources**

Resources comprise both tangible assets such as equipment, technologies and cash, and intangible ones, such as product formulas, information, brands and relationships with suppliers, distributors and customers (Christensen & Overdorf, 2000). Access to resources may hamper start-ups with viable business concepts, but it seems less of a problem to established successful companies.

- **Knowledge**

Knowledge refers to both the explicit (defined processes) and the implicit knowledge repertoire that stores what a company knows and that defines how fast the company creates what it knows. The most important capabilities and/or concurrent rigidities are embodied in the latter (Christensen & Overdorf, 2000), and it seems that a company's institutionalised system has a decisive role in converting implicit knowledge into capabilities or into rigidities.

- **Institutionalised system**

An institutionalised system comprises the legitimate system, corporate values and personal values. The legitimate system is embodied in an organisation's routines: its hierarchy, responsibility and authority definition, strategies, policies, plans, procedures, job descriptions and control systems. Corporate values refer to customs, habits, rituals and the mindset that have been evolving over time. Personal values are those values that an individual brings into the organisation. Some elements of the corporate and personal values may be explicit, but most are implicit, approved and widely shared informal systems, which form a culture. Institutionalised systems dictate how individuals perceive things, how they interact with each other and how they set priorities in decision-making.

In studying organisational processes conducive to knowledge creation and innovation, one must understand and analyse the elements of an institutionalised system. While some elements need to be encouraged and creatively used as a means for guiding the creative

processes and coherence mechanism in a seemingly chaotic organisation, others need to be either minimised or eliminated. In this regard, the institutionalised ways of thinking that fall in the latter category, among others (for e.g. the “silent killers” that impede learning, Beer & Eisenstat, 2000), are traditional and evolutionary strategy mindsets.

4.3 The knowledge creation process

4.3.1 The learning approach for knowledge creation

In classical strategic management, an individual is assumed to produce innovative ideas through a formalised process of rational, deductive reasoning about the environment and the internal goals set by the organisation. The learning school rejects the possibility of a formalised process (Mintzberg, 1994; Campbell & Alexander, 1997; Huffman, 2001), arguing that innovation has never been institutionalised (Mintzberg, 1994). According to this view, the origin of innovation takes the form of serendipity and the recognition of unexpected patterns, and then engage in the learning process to realise that innovation.

4.3.1.1 The SECI model

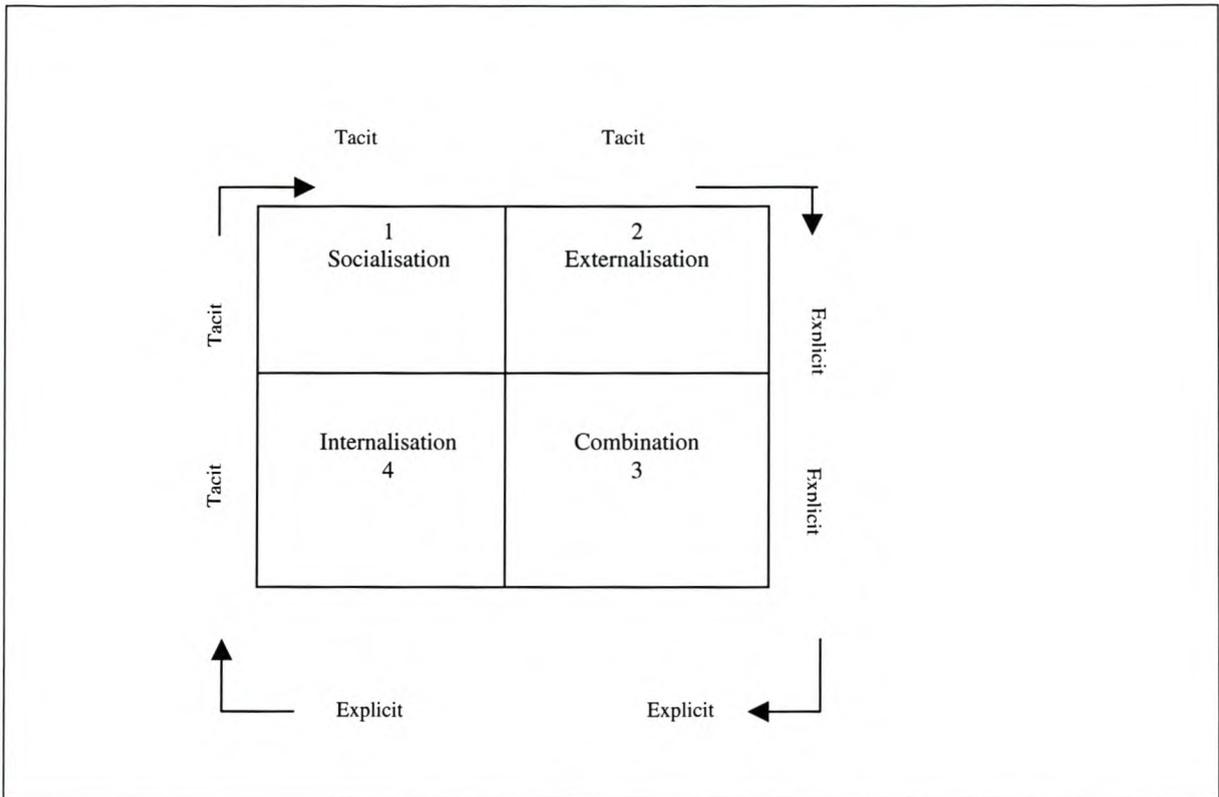
The learning approach for knowledge creation is better represented by the SECI (socialisation, externalisation, combination and internationalisation) model, as shown in figure 4.2 (Nonaka & Takeuchi, 1995).

The SECI model describes the four conversion modes of knowledge:

1. **Socialization** (*from tacit to tacit*) is the process of sharing experiences through exchanging tacit knowledge between an individual and an organisation and its environment.
2. **Externalisation** (*from tacit to explicit*) is the process of interpretation of tacit knowledge into explicit forms.
3. **Combination** (*from explicit to explicit*) is the process of conversion of explicit knowledge held by individuals to explicit knowledge at the organisational level.
4. **Internalisation** (*from explicit to tacit*) is the process of conversion of explicit knowledge, whether at individual or organisation level, to individual tacit

knowledge.

Figure 4.2 The SECI framework for knowledge creation



Source: Adapted from Nonaka and Takeuchi (1995).

The SECI model emphasises on the on-going learning process in an organisation as a major source of innovation, but gives less attention to the institutionalised system which makes optimum interaction possible, or break it. The complexity theory takes a radically different approach: strategic innovation cannot result from a purely deliberate and rational process, the focus of traditional approaches. Nor is it a function of luck or intuition, the focus of the learning approach. Rather, the complexity theory focuses on context that makes creative and innovative behaviour possible. This analysis provides the rationale for academic suggestions to design complex adaptive systems in business organisations.

4.4 Complexity theory and business application

The growing academic popularity of the complexity theory as an emerging model for management practices (Stacey, 1996; Youngblood 1997; Anderson; 1999; Pascal 1999; Black

and Farias, 2000) is evidently due to environmental turbulence facing organisations today. Complexity management is described as

a body of managerial techniques, including application of simple rules, to guide and cohere seemingly chaotic, diverse and complex activities in organizations and business networks. It is based on complexity science, a body of knowledge focusing on purposeful co-evolution of systems via the influencing of underlying patterns of self-organizing behaviour (Leibold et. al., 2002, p. 350).

4.4.1 Basic principles of the complexity theory

Common to the discussion of complexity management are a few fundamental characteristics of the complex adaptive systems theory relevant to strategic management (Brown and Eisenhardt, 1998; Cilliers, 1998; Anderson, 1999, Pascale, 1999):

- Complex adaptive systems (CAS) consist of a large number of interacting agents. Each agent interacts according to a set of cognitive structures called *schema*, which is a blueprint or image of the environment that attempts to capture its salient complexity. CAS agents encode their environment into many schemata that compete against one another internally.
- The interactions between agents are dynamic, continuously shifting the pattern of interconnections and structures of the system. Thus, complex adaptive systems evolve over time through recombination, i.e. entry, exit and transformation of agents.
- Complex adaptive systems operate under conditions far from equilibrium. Complex adaptive systems, with many interactions among highly differentiated agents, can produce, under certain conditions, surprisingly simple, predictable behaviour (equilibrium) while under other (critical) conditions, they exhibit the capacity of self-organisation to produce *emergent complexity*. Maintaining a self-organised state, i.e. to ensure the system's survival under critical conditions, requires injecting energy into the system. Absolute equilibrium means death.

- Although the behaviour that emerges is *complex*, the rules that govern the system are necessarily simple. This simplicity creates the freedom to behave in complicated, adaptive and surprising ways. Further, the rules are associated with the system not with individual agent. Systems that exhibit this type of leaderless yet orderly behaviour are said to be *self-organised* because the agents themselves figure out how to organise change.
- While complex adaptive systems exhibit the capacity of self-organisation and emergent complexity, the consequences of this emergent complexity is highly unpredictable. The interactions of agents in complex adaptive systems are characterised by weak cause-and-effect linkages or non-linearity. System transformation takes place in a situation where a small and undetectable change can product huge effects. Alternatively, large changes may have little effects.

The proponents of complexity thinking for strategic managements (Stacey, 1996; Youngblood, 1997; Anderson, 1999; Pascale, 1999) believe that organisations comply with all the principles of complex adaptive systems, but since most organisations are either too institutionalised (operate under equilibrium) or too chaotic (highly decentralised), they are less able to produce emergent complexity to adapt proactively to the discontinuously changing landscape.

4.4.2 The complexity approach for knowledge creation

The key discovery of the complexity theory, relevant to business organisations, is that complex adaptive systems are creative only when they operate under conditions far from equilibrium, commonly known *at the edge of chaos*, which is described as -

a paradoxical one that is both stable and unstable at the same time, driven by contradictory dynamics of both competition and cooperation, both amplification and constraint, both exposure to creative tension and protection from it. (Stacey, 1996, p. 146)”

4.4.2.1 Creativity at the individual level

Stacey (1996) argues that individual minds are creative when they (a) occupy the depressive position, that is when they can bear paradox in mind, and when (b) they can utilise transformational concepts to play. In this state of paradox, human minds create new symbols out of interactions between old ones, i.e. through mental cross-fertilisation the total population of symbols increase over time.

The transformational concepts can be interpreted as strategy theories and knowledge tools that can help an individual to derive meaning out of the symbols, i.e. to understand the organisation capabilities and the demands of the rapidly changing environment and to reflect upon himself (this will be discussed in Chapter five).

According to Stacey (1996), individuals interact with each other according to a set of rules called a *schema*, which is classified into *dominant schema* and *recessive schema*. *Dominant schema* is described as routine rules and behaviours, while a *recessive schema* reflects the current perception of the environment and corresponding spontaneous responses. It is argued that in a routinised situation, individuals can employ rules, but in the face of greater uncertainty, individuals employ recessive schema to generate creativity and innovation (Stacey, 1996).

4.4.2.2 Creativity at the group level

An individual is the centre for generating novel ideas and approaches, the wellspring of creativity. But innovation can never be an individual process, it must always involve interaction with others in a group (Nonaka and Takeuchi, 1995; Stacey, 1996; Fonseca, 2002). First, potential creativity becomes actual innovation only when it helps an individual to survive better in his/her or environment, that is, to climb to a higher peak. The fitness landscape for an individual is determined by the behaviour of the group to whom this individual is linked in his or her network (Anderson, 1999).

Second, anxiety is an inevitable attribute of mental life at the edge of chaos; the ability to bear that anxiety is a prerequisite for creativity and innovation. To contain such anxiety, an individual requires a strong ego structure and a good enough holding environment, which is to

be found in the group to which the individual belongs (Stacey, 1996). As the case study below demonstrates, creativity only becomes an innovation of value if an individual is a member of a group, where he or she can continually engage in dialogue.

Sharing intelligence and meaning with a high interactivity

Unocal Corp has always valued innovation. But at the El Segundo, Calif., Oil and Gas Exploration Company, opportunities for even more innovation did not happen as fast as the company would like to see, says Fielding Walker, vice-president of organisation development. The main reason was that people did not communicate enough. The question was, "How do you rally people around the common purpose so that sharing what they know is in their interests?" The task of organization development was to make informal networks that exist within the organization more visible. Employees world-wide needed to be aware that they must habitually ask, "who else do we need to include in our conversation, discussions and meetings? Creating forums for discussion and employing communication technology helps", Walker says "but the most important part – awareness - cannot be introduced through structural changes. It's a matter of people popping the question from day to day. The more aware everybody within our firm is of how well we are doing something, the quicker innovation is known by more people," says Walker. "That creates a confidence of the organization in its own ability to cope with a steadily changing environment".

Source: Wah (1998)

From the above analysis of knowledge creation approaches, it can be deduced that human minds are creative when they experience anxiety and when learning takes place through free flowing dialogue among continually interacting members of a group.

4.5 Designing complex adaptive systems in business organization

The complexity theory assumes that business environments are chaotic or complex systems which are characterised by non-linearity aperiodicity, and unpredictability (Black & Farias, 2000). Similarly, organisations are enormously complex and made up of people placed in different business units, departments, management levels, job titles and spatial differences.

The complexity theory tries to match the complexity of an organisation's structure with the complexity of its environment that must be dealt with simultaneously (Anderson, 1999).

The second implication of the complexity theory for business organisation is that people are creative when they operate at the edge of chaos. The four fundamental principles for designing complex adaptive systems are:

- (a) create internal variety (Stacey, 1996);
- (b) disintegrate the system sufficiently (Stacey, 1996; Youngblood, 1997; Brown & Eisenhardt, 1998);
- (c) establish coherence mechanism (Youngblood, 1997, Roose & Lissack, 1999), and
- (d) energise self-organisation members.

4.5.1 Creating internal variety: nurturing “communities of practice”

Any system that wants to survive must cultivate variety within an organisation by promoting diversity at individual and group levels. The usefulness of informal groups or grapevine has long been recognised in management literature. People do not come together in organisations simply to perform the official task. When they work, they socialize with each other and form *shadow system* (Stacey, 1996), an informal system which is used to sabotage the institutionalised (legitimate) system or to constitute a learning community that assists the legitimate system to function in the face of ambiguity and uncertainty by circumventing its rules.

It appears that in organisations where the institutionalised system (hierarchical structures, clearly recognisable tasks, rules, procedures, normal social routines and rituals) is very powerful, informal group behaviour ossifies and individual creativity becomes less possible. On the other extreme, if the institutionalised system is removed altogether, the organisation is instantly plunged into a highly unstable zone and the informal system disintegrates into anarchy. But between these two extremes, complexity theorists argue that, there is the space of creativity in an organisation (Stacey, 1996; Anderson 1999; Pascale, 1999). When an organisation is in this state, at least some members play by engaging in exploratory dialogue, utilising analogies and metaphors, and employing self-reflection to create new knowledge.

The first step toward creating a complex adaptive system is to creatively convert informal groups into *communities of practice* (Wenger & Snyder, 2000). Being organic, spontaneous and informal, communities of practice can be considered as shadow systems that drive the legitimate system to the edge of chaos.

Wenger and Snyder (2000) define communities of practice as *groups of people informally bound together by shared expertise and passion for a joint enterprise*. With the help of leaders and consultants, informal networks of people with the ability and passion to develop an organization's core competencies further (or to create new ones) come together and form a voluntary association of experts. The group organise themselves and select their own leadership. The members may or may not have explicit agenda to meet. Instead, they share their experiences and knowledge in “... *free-flowing, creative ways that foster new approaches to problems* ...” (Wenger & Snyder, 2000, p. 140).

Table 4.1 Comparison between various forms of teams

	What's the purpose?	Who belongs?	What holds together?	How long does it stay?
Communities of practice	<i>To develop members' capabilities to build and exchange knowledge</i>	<i>Members who select themselves</i>	<i>Passion, commitment, and identification with the group's expertise</i>	<i>As long as there is interest in maintaining the group</i>
Formal work group	<i>To deliver a product or service</i>	<i>Everyone who reports to the group's manager</i>	<i>Job requirements and common goals</i>	<i>Until the next reorganization</i>
Project team	<i>To accomplish a specified task</i>	<i>Employees assigned by senior management</i>	<i>The project's milestones and goals</i>	<i>Until the project has been completed</i>
Informal network	<i>To collect and pass on business information</i>	<i>Friends and business acquaintances</i>	<i>Mutual needs</i>	<i>As long as people have a reason to connect</i>

Source: Wenger and Snyder (2000).

Because communities of practice are fundamentally informal and self-organising, they require management support. To keep communities going and to maintain them, Wenger and Snyder (2000) suggest managers should -

- identify potential communities of practice that will enhance the company's strategic capabilities;
- provide the infrastructure that will support such communities and enable them to apply their expertise effectively, and;
- use nontraditional methods to assess the value of the company's communities of practice.

4.5.1.1 Creative cannibalisation

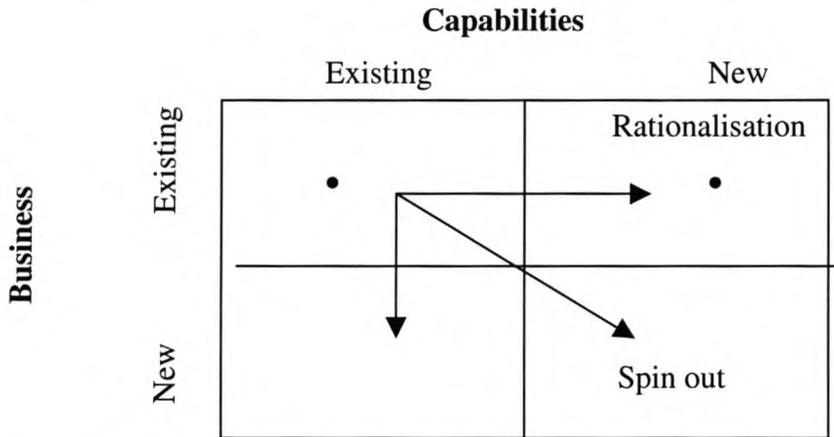
Although it is essential to maintain the existence of the communities of practice as shadow systems, the new entrepreneurial process and values that evolve from them, should ultimately undermine the old assumptions and values that exist throughout the organisation. But managers should not plan organisation-wide change programmes (see. e.g Beer & Eisentat, 2002), instead they should allow self-organisation groups to evolve.

Gladwell (2000) writes that success of any kind of social change is heavily dependent on the involvement of people with a particular and rare set of social gifts. The implication of the Law of Few to management is that there are three important types of workers namely *connectors*, *mavens*, and *salesmen* (Gladwell, 2000) who ignite episodes and help lead the organisation to the 'tipping point.' The *connectors* are critical in spreading information. The *mavens* have information on a lot of what is going on inside and outside the organisation. Finally, the *salesmen* are those who provide the persuasive elements to hone and sharpen the messages into action. A company can use these people to spread the new entrepreneurial processes and values throughout the organisation. Management teams must identify these three groups within their communities of practice and formal structures, and focus time, attention and resources on them.

The transformation of organisation does not mean an immediate ending of existing practices and business models. The renewal process needs to run into two symbiotic processes. The renewal process consists, on the one hand, of an ongoing pressure for rationalization and

restructuring of existing business model for effective utilization of knowledge and resources, and on the other hand, changing the existing rules of the game altogether.

Figure 4.3 The symbiotic components of the renewal process



Source: Adapted from Camillus (1997)

As shown in figure 4.3, undertaking strategic moves to enable inflection point demands that businesses move from their existing business and capabilities to create new businesses or capabilities. For this purpose, the company must nurture the spirit of industry revolutionaries inside the hearts of the members of communities of practice and energise them to focus on *business not as usual*.

4.5.1.2 Nurturing industry revolutionaries

When communities of practice craft new and viable business concepts that are either too small or too different to incorporate with the mainstream business, the company should *spin it out as a new venture* (Christensen & Overdorf, 2000). With the physical and intellectual support of the company, the new venture can outperform start-ups that lack resources in the emerging and small markets. The new company needs to be autonomous in terms of resource allocation and people. In addition, the people must own a significant share of the business. The creation of such new business could potentially trigger an inflection point if it meets the three requirements for inflection point.

4.5.2 Disturbing the system

Having created enough variety and successful communities of practice, the next step in designing complex adaptive systems organisational form is to disturb the system deliberately. Several suggestions in this respect include creating compelling goals, ensuring the rich flow of information, allowing sufficient levels of connectivity, containing anxiety and balancing the degree of power differentials (Stacey, 1996; Youngblood, 1997; Brown & Eisenhardt, 1998):

◆ **Creating compelling goals:** Leaders need to formulate creatively compelling goals that put forth high anxiety on members and have three attributes. Such attributes imply that the goals will be –

- (1) audacious - they stretch the limits of credibility;
- (2) inspiring – they enflame the imagination and inspire the human spirit, and
- (3) unifying – they cannot be achieved without the collaboration and cooperation of the entire organisation.

◆ **Ensuring the rich flow of information:** The information necessary to inform members about the changing landscape must flow more rapidly through the organisation. Leaders are essential in helping the organisation obtain accurate and useful information and feedback from the external environment. At some critical point, it may become impossible for the formal system to retain enough information; it therefore becomes necessary to use the informal structure, which can retain faster flows of information because of its informality and the fact that information is retained and acted upon at local levels. Past the critical point, however, even the shadow system will be unable to retain, and the challenge for leaders is to set the tune right.

◆ **Richness of connectivity:** Few connections bring stability and many bring instability, but between the extremes lie critical points where connections are rich but not rich enough to cause anarchy. The effect of strong ties (formal structure) is to bind people together, making it more likely that behaviour will be routine and uniform. Weak ties (informal structure), on the other hand, provide bridges to other parts of a network through which variety may be imported into a cluster of people held together with strong ties. This indicates that at some

critical point in the ranges of *weakness* to *strength*, and *many* to *few*, the network is likely to produce great variety in behaviour (Stacey, 1996).

◆ **Level of contained anxiety:** When hierarchy and bureaucracy require strict adherence, anxiety is firmly contained or avoided altogether. On the other hand, when an organisation operates in state of anarchy, anxiety cannot be contained, making creativity impossible. Only when the anxiety of work and creativity can be experienced, but also contained in a good enough manner, is creativity possible. This requires maturity and trust among members of a group and between groups and the organisation. Furthermore, leaders help members to hold and use anxiety by steering it into its proper direction and by energizing the members for creative action (Youngblood, 1997).

◆ **Degree of power differentials:** When power differentials are extreme and rather permanent, with a fixed elite wielding most of the power, and when that power is exercised as force or oppressive authority, then members operate under fear. On the other hand, if power is equally distributed, it can lead to anarchic state with a *garbage-can* decision-making process. In the spectrum ranging from *concentrated power* exercised in an authoritarian manner to *equally distributed power* that is hardly exercised at all, a critical point is reached where one can find both containment of anxiety through clear hierarchical structures and directed forms of leadership, on one hand, and the freedom to express opinions and to risk subversive, creative activity, on the other hand (Brown & Eisenhardt, 1998). At this point the organisation is in the space of creativity.

The complexity theory states that when agents operate under conditions far from equilibrium, they exhibit the capacity of self-organisation to produce emergent complexity. However, the non-linearity assumption of the complexity theory means that there is no guarantee that all groups will be increasingly fit or that they will produce beneficial and good outcomes from the creative cannibalisation or spin out.

Some specific groups may become fitter and others weaker. In the worst scenario, the whole system stands open to destruction. Application of the complexity theory into organisational practices therefore appears to be risky. In order to minimise the risk, Youngblood (1997)

offers the following guidance for leaders to navigate the organisation that operates at the edge of chaos.

4.5.3 Developing coherence mechanism

Coherent actions stem from a coherent viewpoint on important facets of the business, which is contingent on having a clear identity. Identity is established through purpose, principles, strategy and culture, all of which come together in a shared vision (Youngblood, 1997). Roos and Lissack (1999) offer few guidelines for cohering diverse initiatives:

- ◆ **Use simple guiding principles:** Guiding principles that work, are those that are built around basic values which are simple and general (Roos & Lissack, 1999).

- ◆ **Combine and recombine:** Leaders need to think first of the immediate members of their complex adaptive systems and then wholes, and their combinations and their recombinations of the larger complex adaptive systems. They should first recognize the first and they are on their way towards finding a new second. The advantage of building blocks is that they can be taken apart, and that they can be put together again in new ways. Holistic thinking does not necessarily lend itself to all potential new combinations (Roos & Lissack, 1999).

- ◆ **Developing alignment:** In a chaotic organisation, coherence takes place when people and organisational design are aligned around a universally shared purpose, strategy and guiding principles. Leaders need to use their global perspective to align people around the shared vision (Youngblood, 1997).

4.5.4 Energizing self-organisation members

Creativity and self-organization in living systems occur when a system (or an organisation) operates at the edge of system disintegration and has a strong cohering identity and culture. To keep the self-organisation always above the threshold, leaders energise members by promoting ownership, nurturing relationship, encouraging learning and nourishing the human spirit (Youngblood, 1997).

◆ **Promoting ownership:** Leaders are constantly promoting employees' ownership of the company's success, as well as employees' self-reliance in doing whatever is necessary to achieve the goals. Leaders communicate the importance of commitment and self-reliance and strive to create the conditions where people can feel ownership for both their work and the company (Youngblood, 1997)..

◆ **Nurturing relationships:** In the web-like structure of an organization, strong relationships are essential to individual and group effectiveness. Leaders look for opportunities to help people and groups to bring together. This includes relationships with key external stakeholders as well as those among the constituents of the organisations. Leaders reinforce the vital importance of the long-term health of relationships, actively promoting collaboration, cooperation, and mutual enrichment (Youngblood, 1997).

◆ **Encouraging learning:** Leaders promote the diffusion of learning within the company. They seek out innovations throughout the firm and introduce them to others who might benefit. Leaders recognise that learning is a process of trial and error, and promote risk-taking and tolerance for failures and mistakes (Youngblood, 1997)..

◆ **Nourishing the human spirit.** Organisations are about people. They are the gardens in which the collective hopes, aspirations and beliefs of the people within them are planted, grown and harvested. Given the right environment, people will self-organise to create a dynamic, thriving, successful organisation, and they will do so in good times and bad. People are inspired by participating in something important, something from which they can derive personal meaning and satisfaction. They also need to bring their whole selves to work: body, mind and spirit. Emotions carry power, vitality and creativity. Thus, instead of repressing emotions, leaders need to channel them into positive and productive directions (Youngblood, 1997).

4.6 The formation of self managing teams

When managers navigate the evolution of communities of practice successfully, the final result is the creation of empowered "self-managing teams" who have power in making

strategic decisions (Sanchez, 1997). The content of much traditionally top-level strategic decision-making must be devolved down to levels where more fully informed decisions can be made. Unlike the communities of practice which are voluntary associations of professionals in specific expertise, the self-managing teams blend experts in different disciplines, such as marketing, manufacturing, engineering, finance, human resources and others. The self-managing teams are made up of small groups who are physically located together. As the following example demonstrates, each group is charged with an experiment that may potentially lead to industry inflection.

Giving up control and stability to achieve innovation

PE Biosystems, Foster City, Calif., bases many of its business practices on the complexity theory. Currently, the division of Perkin Elmer (PE) has sales of \$925 million and has experienced a 20 percent annual growth for its entire history of 16 years. What is exceptional about the growth is that between 50 percent and 65 percent of current sales come from products that have not even existed a year ago. Ken Prokuski, who directs the development and manufacturing of consumable products, such as chemicals for biotechnology companies, says that new product development does not depend on an overall strategy. Instead, a large number of projects are in progress at any given time, none of which requires any initial approval from top management.

It is an organic process that may seem risky, since the company puts a lot of resources into experimentation. But Prokuski says there is little risk or waste. "If you have many people working on different paths, at least one group will come up with the right path," he says. As soon as that path emerges, PE Biosystems amasses resources quickly around it to speed up the process of pushing the product to market. With such a fluid strategy, it has been able to develop innovations more quickly than expected. The main characteristics of this adaptive system is that the organisation is truly flat and team-based. Also, team members always tell co-workers important issues in person instead of sending memos or e-mail. Communication is verbal and interactive.

Source: Wah (1998).

4.6.1 The roles of management

Giving up control and empowering self-managing teams to take charge of their immediate environments do not leave senior and higher management without jobs. To the contrary, the design of successful complex adaptive systems inside the organisation demands much more critical roles from top management. Bartlett and Ghoshal (2000) envisage the future organisation in terms of three core processes: the entrepreneurial process, the integration process, and the renewal process, with management roles postulated as follows:

- self managing teams drive the entrepreneurial process which is the opportunity-seeking, externally focused ability of the organisation to open new markets and create new businesses;
- senior-level managers anchor the integration process which allows them to link and leverage an organization's dispersed worldwide resources and capabilities, to determine when and where to collaborate with external self-organisation systems (Eisenhardt & Gulanic, 2000) so as to maintain organisational flexibility and agility, and
- the corporate leaders provide contexts where self-organisations can evolve, establish coherence mechanism, maintain the organization's ability to challenge its own beliefs and practices through continually navigating at the edge of chaos so as to develop an enduring institution that transforms without end.

Having reached this stage, a company becomes fit to survive and most capable to adapt to the changing landscape, but not fit enough to enable industry inflection. The shape and movement of the fitness landscape depend not only on an organisation's own actions, but also on those of the other organisations with which it interacts. Emphasis on co-evolution as a means of enabling industry inflection therefore becomes important.

4.7 Co-evolution as a means for achieving organisational fitness

Earlier in this chapter it was noted that enabling industry inflection is contingent on having high organisational fitness. The internal dimension of organisation fitness, i.e. the ability to self-organize internally quickly has been covered thoroughly in the above discussion. This section discusses the external dimension of organisational fitness.

4.7.1 Fitness landscape and point of inflection

Fitness landscape measures an organisation's external dimension of organisational fitness (adaptability within its own context) by evaluating the positions of each business unit in its respective environment at a given time. Extending the works of biology to business strategy, business scholars maintain that by using computing and graphics capabilities, fitness of a given business unit can be measured in multidimensional traits (Anderson, 1999; Beinhocker, 1999; Lebold *et al.*, 2002). For example, traits of a given business unit comprise the rate of diffusion of an innovation, customer base, profitability, and strength of relationships with external stakeholders including suppliers, customers, co-producers, institutions and governments (Leibold, 2002).

When a number of enterprises are modelled in this way, the landscape depicts high peaks and low valleys, representing successful and less successful businesses respectively. Beinhocker (1999) contends that business strategy is about an evolutionary search for high points in a fitness landscape. For every move there is a reciprocal move or moves from competitors, creating a complex landscape with lots of peaks and valleys. The landscape is thus not fixed, but is constantly shifting as a result of competitive or collaborative moves. The shape and movement of the fitness landscape therefore depend not only on an organisation's own actions, but also on those of the other organisations with which it interacts. This statement implies that single moves to enable industry inflection can be ineffectual without proactive participation of those other organisations.

It is posited that external organisational fitness can be achieved through a co-evolutionary process. The co-evolutionary process is a preparatory phase that aims to understand the interdependence and dynamics of one's complex dynamic environment so as to nurture deliberately a robust business community for the purpose of enabling industry inflection. The co-evolutionary process has three consequential stages: co-evolution, co-adaptation and the shadow organisation stages.

4.7.2 The co-evolutionary process

The term *co-evolution* has its origins in biology, and refers to a process in which interdependent species evolve in an end-less reciprocal cycle, in which the actions of one species set the context for the natural selection of changes in the other (Moore, 1993;

Eisenhardt & Gulanic, 2000). This interdependence can be either collaborative or competitive. In collaborative interdependence, species co-evolve to adapt effectively to their environment. In a competitive interdependence, one species may drive out the other, or both species may evolve into distinct, non-competitive niches (Eisenhardt & Gulanic, 2000). Moore (1993) says a natural ecosystem can sometimes collapse when environmental conditions change too radically. Dominant combinations of species may lose their leadership. New ecosystems then establish themselves, often with previously marginal plants and animals at the centre.

For studies dealing with disruptive industry changes, such as inflection point, the natural co-evolution of species has important implications. Business organisations co-evolve competitively or collaboratively to adapt to their environments either by reacting to inflection point or by proactively enabling it. As business organisations adapt to their environments, they also adapt to one another, and so they gradually move from a random collection of individual businesses to a more structured community called a *business ecosystem*, which Moore (1993) defines as *a business community that crosses a variety of industries*. Co-evolution, in a more broader context than ecosystem boundaries, takes place in the socio-cultural business system. According to Leibold *et al.* (2002), *socio-cultural business system* is defined as -

A purposeful, voluntary group of organizations and their stakeholders within large societal networks, held together ('cohered') by common objectives, values and culture. While a business ecosystem focuses on information and coordination (genetic codes), a business socio-cultural system is knowledge and relationship bonded (cultural codes or 'memes') (p. 349).

4.7.2.1 Co-adaptation

Co-adaptation results from healthy co-evolution in the socio-cultural business system. *Co-adaptation* is the process whereby systems take mutual advantage of each other in order to adapt more effectively, yet still remaining adaptive in each system's particular situation (Brown & Eisenhardt, 1998). In a business socio-cultural system, cross-organisational interdependence naturally co-evolve when strategic partners, suppliers, co-producers, customers and stakeholders frequently interact within the community. When two or more self-organisation systems (internal and external) interact over time, they develop patterns of

co-adaptation behaviour.

Leaders need not plan collaborative strategy, they should rather set context and allow collaboration to emerge. Collaboration occurs when self-organisations believe that linking makes sense for their respective companies, not because collaboration *per se* is useful. An organisation that intends to start a strategic process to enable industry inflection, must deliberately find reasons to make good links for nurturing a robust business community through co-adaptation. Tight co-adaptation among businesses in a discontinuously changing landscape, however, may reduce an organisation's adaptability to its own particular context.

4.7.2.1.1 Balancing the number of links

Effective co-adaptation occurs when external connections are poised at the edge of chaos, where the societal control parameters, such as the speed of information flow, the extent of differences expressed and worked with, the richness of interconnections between members in the ecosystem, the levels of contained anxiety, and the degree of power differences, as well as the way in which power is used, are set at critical points (Stacey, 1996). Co-adapting managers balance the tension between too many links that restrict adaptation and too few that miss important opportunities for synergies (Brown & Eisenhardt, 1998).

4.7.2.1.2 The space for novelty in the socio-cultural business system

Stacey (1996) argues that the spaces for creativity at the level of an ecosystem must have the same characteristics as those at the level of an organisation, a group or an individual. According to this author, an ecosystem is creative when members co-exist in tension between competition and collaboration. This is a state of paradox in which the ecosystem members co-exist in tension, a tension arising from the internal competition and from which the vying ecosystem seeks to drive them out, on one hand, and the fact that members independently or collectively collaborate with each other and with competitors, on the other hand.

4.7.3 Creating a shadow organisation

Members in a business ecosystem can develop powerful co-adaptation where each knows the other well and responds to one another organically without conscious planning. Like employees at the organisational level, assisted by their leaders, create a community of practice

that serve as a shadow system to challenge the legitimate system at the ecosystem level with practice, integrity, trust and a supportive context provided by leaders, self-organisation systems create a “shadow organisation” (Leibold *et al.* 2002). This provides a context where some active members engage in exploratory dialogue to investigate the space possibilities for the ecosystem’s combined capabilities. Unlike a defined organisation, or the traditional joint R&D facility, the shadow organisation is a boundary-less and time-less context, where sharing of ideas, interactions and experimentations take place among members bound by their common interest in the socio-cultural business system. The space possibility refers to possible actions that can be created by identifying gaps in the socio-cultural business system.

A prime-mover organisation in the ecosystem initiates a move to create a context where a shadow organisation can evolve in which the organisation will be able to engage in the creative and innovative dialogue of other organisations and also to involve them in its own creative processes.

4.7.3.1 Factors that affect space possibilities

From the point of view of a single organisation, its space possibility is limited by its path dependencies (Teece *et al.* 1997), i.e its repertoire of knowledge, its processes and its institutionalised system limit its space possibilities. When an organisation takes part in the shadow organisation competitively and collaboratively, it broadens its space possibilities. By taking their mutual advantage, co-adaptors can together explore the possible range of actions for different future scenarios. The space of possibility for co-adaptors is broader than each would have on its own, however, where natural selection, legal and societal norms determine possible actions.

- **Natural selection**

Natural selection comes from the Darwinian evolutionary theory and refers to the process whereby change occurs through inherited genetic variation, selection of the variations best adjusted to the environment, and perpetuation (or retention) of the genetic qualities best suited to a particular environment (Brown & Eisenhardt, 1998).

With regard to space possibility, an important managerial lesson to be learnt from the

concept of natural selection is that effective formation of a population of space possibilities relies on accumulating wisdom about the socio-cultural business system experiences, recombination of diverse skills, understanding dynamics of the complex parts, systems and the whole, selecting the best space possibilities that will most probably fit into market(s), and exploiting them.

- **Legal rules**

Firms that are taking part in a shadow organisation, are confronted with dilemma that they must expose what they have in order to benefit from it on one hand, and to worry about the diffusion of their secret knowledge to competitors, on the other hand. A strong legal system that protects intellectual property, is important. Teece *et al.* (1997), however, observe that intellectual property protection is not uniform across products, processes and technologies, and is best thought of as islands in a sea of open competition. Furthermore, the strength of a legal system in protecting the interests of stakeholders in the ecosystem may cannot be overemphasised.

- **Cultural norms**

In a free-flowing dialogue and experimenting, the question of trust and cohering diverse cross-organisational actions becomes important. It should be clear that at the organisational level, employees' diverse actions can be cohered by shared values, organisational identity and norms. The issue of coherence for people in the ecosystem, namely that an individual may be a member of more than one organisation, and that he /she can have different and conflicting cultures and norms, is less understood.

In the face of such conflicting cultures and values, the application of the Integrative Social Contracts Theory (ISCT) is helpful (Donaldson & Dunfee, 1999). The broadest categories for sorting authentic ecosystem norms through ISCT are explained as follows and displayed in a figure 4.4 below.

- **Hypernorms**

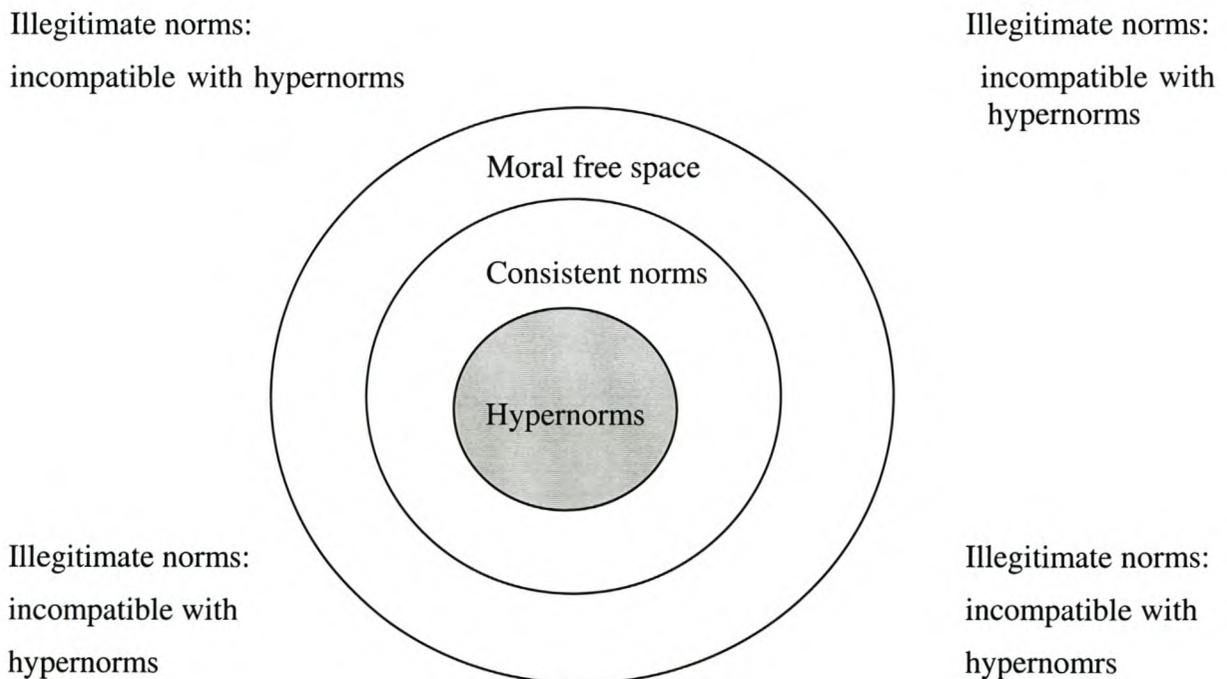
These include, for example, fundamental human rights or basic prescriptions common

to most major religions. The values they represent are by definition acceptable to all cultures and all organizations.

- **Consistent norms**

These values are culturally more specific than those at the centre, but are consistent with hypernorms and other legitimate norms, including those of other economic cultures. Most corporations' ethical codes and vision-value statements would fall within this circle. Johnson and Johnson's famous "*Credo*" and AT&T's "*Our Common Bond*" are examples.

Figure 4.4 Categories of authentic ecosystem norms under ISCT



Source: Donaldson and Dunfee (1999).

- **Moral free space**

As one moves away from the centre of the circle signifying *hypernorms* to the circle signifying *moral free space*, one finds norms that are inconsistent with at least some

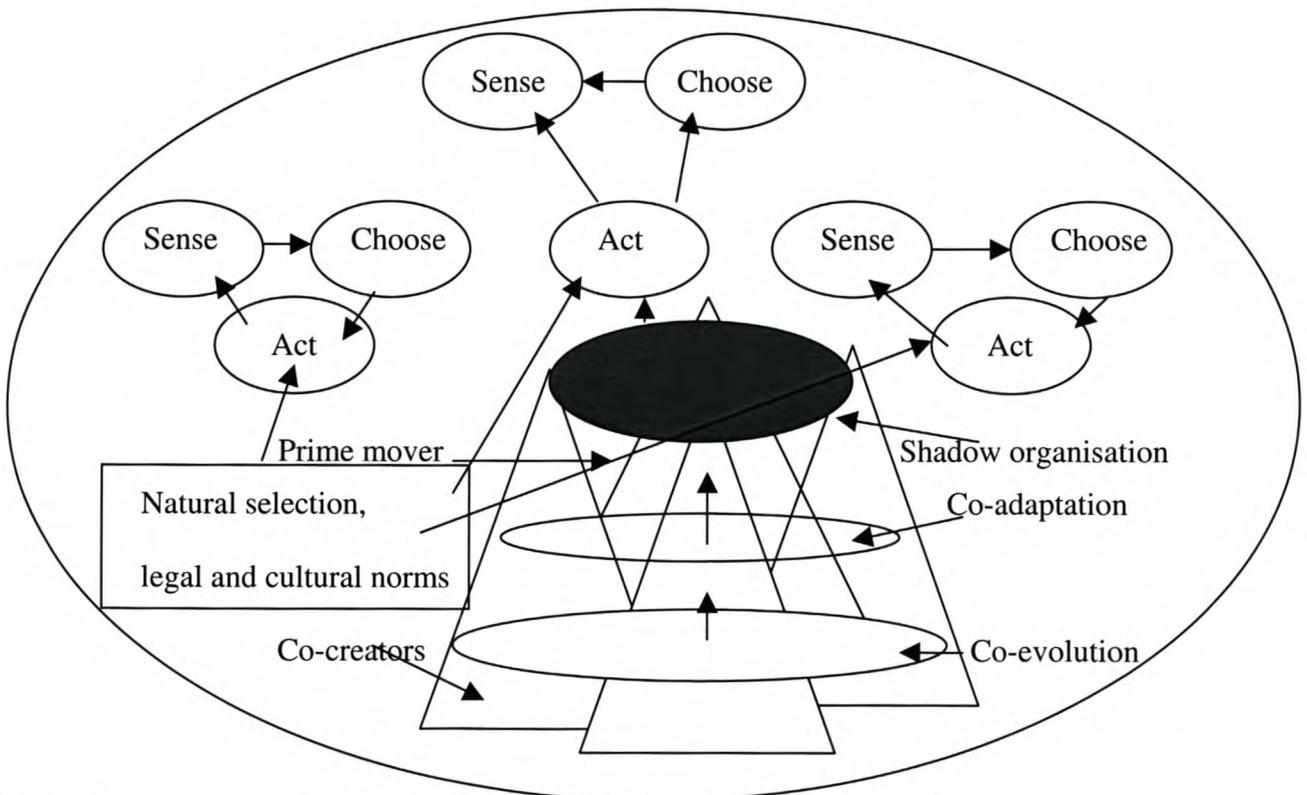
other legitimate norms existing in one economic culture. Such norms can be in mild tension with hypernorms, even though they might be compatible with them. Moral free space norms often express unique, but strongly held cultural beliefs. Monsanto's production of genetic foods fall in this category, for instance.

- **Illegitimate norms**

These are norms that are incompatible with hypernorms. When values or practices reach a point where they transgress permissible limits (as specified, say, by fundamental human rights), they fall outside the circle and into the *incompatible zone*. Involving workers in an experiment that contains unreasonable levels of carcinogens (e.g. asbestos), for example, is an expression of a value falling outside the circle.

The space possibilities for organisations are broadened when they take part in the shadow organisation.

Figure 4.5 The space possibilities in socio-cultural business system



Source: Adapted from Moore (1993); Stacey (1996); Brown & Eisenhardt (1998).

Figure 4.5 explains that healthy co-evolution leads to co-adaptation. With a prime mover driving a sufficient number of co-creators, a shadow organization evolves where players explore space possibilities for their systemic capabilities. Each organisation is fully aware of its own and common space possibilities. It can sense and identify value innovation on its own, or in collaboration with others. It can choose to experiment with the new value proposition independently, with one or more members competitively or in the shadow organisation collaboratively. Possible actions are, of course, limited or enabled by natural selection, legal and cultural norms.

4.8 Summary

The purpose of this chapter was to review the relevance and application of the complexity theory for enabling industry inflection. It was established that enabling industry inflection is contingent on having high organisational fitness. *Organisational fitness* is defined as dynamic organisational capabilities through which an organisation becomes dynamically fit to transform internally and to co-evolve externally so as to adapt proactively to a constantly changing landscape.

Dynamic capabilities form the internal dimension of organisational fitness. Three key components of dynamic capabilities were identified: resources, knowledge and institutionalised system. While resources are believed to be less of a problem to an established large company, its institutionalised system determines how the company utilises its knowledge. The learning and complexity approaches for knowledge creation processes were analysed to examine the rationale for designing complex adaptive systems in business organisations.

The techniques for designing complex adaptive systems were reviewed. Four basic techniques were identified, namely (a) creating internal variety; (b) disturbing the system; (c) establishing coherence mechanism, and (d) energising the self-organisation members. The relevance of the theory of communities of practice to designing complex adaptive systems was analysed. Successful evolution of communities of practice could transform the organisation into small groups of self-organisation systems. The transformation process needs to run into two symbiotic processes. The transformation process consists, on the one hand, of an ongoing pressure for creative cannibalisation of the existing business model, and,

on the other hand, creating a new business model. Undertaking strategic moves to enable industry inflection demands the creation of a new business model.

It was demonstrated that successful design of complex adaptive systems could result in the definition of a company in terms of three core processes: the entrepreneurial process, the integration process and the renewal process. It was argued that an organisation could become fit to adapt to changing landscape, but not fit enough to enable industry inflection proactively, because the shape and movement of the fitness landscape depend not only on an organisation's own actions but also on those of the other organisations with which it interacts.

The study suggested that the external dimension of the organisation process could be achieved through a co-evolutionary process. The co-evolutionary process aims to nurture deliberately a robust business community for the purpose of preparing the socio-cultural business system for a revolutionary change. Healthy co-evolution leads to co-adaptation whereby organisations take mutual advantage of each other in order to adapt more effectively, yet still remaining adaptive in each system's particular situation.

With a prime mover driving a sufficient number of self-organisations, co-adaptors play in the shadow organisation to explore space possibilities for their systemic capabilities. When organisations take part in the shadow organisation, their space possibilities broadens. Possible actions are, however, influenced by natural selection as well as legal and cultural norms.

CHAPTER V

ENABLING INDUSTRY INFLECTION BY CO-SHAPING NEW BUSINESS MODELS

5.1 Introduction

This chapter describes a strategy for enabling industry inflection in a couple-phased complexity approach. As discussed in Chapter four, the first phase is a co-evolutionary process in which a proactive large corporation deliberately nurtures a robust business community for the purpose of triggering a revolution. It was established that effective co-evolution could lead to co-adaptation, where players collaborate to adapt effectively, yet still remaining free to compete for a prime-movership position in the process. This is the edge of chaos at socio-cultural business level, with trust, integrity and context provided by leaders, where co-adaptation enables organizations to create a shadow organisation in which active members of the socio-cultural business system play by engaging in exploratory dialogue to discover space possibilities for value innovation.

Co-evolution, according to this viewpoint, is understood not in the sense of the Darwinian survival of the fittest as the focus of evolutionary strategy, where competition dominates over collaboration, but in a sense of collaborative interdependence for co-shaping the landscape, where collaboration dominates over competition as the focus of the emerging paradigm.

The new strategic management paradigm now becomes *systemic strategic management* (Leibold *et al.*, 2001) where the strategy of the organisation changes from being *fit* to adapt reactively to the changing landscape to being a prime mover for co-shaping a new business model capable of changing the industry structure (Normann, 2001; Leibold *et al.*, 2002). Four key principles for adopting systemic strategic management will be outlined in this chapter.

The second phase of the strategic process for enabling industry inflection is the revolutionary process which has four stages for co-shaping a new business model to enable industry inflection:

Phase 1: sense-making for co-creating new business models;

Phase 2: co-experimentation for co-shaping new business models;

Phase 3: industry inflection, and

Phase 4: committing and renewal stage.

This chapter discusses each phase analytically and the study culminates by depicting the model of the two-phased complexity approach for enabling industry inflection.

5.2 Systemic strategic management for guiding effective co-evolution

According to the traditional strategic management viewpoint, an organisation's environment is defined by the industry boundary from which it forms part. Systemic strategic management takes a radically different viewpoint, i.e. a company is considered part of a business community or network that crosses a variety of industries (Moore, 1993; Gulati *et al.*, 2000; Tapscott, *et al.*, 2000; Leibold *et al.*, 2002).

From various network and ecosystem approaches, the most encompassing seems to be the socio-cultural business system, because it provides a wider spectrum of one's complex environment and its dynamics in order to guide effective co-evolution of self-organisation systems. There are four key fundamental principles for adopting systemic strategic management to help managers in guiding effective co-evolution of self-organisation systems: (a) dynamic; (b) collaborative; (c) aggressive, and (d) holistic approaches.

- **The dynamic principle**

Complex systems are difficult to predict because they exhibit a punctuated equilibrium of relative quiescence interspersed with episodes of dramatic change (Beinchocker, 1999). This means that everything can change: the market structure, industry structure, even the existing institutions, infrastructures, and norms that constrain the ways organisations may function, can change (Sanchez, 1997). Occasional, major inflection points are inherent in the dynamics of a system, and are not usually the result of some unusual external forces (Beinchocker, 1999). Because of this, industry conditions can be shaped (Leibold, *et al.*, 20002).

- **The collaborative principle**

The complexity theory characterises an organisation as an open system interacting with a larger system or network that crosses a variety of industries. To capture a changing array of external sources of innovation, an organisation needs to re-conceptualise itself in terms of its core-competencies, instead of as a defined business belonging to a certain industry (Bradley & Nolan, 1998; Tapscott, 2001). Effective participation requires sharing of power *with*, rather than power *over* (Normann, 2001).

- **The aggressive principle**

Dynamic and collaborative principles lead to a third proposition of systemic thinking: an aggressive strategy of knowledge. Unbounded innovators, who closely integrate internal and external knowledge without regard for industry boundaries, see knowledge as an ongoing process of creative destruction (Zack, 1999). These innovators pursue an aggressive strategy to explore and exploit knowledge in markets beyond their current industry, and aggressively seek to share their own knowledge for common wealth creation (Leibold, *et al.*, 2002).

- **The holistic principle**

Business leaders should have a holistic view of strategy thinking for effective functioning of complex adaptive systems. A firm should mediate the interests of diverse constituencies of resources providers internal and external to the firm in order to create a robust and healthy eco-system that, in turn, contributes to its growth (Sanchez, 1997; Leibold, *et al.*, 2002).

These principles indicate the radical shift of strategic management from a static, competitive, conservative and shareholders-driven strategy - the focus of traditional strategy models - to dynamic, collaborative, aggressive and holistic views of strategy, which are essential requirements for adopting systemic strategic thinking to guide the co-evolutionary phases for enabling industry inflection. The revolutionary phase is described in four stages: sense-making, co-experimentation, industry inflection point and committing and renewal.

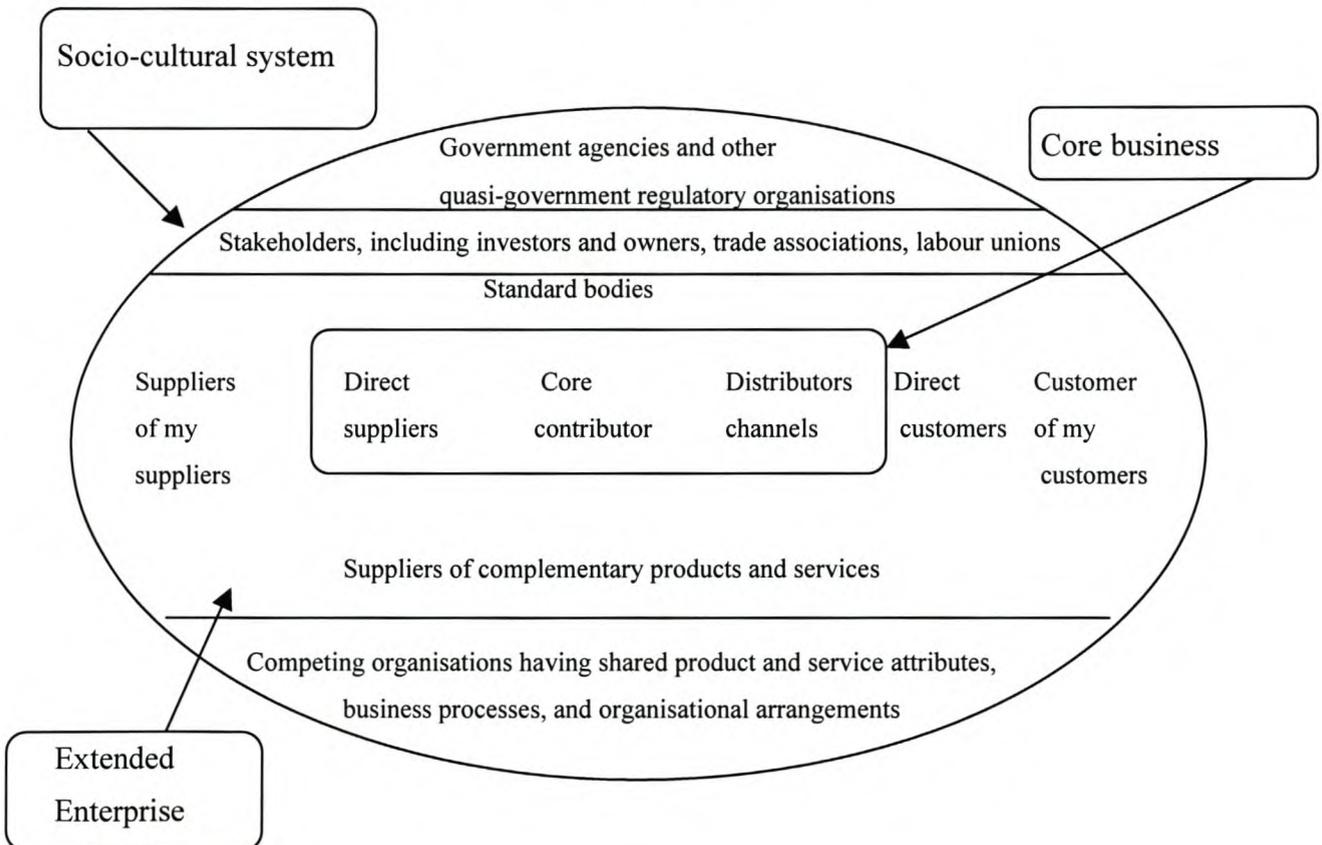
5.3 The sense-making stage

The sense-making stage is the stage where co-creators engage in an ongoing dialogue in search of ideas for revolutionary propositions. Four key strategic management tools for sense-making are the socio-cultural business system, co-adaptation, the systematic framework and the systemic framework.

5.3.1 The socio-cultural business system as a sense-making framework

Leibold *et al.* (2002) describe a socio-cultural business system as a large business community consisting of ecosystems, economic communities of interest, and co-evolving organisations and individuals. This economic community produces goods of value to customers, who are themselves members of the socio-cultural business system. The members also include suppliers, lead producers, competitors and other stakeholders.

Figure 5.1 Components of a socio-cultural business system



Source: Leibold *et al.* (2002)

If one looks at figure 5.1 above, one can understand the components and parts separately and their interconnections that provide a picture of a whole complex network system. The socio-cultural business system provides not only directions and boundaries to guide effective co-evolution of self-organization systems, but new business models also arise from managerial sense-making of the dynamics of a socio-cultural business system (Leibold, *et al.*, 2002).

5.3.2 Co-adaptation as a means for sense-making

In Chapter four, it was explained how a complex adaptive organisation encourages spin out of internal industry revolutionaries for possible industry inflection. Similarly, an agile organisation encourages its driving self-organisation systems to attract external industry revolutionaries and to allow co-adaptation to evolve. Two co-adaptation tools for sense-making are *co-opting customers* and *networked incubating*.

5.3.2.1 Co-opting customer competence

Naturally the interaction between customers and a business organisation exhibits co-evolution between two complex adaptive systems. With the proliferation of the Internet, customers are voluntarily engaging themselves in an active dialogue with business organisations. With the realisation of knowledge as key source of innovation, scholars are urging firms to tap knowledge residing in customers' heads for potential value innovations (Prahalad & Ramaswamy, 2000; Leibold, *et al.*, 2001). As the below case demonstrates, co-opting techniques invite revolutionary customers to take part in the ongoing dialogue for the search of newness.

Co-opting customer competence

Customers of Microsoft voluntarily formed a community that helped the Microsoft software developers create an operating system that had maximal value to them. Windows 95 and Windows NT are now released products, but the customer community continues to enable a "win-win" situation – customers maximise their value-added from Microsoft, while Microsoft maximises revenue by providing customers with what they most need and want.

Source: Bradley and Nolan (1998).

5.3.2.2 Network incubating

Hamel (1999) observes that in the knowledge economy, successful start-ups are increasingly dominating the competition by changing the rules of the game. The challenge for an established *grey-haired* company (Hamel, 1999) is to partner such innovators. In so doing, a company becomes a *networked incubator* (Hansen, Chesbrough, Nohria & Sull, 2000) which does not only seek partnership between the start-up and itself, but also helps foster partnerships among start-up teams and other successful Internet-oriented firms, thus facilitating the flow of knowledge and talent across companies and the forging of marketing and technology relationships between them.

Hansen *et al.*, (2000) contend that when such a partnership of networking is properly designed, “ ... *network incubators combine the best of two worlds – the scale and scope of large, established corporations and the entrepreneurial spirit of small venture-capital firms – all while providing unique networking benefits ...* (p. 76).” From the start-up point of view, the support of the large company will enable them to network so as to access resources and potential partners rapidly, thus helping the start-ups to emerge as robust starters in the marketplace. From the incumbent point of view, this networking will help the company to broaden its sense-making capabilities through spreading its network linkages to many partners. To maintain a spirit of entrepreneurship, the authors suggest, *incubators* allow founding teams to retain significant ownership and ensure that the incubates are free from the strategic, bureaucratic, and organisational influences of the established company.

Co-opting customers’ competence and network incubating are only two means. Structural coupling with external self-organisation systems may co-evolve with a number of other key players including suppliers, co-producers, distributors and other stakeholders (Leboild, 2002).

5.3.3 The three arenas framework for business model innovation

In Chapter four it was noted that individual minds are creative when they hold paradox in mind, and when they can utilise transformational concepts to play. The managerial implication of this is that an organisation needs to train front line entrepreneurs regarding systematic sense-making frameworks to guide the entrepreneurs’ creative process. For this purpose, the *three arena framework* (Govindarajan & Gupta, 2001) and the *six lenses framework* (Kim & Mauborgne, 1999a) can be useful tools to pursue radical ideas for

systemic innovation.

Govindarajan and Gupta (2001) suggest that there are three arenas in a business model which firms need to look at for possible innovation of a business model:

- dramatic redesign of the end-to-end value chain architecture (“*How can we make the value chain much more efficient?*”)
- dramatic reinvention of the concept of customer value (“*How can we transform the value customers receive?*”)
- dramatic redefinition of the customer base (“*How do we expand market size?*”).

Table 5.1 From head-to-head competition to creating new market space

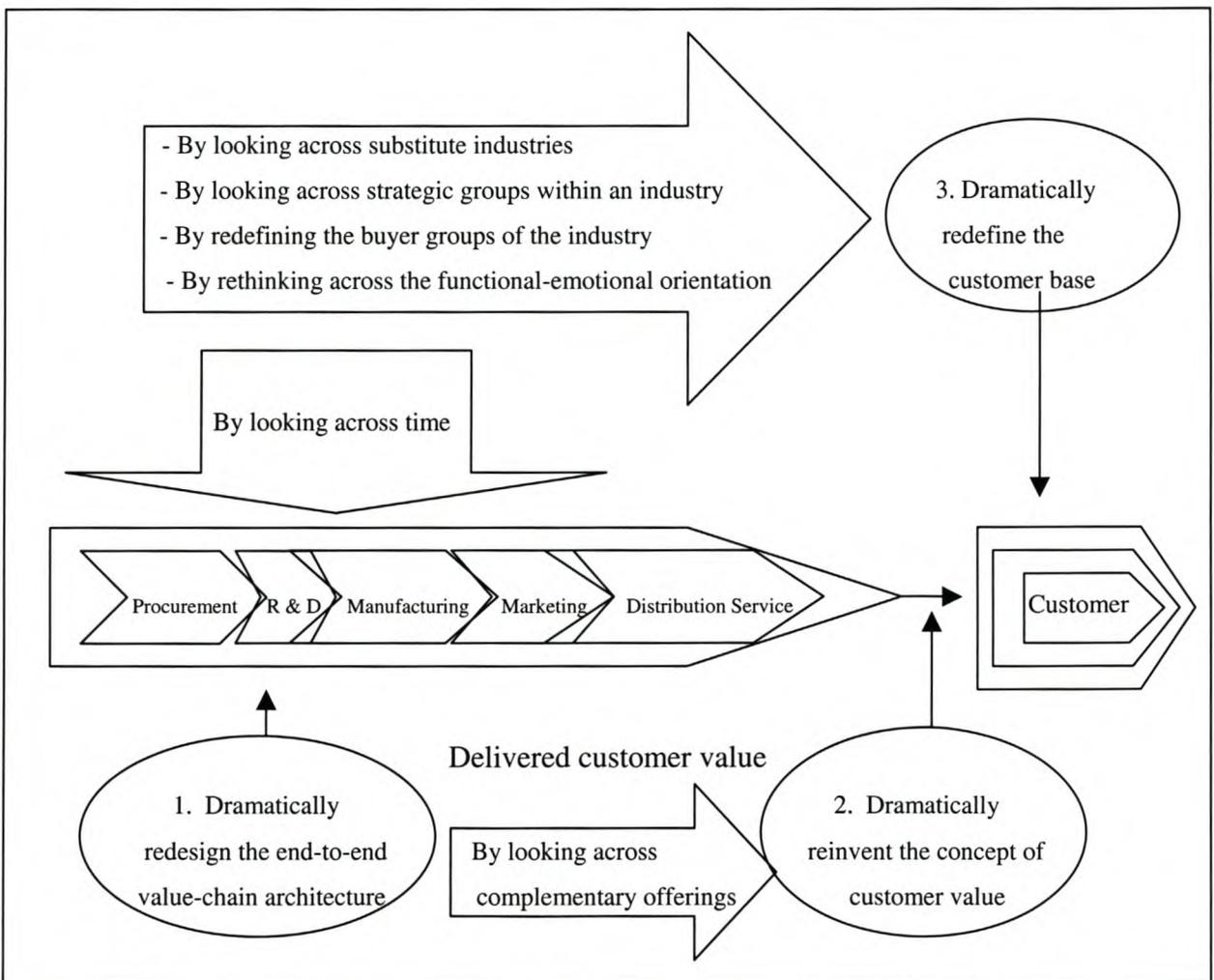
The conventional boundaries of competition	Head to head Competition	Creating new market space
Industry	<i>Focuses on rivals within its industry</i> 	<i>Looks across substitute industries</i>
Strategic group	<i>Focuses on competitive position within strategic group</i> 	<i>Looks across strategic groups within its industry</i>
Buyer group	<i>Focuses on better serving the buyer group</i> 	<i>redefines the buyer group of the industry</i>
Scope of product and services offerings	<i>Focuses on maximizing the value of product and service offerings within the bounds of its industry</i> 	<i>Looks across to complementary product and service offerings that go beyond the bounds of its industry</i>
Functional-emotional orientation of an industry	<i>Focuses on improving price-performance in line with the functional-emotional orientation of its industry</i> 	<i>Rethinks the functional-emotional orientation of its industry</i>
Time	<i>Focuses on adapting to external trends as they occur</i> 	<i>Participates in shaping external trends over time</i>

Source: Kim & Mauborgne (1999a)

Kim and Mauborgne (1999a) propose the six lenses framework as shown in table 5.1 above through which a business can systematically pursue value innovation by looking across the conventionally-defined boundaries of competition: across substitute industries, across strategic groups, across buyer groups, across complementary product and service offerings, across the functional-emotional orientation of an industry and across time.

Incorporating the *six lenses framework* into the *three arenas framework*, a comprehensive systematic framework can be developed, as displayed in figure 5.2.

Figure 5.2 The three arenas framework for sense-making



Source : Adopted from Govindarajan and Gupta (2001) and Kim and Mauborgne (1999a).

1. Redesigning the end-to-end value chain architecture

A *value chain* is the linked set of value-creating activities starting from basic raw material sources for component suppliers to the ultimate end-use product delivered into the final customer's hands. The need to redesign the end-to-end value chain arises because some existing value chains are being fragmented and reconstructed as a result of the Internet disintermediation forces as well as the customers' increased knowledge and power (Evans & Wurster, 1997).

(a) By looking across time: Most companies adapt incrementally and somewhat passively as inflection points unfold. Whether it is the emergence of new technologies or major regulatory changes, managers tend to focus on projecting the trend itself. But key insights into new market spaces rarely come from projecting the trend itself. Instead they arise from business insights into how the trend will change value for customers.

By looking across time, from the value a market delivers today to the value it might deliver tomorrow, managers can actively shape the future of their firm and lay claim to new market space. When managers sense a trend, they have to re-examine their existing value chain and redesign the end-to-end value architecture to adapt the new landscape proactively (Govindarajan & Gupta, 2001).

2. Reinventing the concept of customer value

Few products and services are used in a vacuum; in most cases, other products and services affect their value.

(a) By looking across complementary product and service offerings: The typical approach of dramatically reinventing the concept of customer value is to shift from selling discrete products to supplying total systems and solutions. A simple way to do this is to think about what happens before, during, and after the product or service is used (Kim & Mauborgne, 1999a).

3. Redefining the customer base

This aspect comprises uncovering of a hidden customer segment so large that it results in a

dramatic expansion of the industry's total customer base (Govindarajan & Gupta, 2001). Business can systematically uncover latent value propositions by looking across substitute industries, across strategic groups, across buyer groups, and across the functional-emotional orientation of an industry (Kim & Mauborgne, 1999a).

(a) By looking across substitute industries: The space between substitute industries can provide opportunities for value innovation. In the broadest sense, a company competes not only with the companies in its own industry, but also with companies in those other industries that produce substitute products or services. The socio-cultural business network can help companies to think consciously about how their customers make trade-offs across substitute offerings.

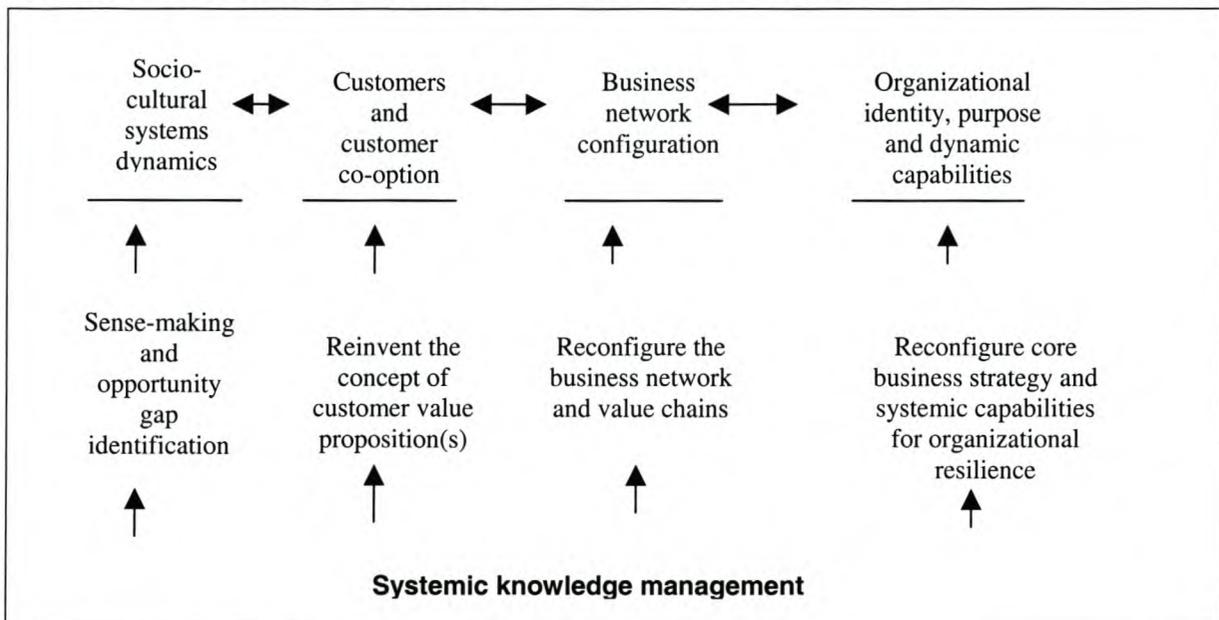
(b) By looking across strategic groups within industries: According to Kim and Mauborgne (1999a), strategic groups can generally be ranked in a rough hierarchical order built on two dimensions namely price and performance. Most companies focus on improving their competitive position within a strategic group.

The key to creating new market space across existing strategic groups is to understand what factors determine buyers' decisions to trade up or down from one group to another. For example, Polo Ralph Lauren created an entirely new and paradoxical market in clothing by combining *high fashion with no fashion*, i.e. the high price of its designer name, the elegance of its stores, and the luxury of its materials capture what most customers value in *haute couture*; and the best classical look with the low fashion that eliminated the sophistication of the fashion houses (Kim & Mauborgne, 1999a).

(c) By looking across the chain of buyers: In most industries, competitors converge around a common definition of who the target customer is. In reality, however, there are three groups of customers: purchasers, users and influencers. While these three groups may overlap, they often differ, and when they do, they frequently hold different definitions of value. Challenging an industry's conventional wisdom about which buyer group to target, can lead to the discovery of new market space. By looking across buyer groups, companies can gain new insights into how to redesign their value curves to focus on a previously overlooked set of customers.

(d) **By looking across functional or emotional appeal to buyers:** Companies can create new market space when they are willing to challenge the functional-emotional orientation of their industry. Emotional-oriented industries offer many extras that add price without enhancing functionality. Stripping those extras away may create a fundamentally simpler, lower-priced, lower-cost business model that customers would welcome. Conversely, functionally-oriented industries can often infuse commodity products with new life by adding a dose of emotion, and in doing so, can stimulate new demand.

Figure 5.3 A systemic perspective for innovation of business models



Source: Leibold, *et al.*, (2002)

5.3.4 A systemic perspective for developing new business models

Expanding the co-adaptation and systematic sense-making tools, Leibold *et al.* (2002) develop the systemic framework for sense-making in a systemic context. As can be understood from the following figure 5.3 above, the four components of the systemic framework can have highly interlinked effects:

- understanding the dynamics of socio-cultural business systems provides a conceptual map for sense-making and the identification of gaps.
- within the socio-cultural business system, a co-evolutionary sense-making framework is used to tap knowledge resident in customers' heads through a co-option technique.

Sensing a discrete customer value proposition leads to systemic value reinvention of the customer value.

- understanding the dynamics of a socio-cultural business system enables an organisation to anticipate emerging value chain fragmentation, deconstruction or possible reconstruction of new ones. Business network reconfiguration will be necessary for co-creating new customer values.
- network configuration becomes possible by reconfiguring an organisation's core business strategy and dynamic capabilities. Organisational identity, purpose and values are fundamental qualifications both for resisting the metamorphosis caused by discontinuity and for organisational resilience in order to enable an organisation proactively to take part in the network reconfiguration.

The four elements can be seen as interconnected to each other in a way. Innovations in any one of them leads to changes in the other three. Identification of possible market space in the socio-cultural business system leads to reinvention of the concept of customer value proposition. Delivering complete customer solutions requires network configuration for co-shaping new business models, in which each participant focuses on its core-competence, which in turn leads to reconfiguring a firm's specific capabilities. When existing business models give way to such consistently linked new business models, the rules of the game are changed. During the sense-making stage, a set of new customer value propositions and alternative new business model concepts are developed through sense-making frameworks. The next phase is to initiate experimentation on various business models.

5.4 The co-experimentation stage

Courtney *et al.*, (1997) distinguish four levels of uncertainty: *clear enough future*, *alternate futures*, *a range of futures*, and *true ambiguity*. Corresponding to the levels of uncertainty, these authors formulate a set of strategies and tools. First, there are three strategic postures a company can choose to take relative to the level of uncertainty: *shaping*, *adapting*, or *reserving the right to play*. Second, there are three types of moves in the portfolio of actions that can be used to implement the strategic posture: *big bets*, *options* and *no-regrets moves*. Strategic postures define the intent of a strategy relative to the current and future state of uncertainty.

Adapters take the current industry structure and its future evolution as givens, and they react to the opportunities the market offer. They also try to win through speed, agility and flexibility in recognising and capturing opportunities in existing markets. Reserving the right to play involves making incremental investments today that will put a company in a privileged position, through either superior information, cost structures or relationships between customers and suppliers, allowing the company to wait until the environment becomes less uncertain before committing a strategy. Players invest sufficiently to stay in the game, but avoid premature commitments. Shapers aim to drive their industries toward a new structure of their own devising, and play a leadership role in establishing how the industry operates, e.g. setting standards.

Table 5.2 Different levels of uncertainty and corresponding strategies

Level of uncertainties	What can be known	Tools to identify scenarios	Strategy postures choices	Choices from portfolio of actions
1. Clear enough future	<ul style="list-style-type: none"> - Stable, predictable future - A single forecast precise enough for determining strategy 	<ul style="list-style-type: none"> - Traditional strategy models 	<ol style="list-style-type: none"> 1. Adapter 2. Shaper 	<ol style="list-style-type: none"> 1. No-regrets moves 2. Options 3. Big-bets
2. Alternative futures	<ul style="list-style-type: none"> - The future is described as one of a few alternate outcomes or discrete scenarios 	<ul style="list-style-type: none"> - Decision analysis - Option valuation models - Game theory 	<ol style="list-style-type: none"> 1. Shaper 2. Adapter 3. Reserve the right to play 	<ol style="list-style-type: none"> 1. Big-bets 2. Options 3. No-regrets moves
3. A range of futures	<ul style="list-style-type: none"> - A range of possible outcomes can be identified, but not natural scenarios 	<ul style="list-style-type: none"> - Latent demand research - Technology forecasting - Scenario planning 	<ol style="list-style-type: none"> 1. Shaper 2. Adapter 3. Reserve the right to play 	<ol style="list-style-type: none"> 1. Big-bets 2. Option 3. No-regrets moves
4. True ambiguity	<ul style="list-style-type: none"> - Multiple dimensions of uncertainty interact to create an environment that is virtually impossible to predict 	<ul style="list-style-type: none"> - Analogies and pattern recognition - Nonlinear dynamic models 	<ol style="list-style-type: none"> 1. Shaper 	<ol style="list-style-type: none"> 1. Big-bets

Source: Adapted from Courtney *et al.*, (1997).

Courtney *et al.* (1997) describe that while a *posture* clarifies strategic intent, a *portfolio of actions* provides tools to fulfil the intent:

- no-regrets moves are moves that will pay off no matter what happens;
- options are designed to secure the big payoffs of the best case scenarios while minimising losses in the worst case scenarios, and
- big bets are large commitments, such as major capital investments or acquisitions, that will result in large payoffs in some scenarios and large losses in others.

Similar to the portfolio of actions described by Courtney *et al.*, (1997), Beinhocker (1999) identifies three tools of strategic initiatives namely *adaptive walks*, *medium walks* and *long jumps*.

As described in table 5.2, most companies in a low level uncertainty environment are adapters, but few undertake risk to enable industry inflection using big bets. These proactive organisations increase the residual uncertainty in an otherwise predictable market, for themselves and their competitors, in an attempt to alter long-standing industry structures and conduct fundamentally (Courtney *et al.*, 1007). FedEx's overnight-delivery business model is a good example.

Enabling industry inflection in stable environment:

FedEx's new overnight delivery business

When Federal Express Corporation created an overnight delivery system, FedEx's strategy in effect created level 3 uncertainty for itself. That is, even though CEO Frederick W. Smith commissioned detailed consulting reports that confirmed the feasibility of his business concept, only a broad range of potential demand for overnight services could be identified at the time. For the industry incumbents, like United Parcel Service, FedEx's created inflection point. Will the overnight-delivery strategy succeed, or not? Do they have to offer a similar service to remain a viable competitor in the market? Over time, the industry returned to level 1 stability, but with a fundamentally new structure. FedEx's bet paid off, forcing the rest of the industry to adapt to the new demand for overnight services.

Source: Adapted from Courtney et al. (1997, p. 75)

5.4.1 From experimentation to co-experimentation

As the degree of uncertainty rises from levels 2 through 4, it is essential that a company has a population of experimental new business models containing a balanced mix ranging from *short jumps* to *long jumps*. Beinhocker (1999) argues that parallelism in experiments increases the odds that one or more will work out. But it seems extremely difficult to determine whether adaptive and middle jumps will work out in high uncertainty levels or in situations of *true ambiguity* (Courtney, 1997). Normann (2001) contends that,

Continuous improvement often becomes a trap from the inside of which companies fail to see that the rules of the game are changing faster than the company, or that the game has changed altogether. (p. 82)

Undertaking experiments to enable industry inflection demands only long jumps or big-bets. It may be beyond a single company's physical resources capacity to have more than one big-bets experiments. But shapers need not make enormous bets alone. What is required is that while companies maintain the *vertical* population of experiments (adaptive and medium jumps) internally, they participate in *horizontal* experimentation of long jumps for co-shaping new business models. Horizontal or cross-organizational experimentations takes place in the shadow organisation where few companies jointly experiment on a number of diverse new business models.

Systemic strategic management now adds the prefix *co-* to the word *experimentation* to highlight the shift in paradigm from *experimentation* to *co-experimentation*. *Co-experimentation* is defined as the process of testing new value propositions and experimenting with new business models for the purpose of enabling industry inflection, in which sufficient actors play proactive roles, but where somebody usually is still the focal actor and prime mover.

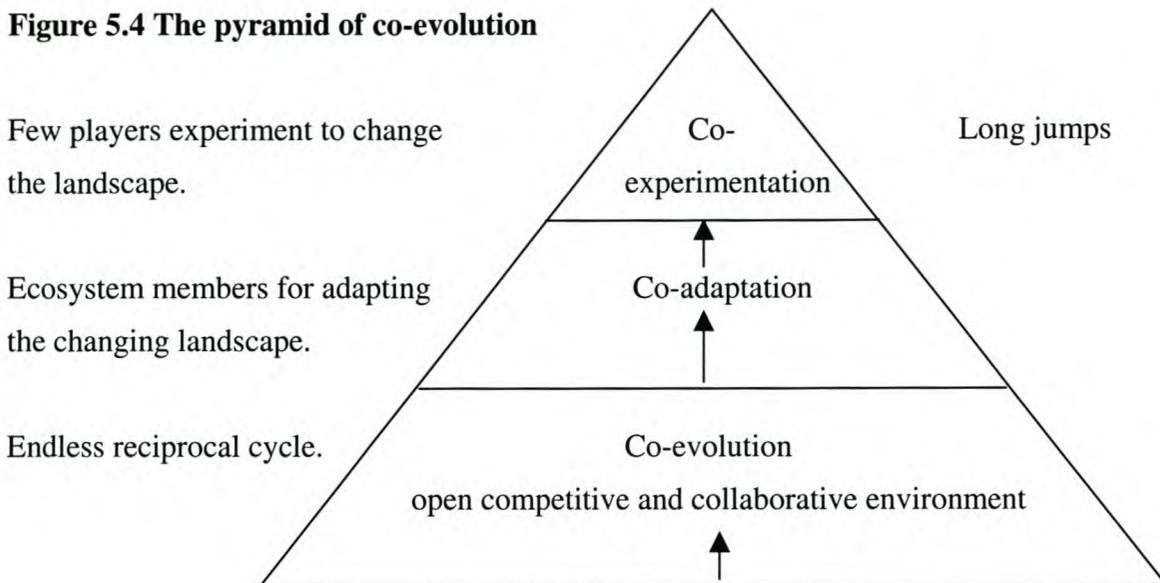
Figure 5.4 The pyramid of co-evolution

Figure 5.4 explains that, unlike traditional joint R&Ds, experimentation of joint ventures and alliances, co-experimentation evolves from co-evolution. As displayed in the diagram above, at the lower level is co-evolution, a natural process in which interdependent species evolve in competitive and collaborative responses. Co-evolution leads to co-adaptation patterns, where co-adapted companies take mutual advantage of each other in order to adapt more effectively. At this stage actions can be taken - sometimes in collaboration, at other times in competition between members.

At the top level is co-experimentation, which is revolutionary by nature. Fewer companies develop a shared aspiration to influence their environment. At this stage only big-bets are possible. Co-experimentation arises when one company identifies possible systemic innovation, shares this with co-creators and receives spontaneous responses to initiate moves for co-experimenting.

5.4.2 Systemic innovation: The battle for prime-movership position

Systemic innovation, in industry inflection context, means innovation of prime-movership. Normann (2001) defines *prime-movership* as *the process of establishing an infrastructure for a larger system, which then will influence the strategies and actions of other actors in that system*. During the sense-making phase, the battle among co-creators is mostly about defining systemic innovation that enables these co-creators to occupy the prime mover position. This position is often achieved by becoming the first one to set industry standards or

to develop a business concept which enables many co-creators to target components in the value chain.

5.4.2.1 Innovating industry standard

In the networked economy, those who move first to set industry standards can achieve critical mass quickly. Although such standards are mainly technological-based, it takes great skill to bring a sufficient number of actors into agreement so that they can line up with a particular system, perhaps modifying it in the process (Normann, 2001).

It is worth noting that achieving prime-mover position is not merely about moving the first, nor is it about developing superior technology. Prime-movership relies mostly on achieving critical mass faster than other first movers. The video standard battle between Betamax and VHS is an apt case in a point. VHS won because not it was only the first mover, but mainly because the VHS followers managed to create large volumes of software and hardware quickly, so that when the allegedly technological superior Betamax system was ready, enough actors had already made their investment (Normann, 2001).

Standards can also be developed by consortia by working out specifications that would be maintained by industry incumbents, but where there is still always somebody as a central prime mover. For example, although the Symbian mobile phone software is being developed by consortia, Nokia holds a central prime mover position (The Fight for Digital Dominance, 2002).

5.4.2.2 Developing a business concept for a new business model

Prime-mover position also comes by reinventing a customer value proposition that is larger than the company's domain of businesses. Prime movers look at identifying discrete customer value and step further to devise a complete business solution, architecting resources and process much broader than the company's realm of activities, in which many players have to fit into that new business model architecture. Such systemic innovation enables the first mover to play the role of new business model co-shaping organiser (Leibold *et al.*, 2002).

5.4.3 Why co-experimentation?

There are three important reasons why co-experimentation will be needed. First, extant strategic management researches view the issue of innovation from a single company perspective. Firms can create value, assign functions, and decide what to manage inside and what to outsource outside. It is assumed that the existing value-creating infrastructures are stable in the industry. From the point of view of industry inflection, there will be initially nothing to outsource because, from a single co-creator's point of view, there is nothing inside to begin with. Proactive industry inflection will begin with new ideas of customer value proposition which leads to architecture of a new business model concept, with a blank slate of the business network configuration and delivery systems in terms of resources. So, developing a new business model requires the participation of appropriate actors from the early stage in architecting the value proposition.

The second reason is based on the aggressive principle of systemic strategic management. When the superiority of large vertically integrated industrial corporations is taken for granted, it is assuming that resources would be internal to the company. No single company can be the best world-class provider of a complete customer value. The value chain network configuration will extend beyond a single company's realm of activities to an extensive business web comprising technology providers, co-producers, system implementers, suppliers, vendors, consultants and others (Tapscott *et al.* 2000). Firms can profit enormously from resources that do not belong to them. In this respect, a firm needs to engage in the creative and innovative process of others and let others take part in its internal dialogue. The third reason is obviously for risk-sharing.

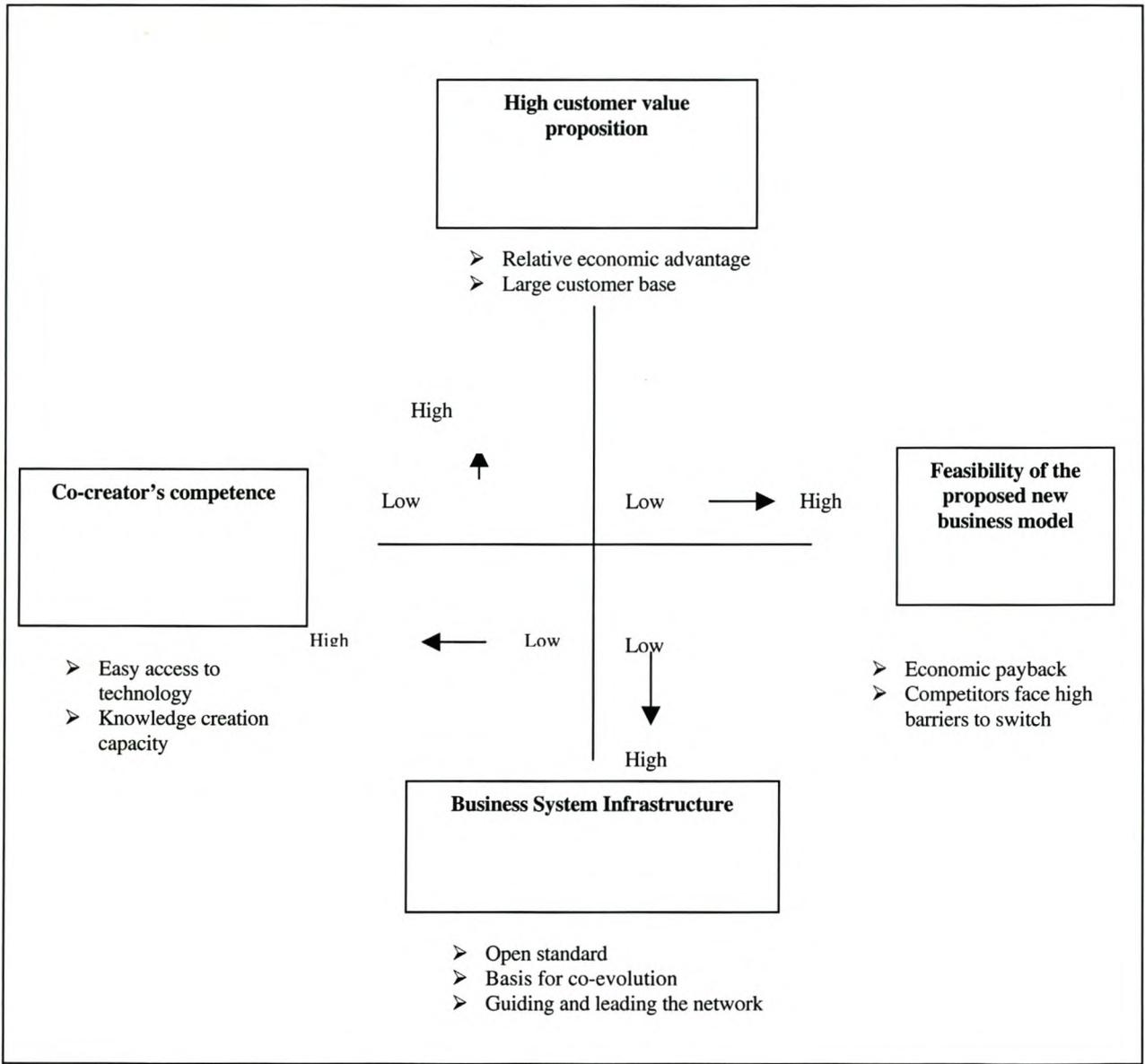
The definition of a business model now becomes a systematic framework for a value creation process, where each player focuses on its core competence, organised around a central prime mover to create greater value for customers and greater wealth for stakeholders than each would have accomplished on its own (Hamel, 1999; Eisenhardt & Gulanic, 2000; Tapscott *et al.*, 2000; Tapscott, 2001).

5.4.4 Key success factors for new business model innovation

Four factors affect the acceptance of the proposed new business model by both co-creators and customers: the relative high value proposition that appeal to a large customer base,

feasibility and sustainability of the proposed new business model, presence of a business system infrastructure, accessibility of technology and co-creators' competence.

Figure 5.5 Key success factors for developing new business model



Source: Adopted from Leibold *et al.*, (2002).

- **High customer value proposition**

The rate of diffusion of new value propositions determines the success a new business model. Generally the new value proposition should enhance greater customer value through price or quality or both, and should appeal to a much larger customer base.

- **Feasibility of the proposed new business model**

The proposed new business model must be evaluated as sustainable and relatively inimitable by co-creators. Although in principle appropriability (excludability) is a function of both the nature of the business model and the legal system, there is little guarantee from the legal system in today's rapidly changing competitive environment to prevent imitation (Teece *et al.*, 1997; Kim & Mauborgne, 1999b).

The sustainability of a new business model depends on the existence of real or psychological disadvantages among competitors in switching to the new structure (Tapscott *et al.*, 2001), and the potential of the new business model to scale up to achieve critical mass to provide economic payback to co-creators at a relatively short time (Govindarajan & Gupta, 2001).

- **Business system infrastructure**

Business system infrastructure refers to standards which enable players to target some components in the value chain of customer value proposition. As noted earlier in the above discussion, many entrepreneurs focus on defining customer value proposition during the co-experimentation stage, but gradually co-evolve their capabilities around a central organiser, who often moves first to set a new industry standard. Business system infrastructure (standard) provides a basis for co-evolution, which once created, must be sustainable for a relatively longer time to generate new sets of linkages and new behaviour patterns for many players (Normann, 2001).

- **Access to new technology and the co-creator's competence for adopting a new business model**

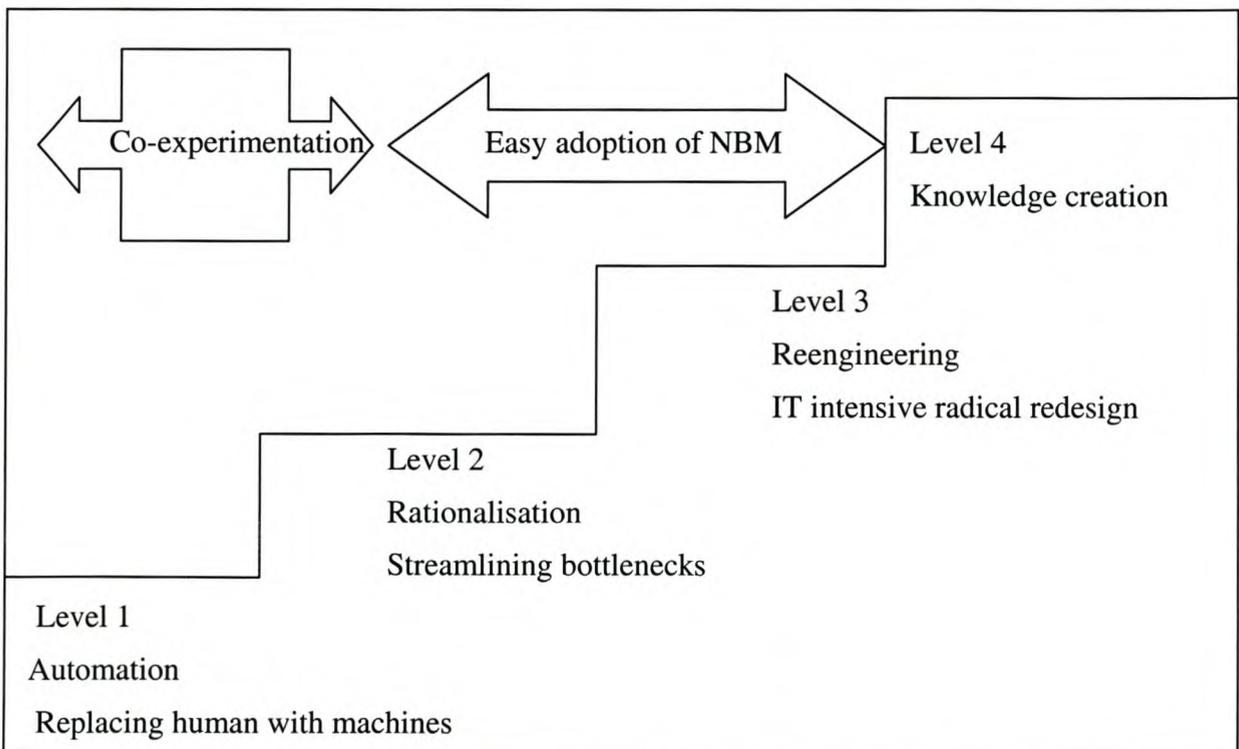
When a new business model is proposed, the availability of the technological infrastructure that will enable quick organisational reconfiguration is decisively important. A company which can create, or has relatively easy access to technology to build state-of-the-art factories consisting of intelligent, programmable robots, flexible manufacturing systems, automated guided vehicles, knowledge and physical resources for organisational and value chain re-configuration, will be able to adopt new business models with less hurdles. While it seems as if investments in technology

infrastructure is important for adopting a new business model, technology alone is less critical for adopting a new business model.

According to Malhotra (2000), the evolution of information management to build knowledge competence and to manage change has generally progressed over three phases: automation, rationalization and reengineering. Adding to the evolution of the knowledge creation level, it can be suggested that modern companies could still be found at any point in a continuum ranging from automation to knowledge creation levels.

Applying this to the purpose of the present study, it can be posited that a company at the highest level uses knowledge to become architect of industry revolution (Hamel, 1998). At the lowest level, a company uses its knowledge for automation, i.e. to replace manual works by machines. So, as displayed in figure 5.4, the levels of a company's competence in terms of the combined capabilities of technology and knowledge determine the rate of adoption of a new business model (NBM) by the appropriate number of co-creators and the new business model's sustainability.

Figure 5.6 Levels of competence



Source: Adapted from Malhotra (2000)

Summarising figure 5.6, the greater the relative customer value, the higher the sustainability and profitability of the new business model, the higher the acceptance of new standards, the higher the co-creator's competence and the greater the likelihood of the success of a new business model.

5.5 The inflection point stage

When an existing business model gives way to a new business model, the co-creators move from their existing business models to the new business model(s), from their old structures to the new. However, industry inflection cannot be determined only by the key success factors for a new business model.

Co-creators are unsure as to whether the co-experimentation process on new business models will lead them to any concrete future outcomes. Their competitors are even more uncertain. Some may see only the tip of iceberg and misinterpret the change, attributing it to other causes (Prahalad & Oosterveld, 1999). Others may sense the upcoming big change and enter the game by appropriating the experimental work of the co-creators, or arrive at the same territory coming from different origin. Competition becomes fierce as each camp tries to attack the same territory (Moore, 1993).

5.5.1 Industry inflection and natural selection

Expanding the implications of natural selection to a proactive strategy for enabling industry inflection, as was related in Chapter four, four important managerial lessons are identified. Co-experimentation must -

- (a) have value propositions that appeal to large customer bases;
- (b) ensure that it has a balanced variations covering diverse but promising segments (Beinhocker, 1999) from which the market can ultimately select the fittest offering;
- (c) recognize people are the DNA of the process (Brown & Eisenhardt, 1998), so deliberately nurture a committed community including customers, suppliers and key players who will carry the new business model forward
- (d) The fourth implication is that despite having all three these conditions, the market selection (from the variations) decisively determines the final success of the industry inflection. The marketing co-experimentation process of trying out innovative customer value propositions and finding out which solutions are attractive to

customers, is hard to accomplish, because much of the success of proactive industry inflection is determined by market dynamics. The current example of inflection point is the present situation of the telecommunications and the computer industries. Many believe that both industries are in a state of inflection point. Although many industrial incumbents are in the process of (co) experimentation for *the next big thing* in digital innovation, no one exactly knows how the market will evolve (see Appendix 1).

Some writers contend, however, that the rate of diffusion to achieve critical mass for new innovation is not completely beyond the control of firms (Gladwell, 2000; Hawkins, Best & Coney, 2001).

5.5.2 The market tipping point

The marketing diffusion model classifies users of any given innovation into five groups based on the relative time at which they adopt (Hawkins *et al.*, 2001):

- ⇒ **Innovators** – the first 2,5 percent to adopt an innovation. Innovators are visionaries who want revolutionary change, something that sets them apart qualitatively from their competitors. Innovators are venturesome risktakers.
- ⇒ **Early adopters** tend to be opinion leaders. They are socially active and willing to take a calculated risk on an innovation, but are concerned with failure.
- ⇒ **Early majority** consumers adopt sooner than most of their social groups, but also after the innovation has proven successful with others.
- ⇒ **Late majority** consumers are skeptical about innovations. They often adopt in response to social pressures or a decreased availability of the previous product.
- ⇒ **Laggards** are locally-oriented and engage in limited social interaction. They tend to be relatively dogmatic and oriented toward the past. Innovations are adopted only with reluctance.

Based on this model from his book *Crossing the Chasm*, Moore (2002) writes that *innovators* are visionaries who want revolutionary change, something that sets them apart qualitatively from their competitors. They are the people who take enormous risks, who buy brand new innovation before it has been perfected or proved or before the price has come down. They are soon followed by *early adopters*, who are willing to take on high risk products in return for expected high rewards. Visionaries and early adopters, however, make up only a small portion of the market.

The bulk of the market consists of the *early majority* (also called *pragmatists*), the *late majority* and *laggards*. Moore (2002) argues that the attitudes of the *early adopters* and that of the *early majority* are fundamentally incompatible. All kinds of high-tech products fail, never making it beyond the *early adopters*, because the companies that make them can't find a way to transform an idea that makes perfect sense to an *early adopter* into one that makes perfect sense to a member of the *early majority*.

Moore's (2002) theory is entirely about high-tech products. But his argument can also apply to other categories of industries. In the case of Hush Puppies, presented in the introduction chapter of this thesis, Gladwell (2000) writes that,

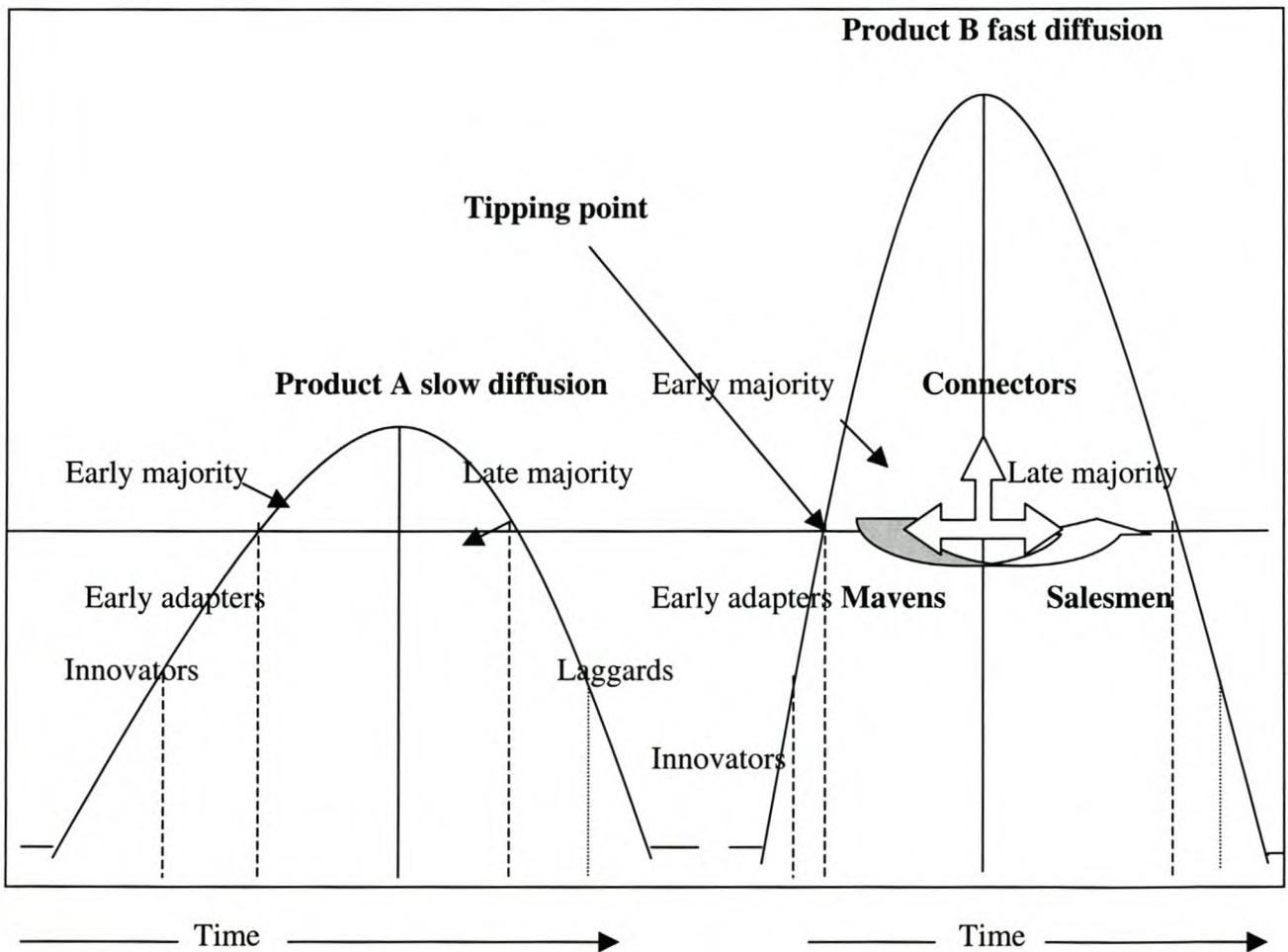
The downtown Manhattan kids who rediscovered the brand were wearing the shoes precisely because no one else would wear them. What they were looking for in fashion was a revolutionary statement. They were willing to take risks in order to set themselves apart (p. 199).

In marketing parlance, the kids were *innovators*. The question is how did the shoes cross the chasm between the groups to tip throughout the market. Gladwell (2000) proposes that the chasm can be crossed by the same mechanics followed in reaching the tipping point in social epidemics. According to this author, there are three rules that make such change dramatic: (a) the *law of the few*, (b) the *stickiness factor*, and (c) the *power of context*.

(a) The law of the few: Gladwell (2000) writes that success of any kind of social epidemic is heavily dependent on the involvement of people with a particular and rare set of social gifts.

In Chapter four, it was analysed that people with special social gifts, known as *connectors*, *mavens*, and *salesmen* were useful in enabling organisational transformation. There is no doubt that this argument applies in diffusion of new innovation as well. *Connectors*, *mavens* and *salesmen* can play important roles to bridge the problem of the chasm. For example, *connectors* are people who know a lot of other people, and can spread an idea through multiple communities. *Mavens* are those who know a lot of information about products and prices. *Salesmen* are those gifted with charismatic and persuasive abilities. Gladwell (2000) argues that these three types of people can take ideas and information from *innovators* and translate them into a language that the rest of the market can understand. The implication to marketing is that, in a conscious effort to tip an epidemic, one should not simply wait for the right people to come along, they must be found, organised, and employed.

Figure 5.7 The diffusion model and the tipping point



Source: Adapted from Hawkins *et al.*, (2001) and Gladwell (2000).

Figure 5.7 explains that the rate of diffusion of product B differs from product A because it has spread through connectors, mavens and salesmen.

(b) The stickiness factor: The concept of *stickiness*, the author says, is that the epidemic must have a message or product that is memorable and that creates action and change. In other words, it must be something that makes people who hear about a new idea actually remember it, and in some way do something about it. Gladwell (2000) suggests that little changes in the presentation of ideas, designed to make the ideas more *sticky*, can have big effects. This calls upon advertisement experts to pay careful attention to the structure and format of their material.

(c) The power of context: Gladwell's (2000) third rule, the *power of context*, challenges some of the most basic assumptions about human nature namely that an individual's inner psychological states and personal histories are less important. Social epidemics are sensitive to small elements in the environment, circumstances, times and places in which they occur. For example, the author says that fixing broken windows and cleaning up graffiti can change the signals that invite crimes in the first place.

The second lesson from the *power of context* is that an individual on his/her own may perceive things differently from when that individual is in a group that shares common perceptions of ideas or things. Moreover, small, close-knit groups have the power to magnify the epidemic potential of a message or idea better than larger groups. The implication for marketing is that a company can create the right context for innovations to diffuse by fostering a sense of community. The use of customer community such as co-opting customers, customers online chat rooms or community newsletter can help to facilitate change. This seems possible because of the Internet technology.

With the explosion of the Internet technology, it has become possible for a company to reach everyone, and for everyone to reach the company at virtually zero cost. This connectivity enables customer communities to evolve and to accelerate not only diffusion of new innovation but also to stimulate innovation of new products and processes in many industries. The above analysis suggests that the market tipping point is the point where diffusion of new innovation crosses from *early adopters* to *early majority*.

Gladwell's (2000) conclusion, however, still leaves a number of critical questions unanswered. Common to discussions concerning social behaviour are the law of 20/80. For example, the Pareto law states that, in most instances, a company's revenue comes from the active 20% of its total customers. Gladwell's (2000) conceptual characters of *connectors*, *mavens* and *salesmen* could be found only in the 20% portion of any customer group for a specific product. This active 20%, by definition, are *innovators* and *early adopters*.

This implies that *connectors*, *mavens* and *salesmen* are the same as *innovators* and *early adopters*, thus, they do not exist in the majority of the market. The market dynamics are mostly beyond the control of the co-creators. The two-phased complexity management approach, therefore, do not completely guarantee success of a proactive strategy for enabling industry inflection.

5.6 The renewal stage

In 1942 Joseph Schumpeter (Grant, 1998) noted that the *perennial gale of creative destruction* leads to the demise of incumbent firms and current market structures, as new firms with better technology arise. This death and renewal leads to a constant cycle of innovation, generated primarily by new firms, which prosper until a newer, more innovative technology displaces the former. In today's rapidly changing competitive environments not only are the life cycles of products getting shorter, but the cycles of business models and industry are also getting shorter (Moore, 1993; Hamel, 1999).

The strategic management implication of this observation is that at the time the inflection point takes off and assuming that the market dynamics responded favourably, co-creators have two responsibilities. The first is to recognise the pattern of the emerging inflection point early and to commit resources immediately in order to scale up the trajectory of the inflection point. In addition, co-creators must protect the trajectory inflection point from other predators by several strategies including (a) maintaining high barriers to entry to prevent innovators from building an alternative ecosystem, and (b) maintaining high customer switching costs in order to buy time to sense new ideas for value innovation (Moore, 1993).

The second responsibility of co-creators is to initiate another round of co-experimentation to explore the future, based on possible scenarios, at the time the existing inflection point takes off. Two possible strategies are that (a) co-creators engage aggressively in creative destruction to obsolete their old knowledge rather than wait for a competitor to destroy it (Zack, 1999), and (b) they work with innovators to bring new ideas to the existing ecosystem (Moore, 1993). Co-creators must adopt a Schumpeterian view of knowledge, i.e. they must constantly create new ideas for the next round of industry inflection.

5.6.1 The dynamic organisational capabilities for transformation without end

In the preceding chapter it was emphasised that dynamic organisational capabilities are necessary preconditions for enabling a prime moving organisation to transform without end, i.e. to continually self-organise to adapt proactively to the constantly shifting landscape.

From the ecosystem perspective, as explained in figure 5.8, dynamic organizational capabilities are defined in terms of three processes, namely self-organising entrepreneurial processes, self-organising integration processes, and self-organising renewal processes.

Figure 5.8 A process-based model of building dynamic organisational capabilities

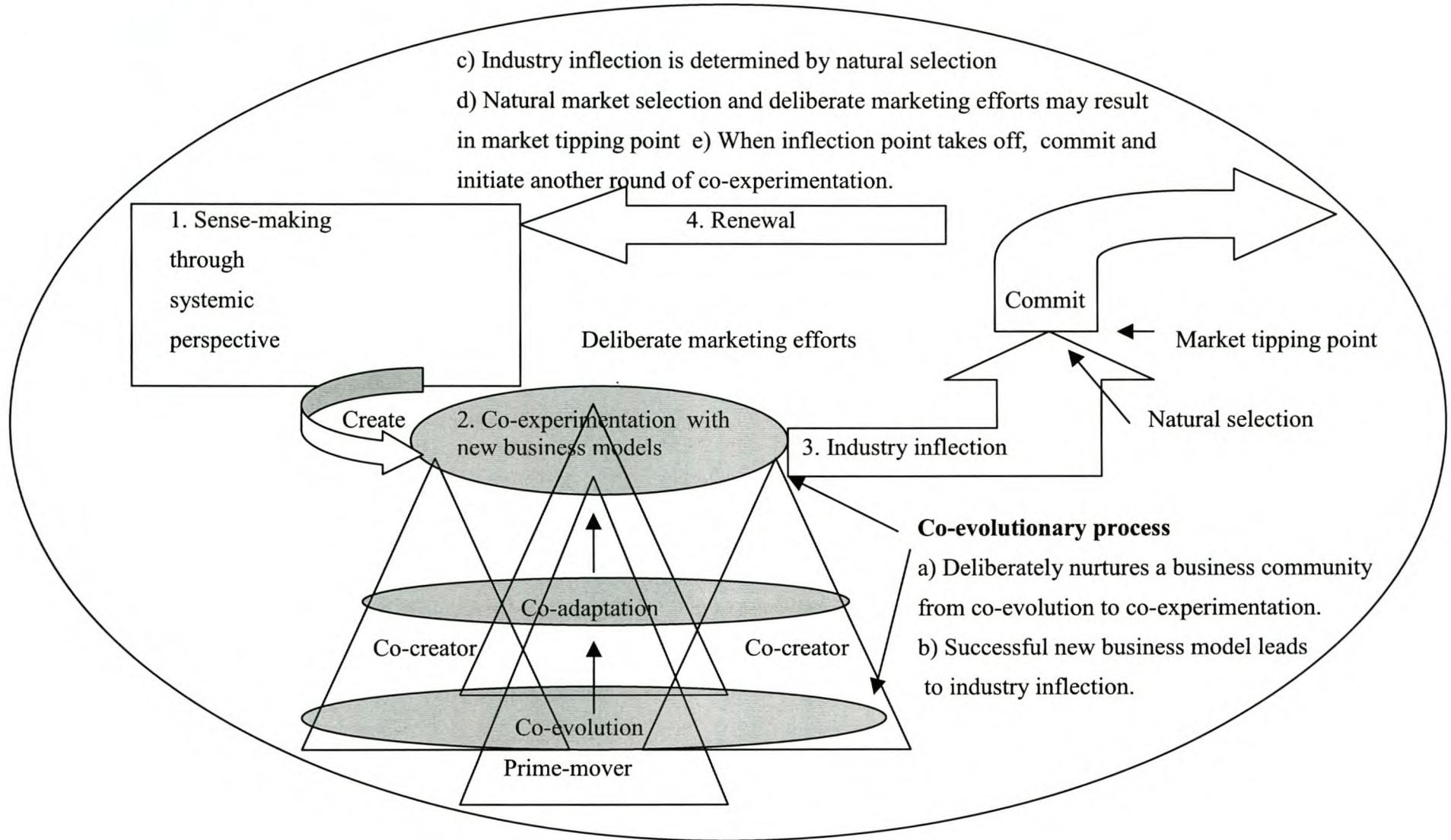


Source: Bartlett and Ghoshal (2000) and Leibold (2002).

In conclusion, figure 5.9 summarises the two-phased complexity approach for enabling industry inflection. The first phase is a co-evolutionary process in which a proactive large corporation deliberately nurtures a robust business community with the purpose of triggering a revolution. The second phase is a revolutionary process which follows four natural stages: (a) the sense-making stage, (b) co-experimentation stage, (c) inflection point stage, and (d) renewal stage.

The two phases should not be understood in such a way as that the co-evolutionary process ceases when a revolutionary process starts. Rather, the revolution is randomly born from seemingly chaotic interactions among agents in the course of co-evolution, and the co-evolutionary process will still be functioning up to the point where the revolutionary process reaches an inflection point, the point when all changes suddenly tip at once.

Figure 5. 9 The two-phased complexity approach for enabling industry inflection



5.7 Summary

In view of the study objective, this chapter attempted to understand and describe the complexity approach for enabling industry inflection in two phases. The first phase is a co-evolutionary process which provides insights into the socio-cultural business system for nurturing a robust business community with the purpose of triggering a revolution. Systemic strategic management was described as appropriate strategy theory for guiding effective co-evolution. Four key principles were described as essential instruments for adopting systemic strategic management to guide effective co-evolution.

The second phase of the strategic intent for enabling industry inflection is the revolutionary process which follows four natural stages: (a) sense-making, (b) co-experimentation, (c) inflection point and (4) renewal. The sense-making stage was described as the stage where co-creators engage in an ongoing dialogue in search of new ideas for value innovations. Four key strategic management tools for sense-making are the socio-cultural business system, co-adaptation as a means of sense-making, and systematic and systemic frameworks. The four dimensional systemic framework integrates the three other frameworks. It was established that when new ideas have been created through one dimension of the systemic framework, it leads to creation of a single internally consistent business model.

Co-experimentation begins when co-creators independently or in consortia develop a systemic innovation. Systemic innovation was referred to as innovation of prime-movership by creating a new industry standard or developing a business concept that transcends beyond a single company's realm of activities which makes it possible for a sufficient number of co-creators to participate in a business network configuration to deliver a complete customer solution.

The relevance of a population of strategies and portfolio of actions to a proactive strategy for enabling industry inflection, were critically analysed. It was argued that, since a proactive inflection point requires radical innovation that affects the context for many, only long jumps can have effects.

Four factors that determine success of a new business model are (a) the acceptance of value propositions by large customer bases, (b) the feasibility and sustainability of the proposed new business model, (c) relative permanence of a business system infrastructure and (d) accessibility of technology and co-creators' competence. The success of a new business model may lead to industry inflection, but much will be unclear about the definite outcomes.

The analysis on the strategic inflection point and natural selection indicated that the final success of an inflection point relies on market dynamics. The application of three rules of the tipping point to the marketing diffusion model was critically reviewed. The review revealed that much about market dynamics is less known, and therefore the application of the complexity theory to strategic management for enabling industry inflection and corporate innovation does not fully guarantee success.

Finally, the last stage in the revolutionary process was described as the committing and renewal stage. Provided that market dynamics respond favourably to one or more from varying offerings, two managerial actions would first be to recognize the signals of inflection points early and to commit resources to scale up the trajectory of the rising inflection point, and secondly to initiate another co-experimentation for the next inflection curve.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The objective of the study was to review the application of the complexity theory to strategic management for adapting to, or enabling industry inflection and corporate innovation. The concept of a strategic inflection point was clarified, and origins of inflection points, contexts and applications were analysed. The appropriateness and application of extant strategic management theories in dealing with industry inflection were analysed. Subsequently, based on the analysis, this study described the two-phased complexity approach for enabling industry inflection.

Chapter six presents the summary, conclusions and recommendations. The first section provides a concise summary of the thesis. Secondly, based on analysis done in this study, conclusions of key points are provided. Finally, recommendations for both strategic management application and for advancement of theory development are provided.

6.2 Summary

Summaries of the main contents of each chapter are provided in cohesive ways.

6.2.1 Overview

Chapter one provided the overview of the study and highlighted the challenges facing business organisations today. It was indicated that inflection points could be foreseen in some instances and they could emerge initially too small to be identified in many other situations in today's highly unpredictable environment. The case of *Encyclopaedia Britannica* was used to illustrate and support the argument that many industries could be living in peril of strategic inflection points.

6.2.1.1 Statement of the problem and the objective of the study

The problem statement of the study was based on the exploratory research undertaken regarding the topic. It was indicated that strategic inflection point seems to threaten a successfully established firm more seriously, because suddenly its key success factors of the past can become its liabilities. This challenge imposes upon strategic management to take a proactive approach to strategic inflection points.

The thesis hypothesised that the complexity theory could be appropriate to deal with strategic inflection points. Based on this hypothesis, the objective of the study was to investigate the relevance and application of the complexity theory to strategic management for adapting to, or enabling industry inflection and corporate innovation.

6.2.2 Industry transition and points of inflection: contexts and applications

Strategic inflection point was defined as a discontinuous change in industry structure where businesses subtly but discontinuously shift from the old business models to the new business models. Origins of discontinuity were identified. Discontinuity arises from many sources, including technological changes, changing customer expectations, excess capacity and high R&D costs, deregulation and privatization as well as environmental concerns. Their impacts on industry structure were analysed by utilising the Porterian five forces model.

It was demonstrated that the impacts of these forces cause intense competition, changes in customers' bargaining power and supplier's positions, blurring entry barriers, and increasing substitution and complementary offerings. Strategic inflection point occurs when one of the five forces changes substantially.

The forces driving strategic inflection in the new economy were analyzed by comparing them to traditional market forces. The traditional factors are economies of scale, relative economic value of an innovation, environmental sensitivity of an innovation and global customer characteristics. It was suggested that these factors could still be valid in some contexts, but in others they may be less relevant. In the new economy, abundance, the law of increasing

return, the network economies of scale and ubiquity of open standards could drive inflection point radically, fast and without warning.

In view of relative industry contexts versus the issue of the inevitability inflection points, two camps of thoughts were analysed. The first camp argues that strategic inflection points are a rare phenomenon, and they tend to be neutralised over time, otherwise change in all industries occurs, on average, slowly.

The opposing front in the argument contends that the convergence of computer and telecommunication devices will radically affect all industries. According to this view point, the Internet is going to be the biggest strategic inflection point for many industries, though more drastically for industries which could be electronically replaced. It was, however, clarified that inflection point is more than just a technology change. Much of a large scale change depends on people's behaviour and their social interaction.

The application of inflection point was described by three principles: i) little changes can have big effects as a result of the ongoing interactions between individuals, businesses, economies and societies in complex adaptive systems, ii) because of the high connectivity, change happens not gradually but suddenly affecting all at once, and leading to iii) discontinuity of the existing industry structure and old ways of doing business.

6.2.3 The relevance of traditional strategic management approaches in dealing with industry inflection

The relevance of traditional strategic management approaches in dealing with industry inflection was critically analysed. A brief history of the evolution of traditional strategy models was presented. It was described that much of the analytical strategy models prior to the 1970s did not have much influence because of the economic turbulence in the 1970s. The two influential models were the Porternian five forces and RBV models. The five forces model tried to relate the firm to its environment, with particular emphasis on the analysis of industry structure and competition, consequently referred to as *outward-inward* analysis. In contrast, the RBV emphasised firm's specific resources and capabilities as source of competitive advantage, and was referred to as *inward-outward* analysis.

While both approaches differ in the domain of analysis, they both tend to focus on analysing static content for sources of competitive advantage. It was deduced that these approaches are useful in contexts where industry structures are less in flux, but not useful on their own in dealing with industry inflection. Four difficulties were identified to support this conclusion.

The appropriateness of learning approaches, in comparison to traditional strategic management approaches, in dealing with discontinuous changes were reviewed. In a continuously changing and predictable environment, the learning approaches can be superior to the analytical approaches. However, when the environment is said to be discontinuously changing, both the learning and traditional approaches have to give way to the complexity management theory.

6.2.4 Complexity management theory as a basis for enabling industry inflection and corporate innovation

In view of the study objective, Chapter four analysed the relevance and application of the complexity theory to strategic management for enabling industry inflection and corporate innovation.

It was established that a proactive strategy to enable industry inflection depends on having high organisational fitness. *Organisational fitness* was defined as dynamic organisational capabilities, through which an organisation becomes dynamically fit to transform continually, from the inside, and to co-evolve effectively, from the outside, so as to adapt proactively to the constantly shifting landscape. The internal dimension of organisational fitness is built by dynamic organisation capabilities. The components of dynamic capabilities were analysed, and it was explained that while resources are said to be less of a concern to a large industrial corporation, its institutionalised system governs the knowledge creation process. It was stated that the rationale for designing complex adaptive systems in a business organisation is to make the institutionalised system conducive for knowledge creation and innovation.

Designing complex adaptive systems in an organisation can be achieved by four basic techniques: (a) creating internal variety, (b) disturbing the system, (c) establishing a coherence mechanism and, (d) energising self-organisation members. It was demonstrated

that the concept of the *communities of practice* can be applied to create self-organisation systems. The creative cannibalisation of existing systems needs to run into two symbiotic processes: the rationalisation of the existing business model, on the one hand, and creation of a new business model, on the other. Enabling industry inflection requires creation of new business models.

The external dimension of organisational fitness refers to an organisation's ability to co-evolve effectively with external key players. It was established that the co-evolutionary process enables an organisation to understand its competitive and collaborative realities in order to nurture a robust business community deliberately. It was conceptualised that healthy co-evolution leads to co-adaptation, where organisations collaborate in order to adapt effectively, yet still remain free to adapt proactively in each one's own context.

Co-adaptors, with a prime mover initiating a move, create a context referred to as a *shadow organisation* where co-adapted companies exchange ideas for innovation of business models with each player pursuing ideas for value innovation competitively. It was suggested that the participation in the shadow organisation broadens each organisation's space possibilities. The possible actions for value innovation are constrained or enabled by natural selection, legal and cultural norms.

6.2.5 Enabling industry inflection by co-shaping new business models

The final chapter described a two-phased complexity approach for enabling industry inflection. The first phase is the co-evolutionary process which provides insights into the natural process of creating healthy co-adaptation. Systemic strategic management was described and four key principles were outlined for guiding effective co-evolution of self-organisation systems. It was emphasised that in the case of systemic strategic management the role of a large successful industrial organization changes from being adaptive to being a co-shaping organiser of new business models. The second phase was defined as a revolutionary process which consists of four stages: (a) sense-making, (b) co-experimentation, (c) industry inflection, and (d) committing and renewal.

The sense-making stage was described as the beginning stage where co-creators, independently or collaboratively engage in exploratory ways to search for ideas for systemic innovation. Four important strategic management tools for sense-making were identified: (a) the socio-cultural business system, (b) co-adaptation as a means for sense-making, (c) a systematic framework, and (d) a four dimensional systemic framework. A systemic framework incorporates all three frameworks and it was stated that an identification of new ideas in one dimension could subsequently lead to creation of one consistent new business model.

Co-experimentation was defined as the process of testing new value propositions and co-shaping new business models for the purpose of enabling industry inflection, in which sufficient actors play proactive roles, but where somebody usually is still the focal actor and prime mover. It was established that four factors determine success of a new business model: (a) the acceptance of a value proposition by a large customer base, (b) the feasibility and sustainability of the proposed new business model, (c) the durability of a business system infrastructure, and (d) accessibility of technology and the co-creator's competence.

It was noted that the success of new business model might lead to industry inflection, but much of the success of the inflection point depends on natural selection. The implication of the concept of natural selection to strategic management for enabling industry inflection was related by four fundamental principles: (a) accumulating wisdom about the socio-cultural business system and selecting the most relevant space possibilities for customer value propositions, (b) ensuring that co-experimentation has balanced variations of value propositions covering diverse but promising segments of the market from which the market can ultimately select the fittest offerings, and (c) nurturing a robust business community from co-evolution to co-experimentation. The fourth implication of natural selection (d) means that, despite having all three, the final success depends on the market selection from the variations.

The last stage in the revolutionary process was described as the renewal stage. It was suggested that, when co-creators recognise the patterns of a proactive inflection point, managers have to respond in two ways: one aiming at scaling up the trajectory of the inflection curve, and the other aiming at initiating new co-experimentation for the next

inflection curve. Finally, the two-phased complexity approach for enabling industry inflection was depicted in a diagram.

6.3 Conclusions

The objective of the study was to investigate the relevance and application of the complexity theory to strategic management for adapting to, or enabling industry inflection and corporate innovation. In view of this objective, extant strategic management literature, including the concepts of strategic inflection point, traditional approaches, the learning approaches and the complexity theory-based frameworks and tools were critically examined and reviewed. Based on this analysis, the following conclusions are made:

(a) The analysis of origins and impacts of change upon industry transition revealed that whilst all strategic inflection points are changes, not all changes are strategic inflection points. Three characteristics are decisive for identifying patterns of industry inflection points: (i) they must be critical to an industry, (ii) they must be irreversible, and (iii) they must have a clear trajectory. A closer scrutiny of the topic reveals that these characteristics are not sufficient on their own, because in today's highly unpredictable business environment, many inflection points can emerge initially too small to be recognised, and then suddenly they can strike hard without warning. This conclusion rationalises the need for adopting the complexity theory to strategic management in order to adapt to, or enabling industry inflection.

(b) In view of the above conclusion, two key points can be highlighted about the appropriateness of the complexity theory in dealing with, and enabling industry inflection. First, it provides principles for understanding how change originates from ongoing interactions and how it can have big effects, and second, it allows a deliberate strategic process for creating context where change can be consciously enabled. Context is created by designing complex adaptive systems inside the organisation, and through the co-evolutionary process outside the organisation. Conceptually viewed, participation in the shadow organisation broadens an organisation's context where inflection point might have originated and where the patterns of inflection points could be immediately recognised.

(c) Methodologically described, industry inflection can be enabled by following the two-phased complexity approach. The first phase focuses on a co-evolutionary process through which co-adaptation with key co-creators will evolve as well as enabling an organisation to nurture deliberately a robust customer community that can carry forward the proposed new business model(s). The second phase, or the revolutionary process, is the deliberate strategic process which follows four stages for co-shaping a new business model for enabling industry inflection.

(d) The critical analysis on two market models, the *diffusion model* and the *law of the few* revealed that the characteristics of *connectors*, *mavens* and *salesmen* in the *law of the few* and *innovators* and *early adopters* in the diffusion model are similar. This finding implies that *connectors*, *mavens* and *salesmen* are found only in the boundaries of *innovators* and *early adopters*, therefore, the *few* do not exist in the mass of customers, and they cannot be used to influence the *early majority*, *late majority* and *laggards*. Much of the market dynamics, i.e. how market evolves and responds to new offerings, are less known.

In the final analysis, this study concludes that application of the complexity theory to strategic management does not guarantee any definite success of proactive strategies for enabling industry inflection. An important conclusion to be made is that strategic inflection cannot be the result of a purely deliberate strategic process, nor can it be the result of perfectly unexplainable market factors. This is the challenge for further research.

6.4 Recommendations

Based on the results of the study, the following recommendations have been made for the application of the complexity theory to organisational practices and regarding further research for the advancement of theory development.

6.4.1 Recommendations for the application of complexity theory in organisational practices

(a) Organisations should seek to co-evolve at the edge of chaos, to embrace disorder and to use instability positively if they want to embark upon a proactive strategy to enable industry inflection. The complexity approach can help organisations to guide their creative processes. The co-evolutionary process provides a framework for understanding the dynamics of one's complex environment, creating context for creativity, collaboration and co-adaptation at the socio-cultural business system level. The revolutionary process enables leaders to guide the co-shaping process of the new business model for enabling industry inflection.

(b) Traditionally, organisations pursue knowledge outside their domain from joint R&D facilities, joint ventures and alliances. The concept of the shadow organisation adds a new lens, i.e. organisations need to look at cross-organizational formal or informal groups such as CEO clubs, professional associations for engineers, medical doctors, and labour unions. An organisation should encourage its members to take active roles in such organisations and it should also engage other members from other organisations in exploratory dialogue to explore space possibilities for the socio-cultural business system's combined capabilities.

(c) An important emphasis is put on co-experimentation for enabling industry inflection. There are three implications for strategic management. First, a proactive strategic inflection point begins with defining the customer value proposition that greatly enhances customer value that appeals to a large customer base, then architecting a new business model for delivering it and finally mobilising resources for business network configuration. No single company can be of world-class standard in every function in the value chain when delivering such value. So, implementing a new business model demands the participation of appropriate actors in the experimentation.

Secondly, when the superiority of a large vertically integrated corporation is taken for granted, it is assumed that the source of competitive advantage would be internal to the firm. In the knowledge economy, by contrast, firms can profit enormously from resources that do not belong to them. In this respect, a firm needs to engage in the creative processes of others

and let others take part in its own. Thirdly, because of the high cost and the high risk, a large established corporation focuses on a single long jump experimentation with a number of medium and adaptive ones. Horizontal co-experimentation will enable a firm to participate in more than one cross-organizational experiment, with similar costs that would have been spent on its own single long jump experiment.

(d) The two-phased complexity approach points out four fundamental recommendations for co-creators namely that they must -

(i) accumulate the knowledge about the socio-cultural business system dynamics, identify the best gaps, and select the best space possibilities for creating value propositions that can deliver greater customer value and that can appeal to large customer bases;

(ii) ensure that the co-experimentation process has balanced variations of the value propositions covering diverse but promising segments from which the market can ultimately select the fittest offerings;

(iii) recognise the importance of having a critical mass of people, including customers, suppliers, co-producers, service providers, distributors and other key players and stakeholders who can carry the new business model forward, and

(iv) realise that, despite all these, the final success depends on the market selection of the variations that are best fitted to the customers.

From the last implication it is clear that conscious strategic initiatives to enable industry inflection are not easy, and they entail a large challenge for co-creators to search for creative and innovative ways to understand the market dynamics and means to influence them.

6.4.2 Recommendations for further research

(a) The most challenging issue for further research regarding the development of the strategic management theory would be to address the big conceptual gap that exists between the complexity theory concept of non-linearity and unpredictability, on the one hand, and the

assumption of analysis and predictability, on the other. The complexity theory states that the variables of any system are non-linear by nature and they cannot be explained in terms of a cause-and-effect relationship.

The implication of this for strategic management is that any result of proactive strategies depends on unexplained non-causal factors of market dynamics. This assumption invalidates the relevance of analysis entirely. It would be worthwhile if further research could exhaustively examine the relevance of scientific analysis in order to incorporate appropriate analytical models in the complexity management theory. This is necessary because it appears that, despite the non-linearity assumption of the complexity theory, the practice of strategic management will be less inclined to abandon analytical strategic models.

(b) The complexity theory defines organisations as dissipative structures which can always operate far from equilibrium, maintained by continual deliberate disruption of the equilibrium system and importing energies into self-organisation systems. It appears that strategic management can hardly support an imperative for organisations to operate constantly at the edge of chaos. An important contribution to the application of the complexity theory to strategic management would be the research on the viability of the constant state of the edge of chaos.

(c) The concept of creativity at socio-cultural business system level seems a fairly new topic, and it requires the attention of strategic management research. Traditionally, creativity at industry level takes place when joint ventures recombine skills and processes inherited from their parent companies. In some corporate mergers, a new entity can emerge that blends elements from several formerly independent boundaries.

From a complexity theory point of view, by contrast, co-adaptation is seen as partnership that naturally evolves; it is not planned. The complexity theory seems to indicate that the space for creativity at the socio-cultural business system level exists in the state between collaborative and competitive interactions that take place among a sufficient number of co-adapted players, where some active members actively engage in exploratory dialogue in the shadow organisation to explore space possibilities.

This is nothing more than a common sense conjecture and it is based purely on the hope that a certain driving self-organisation (prime-mover) would take initiative to create a context, which in this study was referred to as a *shadow organization*. It would be a major contribution to strategic management to describe the notions of *creativity*, *shadow organization*, *the edge of chaos* and *coherence mechanism* at socio-cultural business level more appropriately.

APPENDIX 1

Computing's new shape: As two industries collide, a new kind of computer may emerge

“A computer on every desk and in every home.” This was Microsoft’s mission statement for many years, and it once sounded visionary and daring. But today it seems lacking in ambition. What about a computer in every pocket? Sure enough, Microsoft has recently amended its statement: its goal is now to “ ... empower people through great software, anytime, any place on any device ... ” Being chained to your desktop is out; mobility is in. The titan of the computer industry has set its sight on an entirely new market.

It is not alone. This week (23-29 November 2002 – SRH) Dell, the world’s largest PC manufacturer, launched its first handheld computers, which run Microsoft’s Pocket PC software. HP and Palm, which also make handheld computers, have just unveiled new models, with far more emphasis on wireless networking and telephony. And in an even more portentous move, the SPV, the first device to run Microsoft’s special version of Windows for mobile phones, has just been launched in Europe by Orange, a mobile operator.

As the computer industry tries to cram PCs into pocket-sized devices, the mobile-phone industry has arrived at the same point – but from the opposite direction. The latest phone announced by Nokia, the world’s largest manufacturer of handsets, includes one model with a folding keyboard aimed at business users, as well as a colourful phone that plays computer games. Digital cameras, already a popular feature of mobile phones in Japan, are starting to appear elsewhere. Colour screens are spreading fast. The latest phones have as much computing power as a desktop computer did ten years ago.

In short, the once separate worlds of computing and mobile telephony are now colliding, and the giants of each industry – Microsoft and Nokia, respectively – are squaring up for a fight for pre-eminence. Both camps are betting that some kind of pocket communicator, or “smart-phone,” will be the next big thing after the PC, which has dominated the technology industry ever since it overthrew the mainframe 20 years ago. Admittedly, the two camps have different ideas about how such devices should be built. The computer industry believes in squeezing a general purpose computer into a small casing; the mobile phone industry takes a more gentle, gradualist approach of adding new features as

consumers get used to existing ones. But are the two sides right about the future of computing in the first place?

The answer is probably yes, even though it is too early to be absolutely sure. As they search for new growth, both industries are certainly acting on that assumption. In the case of computers, sales of PCs have levelled off and corporate spending has stalled, so bets are being placed on mobile personal devices. For mobile phones, revenues from voice calls are now flat, so new data services such as photo-messaging, gaming and location-based information are seen to as the most promising source of growth.

*Inevitably, there have been mis-steps already; the most obvious has been the fiasco of European operators' attempts to launch "third-generation" (3G) mobile networks. The operators' willingness to pay vast amounts of money for licenses to operate 3G networks shows how fervently they believed that the convergence of computers and phones was **the next big thing**. Even so, they paid too much: over \$ 100 billion in all. Many operators have since decided to bow out of the 3G race, and the particular 3G technology that is being adopted in Europe happens not to work properly yet. Similarly, handheld computers, also known as personal digital assistants (PDAS), appear to have limited appeal; annual sales are flat at around 10 million units.*

Yet the trend remains clear. Mainframes ruled the computer industry until the rise of the PC; another 20 years on, the PC's reign now seems to be coming to an end. Previous generations of computers live on – mainframe are widespread, and PCs are certainly not going away – but each successive generation of computing devices is smaller, more personal and more numerous than its predecessor. Mainframes filled whole rooms, and belonged to single companies. PCs now sit on desks and are used by individuals or households. Phones are truly personal pocket-sized devices that are carried everywhere. More than a billion people around the world now have one.

The switch to mobile devices is therefore a logical long-term step. Moreover, the earliest incarnations of a technology, with all the usual chaos and confusion, are not always as accurate guide to its subsequent development. The short-term impact of a new technology is usually overstated; the long-term benefit is often underestimated. Consider the earliest PCs, 20 years ago. They were hardly consumer products, yet they evolved into something with a far broader appeal.

Today's smartphones and handheld computers are in a similar state of development. Their manufacturers do not claim to have all the answers, and are hedging their bets. The chances are that a variety of devices will emerge, each appealing to a different type of user. Microsoft is pursuing both smartphones and slate-like handheld computers. Nokia has split its handset division into nine "mini-Nokias," each concentrating on a different market segment, while sharing research, development and manufacturing facilities. Entirely new devices are appearing from companies such as Danger, a Silicon Valley firm with a pocket communicator that is neither a jazzed-up phone nor a scaled-down PC, but a genuine hybrid of the two.

Looking for the next Microsoft

If this is the next stage in the evolution of computing, one obvious question arises: which firm will dominate it, as IBM dominated the mainframe age, and Microsoft the PC era? The answer is that there is unlikely to be a single winner this time around. IBM ruled in mainframes because it owned the dominant hardware and software standards. In the PC era, hardware became an open standard (in the form of the IBM-compatible PC), and Microsoft held sway by virtue of its ownership of Windows, the dominant software standard. But the direction of both computing and telecommunications, on the Internet and in mobile telecoms, is towards open standards: communication devices are less useful if they cannot all talk to each other. Makers of pocket communicators, smartphones and whatever else merges will therefore have to compete on design and branding, logistics and their ability to innovate around such open standards.

At the moment, these considerations seem to favour Nokia more than any other company. But Nokia faces a direct challenge as Microsoft leads the computer industry on its turf; its continued dominance of the mobile-phone industry is by no means assured, since it is not based on the ownership of proprietary standards. Microsoft, for its part, will try to exploit its dominance of the PC industry to help force its way into the new market. But it may fail. Either way, there will be no need this time round for any repeat of long, drawn-out antitrust cases against first IBM and then Microsoft. Instead, the collision of the computing and mobile-phone industries seems likely to lead to a surge of innovation, as the two camps fight it out to create a truly personal computing and communications device, with far wider appeal than the misleadingly named personal computer. And as these titans slug it out, it will be consumers who emerge as the winners.

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